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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment.

The Current Issue.

In view of the revived interest in the manufacture of power alcohol a paper by Mr. Pollock on the Cassava plant is especially useful. Mr. Pollock also discusses fodder conservation very fully. The production of new varieties of wheat suitable to Queensland conditions is described by Mr. Quodling. The suitability of the Central Coast for sheep raising is the subject of a short report by Mr. Brown. Mr. Shelton contributes a paper on pig clubs for scholars in addition to other valuable notes. The display of Queensland produce at the British Empire Exhibition is described by Mr. Mobsby in a brief interview. Turkey raising is Mr. Rumball's subject this month. An excellent paper on banana packing and grading by the late Mr. W. Rowlands is a special feature of this issue. Among reprinted matter is a notable article by Mr. E. G. Theodore on white settlement in the Australian tropics. The April Journal is excellently illustrated and, generally, readers will find it very acceptable.

Power Alcohol.

The possibility of establishing a power alcohol industry in Queensland is claiming the close attention of the Government. The matter though really one of Federal concern is of particular interest to Queensland, as it is believed that this State possesses greater advantage as a field for raw material than any other in the

Commonwealth. Discussing the matter recently with representatives of the Press the Minister for Agriculture and Stock (Hon. W. Forgan Smith) pointed out that Australia at the present time is practically dependent on outside sources for supplies of lighter oils which are suitable for use in internal combustion engines, and it is significant that the Commonwealth requirements in oils of such character show a material increase from year to year. It would be a splendid thing for Queensland if a means could be devised which would permit of this State contributing a substantial percentage of the total complement of lighter oils consumed annually.

The question of the production of power alcohol has gained in prominence in many countries since the termination of the war, and the subject was discussed by Mr. Theodore when in Great Britain last year with representatives of the International Sugar and Alcohol Company, Limited. This company is seriously considering the matter of co-operating with the Plane Creek Central Mill with the object of erecting a power alcohol factory at Sarina, and to assist in the project the Government is prepared to advance by way of a loan to the Plane Creek Central Mill the sum of £25,000.

Experiments to determine the efficiency of power alcohol as a substitute for motor spirit have been made, and results show that power alcohol is satisfactory for practically all purposes for which motor spirits are now being used. The companies concerned in the building of the factory at Sarina anticipate that they could have the premises in readiness to commence operations by March of next year. It is proposed to treat molasses from the mill for power alcohol, and as a further source of raw material it was proposed to plant 300 acres with Cassava. Cassava, Mr. Smith pointed out, is not widely grown in Queensland or in any of the States of the Commonwealth at the present time. The Dutch in Java hold pride of place as cultivators of the plant and it has been decided to send Mr. G. B. Brooks, Instructor in Agriculture of this Department, to Java to make a full inquiry into Cassava cultivation.

Cassava Cultivation.

About twenty years ago Cassava was grown at the Mackay Experiment Station and yielded from 12 to 15 tons per acre. Forms of plant life which have a comparatively high starch content are most suitable for alcohol extraction, and experiments are about to be made by this department with the object of determining what other kinds of plant life may be suitable as a source of raw material in power alcohol production. It is estimated that Cassava will crop from 8 to 12 tons per acre, and that 1 ton of it will produce 39 gallons of alcohol. On the other hand, 1 ton of sugar-cane will produce 23 gallons of power alcohol, but the former may be grown more cheaply.

Commonwealth Petrol Consumption.

The estimated consumption in the Commonwealth of petrol for power alcohol purposes is 42,000,000 gallons yearly, and that 65,000,000 gallons will be required for next year. These figures indicate the very rapid rate at which power alcohol requirements are increasing. The entire molasses yield from the 1925-26 crop will produce not more than 7,200,000 gallons of 95 per cent. alcohol, or about 17 per cent. of the total present requirements. These figures illustrate that there is a wide field offering for the development of the manufacture of industrial or power alcohol.

THE HON. W. N. GILLIES, STATE PREMIER.

A pioneer son of pioneer parents, and in every sense a big Australian, is the first farmer Premier of Queensland, Mr. William Neal Gillies.

Coming from Scotland his parents settled on the land in the Hunter River district of New South Wales, and it was there that Mr. Gillies was born. When a lad of thirteen his parents trekked northward to the Richmond River, and soon after the resourceful young Australian, who was destined to achieve distinction in

Hon. W. N. Gillies,
who has succeeded the Hon. E. G. Theodore as Premier of Queensland.

the service of the people, started farming for himself. At sixteen he was managing a local creamery and, later, filling the role of postmaster. Sticking to the land he engaged in sugar-growing. It was the day of indentured coloured labour from the South Seas, and from his father, who was the originator of the Anti-Alien League of New South Wales, which had for its aim the abolition of kanaka labour in the

sugar industry, young Gillies absorbed his democratic ideas and faith in the national ideal of White Australia. Following a strong paternal lead Mr. Gillies became, later, president of the New South Wales Sugar Defence League, an outgrowth of the earlier successful organisation founded by his father, a position which he retained until 1911.

The present generation has, perhaps, very little appreciation of the strenuous efforts of the farmers of that time to make and maintain sugar-growing as a white man's industry. The fine national spirit, strength of character and foresight of these hard fighting farmers on the Northern Rivers were big factors in forcing a general acceptance of the Australian Monroe Doctrine, which, to-day, is the nation's slogan.

Attracted to the new and fertile lands of the North, Mr. Gillies came to Queensland in 1911 and settled on virgin scrub country on the Atherton Tableland, a region rivalling in richness the Big Scrub of his native State. As a leader among the new settlers and workers his worth was quickly recognised and, within a year of his driving in his tent pegs on his new selection, they sent him down to Brisbane to represent them in the Parliament of the State. As representative of Eacham he has sat ever since, each following election securing his tenure by increasing majorities. In 1916 the Public Works Commission was appointed with Mr. Gillies as its first chairman. The Brisbane-Kyogle Railway proposal, the building of which Mr. Gillies advocated on both sides of the border—an effective advocacy to which is largely due the present practical stage of the project—was the subject of the Commission's first inquiry. In 1918 Mr. Gillies entered the State Cabinet as Assistant Minister for Justice, and in the following year attained full Ministerial rank as holder of that portfolio. When Mr. William Lennon was appointed Lieutenant-Governor, Mr. Gillies succeeded him as Minister for Agriculture and Stock. In 1921 he was chosen by his colleagues to fill the chair of Deputy Premier when Mr. E. G. Theodore assumed the Premiership in succession to the late Mr. T. J. Ryan, K.C.

Agriculture is still Australia's basic industry and agricultural prosperity is of vital importance to the country and it was, seemingly, with these ideas in view that Mr. Gillies, both as Deputy Premier and Minister for Agriculture and Stock, performed such notable service to the industry in State and Federal Councils. The country cannot thrive without a prosperous rural population—a prosperity based on better business, better farming, and better living. Increase of population in rural areas; need for improvement in the business organisation of agriculture; definite improvement in the marketing of farm products; application of economical methods of marketing enabling farmers to sell and buy on more equitable terms; promotion of progress in production and prevention of waste due to animal and plant diseases by education, research, and legislation; provision of advisory officers both in new and established rural industries; capital provision for settlers' current needs; general stabilisation of farming; encouragement of arable farming; better methods of cultivation; improvement of live stock breeds—all these ideas were crystallised in measures introduced and piloted through Parliament by Mr. Gillies in the course of a record term as Minister for Agriculture and Stock, a period of legislative and administrative activity and achievement that in Australia, it may be fairly said, has no parallel.

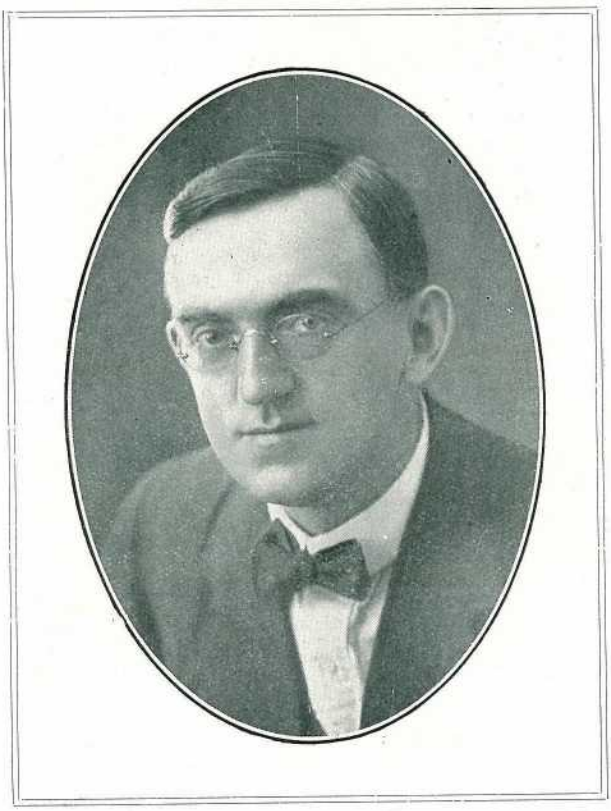
On his entry into the Agriculture Office Mr. Gillies found twenty-two Acts of Parliament to administer. In the course of his Ministerial term he had seven of these amended or consolidated and added fourteen new agricultural and related measures. The whole period was marked by phenomenal departmental activity.

The establishment of the cotton industry, stabilisation of the sugar and other farming industries, systematic agricultural organisation, formation of wheat and other pools, the placing of the farmers' co-operative movement on a sound basis, the protection of banana growing and its preservation as a white man's industry, the Sugar Agreement with the Commonwealth—all required special legislation or regulation, and in these enactments the general benefit of agriculture, and therefore of the nation, was the basic idea. The administrative acts of Mr. Gillies during

this period also covered a very wide field. Among other practical measures the system of advances to settlers was liberalised, schemes for grain and fodder conservation were initiated, native birds and animals were more closely protected, the scientific services of the department were extended, and publicity in respect to rural enterprises, conditions and problems by motion pictures and otherwise was greatly improved. Behind it all Mr. Gillies was the driving force, a force expressive of uncommon ability, courage, pertinacity, and vast energy, a force encased in a sound practical knowledge of agriculture and the economic and other problems, in all their complexity and perplexity, that confront the industry.

HON. W. FORGAN SMITH, SECRETARY FOR AGRICULTURE AND STOCK.

Mr. Forgan Smith was born at Mynlefield House, Invergowrie, Perthshire, Scotland, in 1887. He is the youngest member of the Queensland Cabinet. He was educated at Dunoon Grammar School, Argyleshire. In 1915 Mr. Smith entered Parliament as member for Mackay, and has held that seat ever since. In 1918 he was appointed Chairman of Committees, and in 1920 he entered the Cabinet as



Hon. W. Forgan Smith,

who has succeeded the Hon. W. N. Gillies as Secretary for Agriculture and Stock.

Minister for Public Works. Mr. Smith, who has often acted as Minister for Agriculture and Stock, brings to his new office an intimate knowledge of the agricultural industry and its economic problems. The sugar industry particularly has been to him a subject of close study, and the present satisfactory position of canegrowing is due in a large measure to his strong advocacy. In the creation of Cane Prices Boards he took a leading part, and as representative of Queensland he, with foresight and forcefulness, helped materially in the negotiations that culminated in the Commonwealth Sugar Agreement.

Bureau of Sugar Experiment Stations.

CANE PEST COMBAT AND CONTROL.

The Entomologist at Meringa, Mr. Edmund Jarvis, has submitted the following report to the Director of Sugar Experiment Stations, embracing the period December to January, 1924-25:—

Fumigating Cane Grubs.

As pointed out in my last monthly report, the time has now arrived for treatment of grub-infested areas with carbon bisulphide or paradichlor., the relative merits of which have already been fully discussed in previous reports.

Apparently very few growers are inclined to take any action this season with regard to control measures, being, in fact, perfectly willing to rely on the activities of various natural enemies to keep this cane pest in subjection and ensure them profitable returns. Certainly, the vigorous and healthy green appearance of most of the cane at present would seem to justify such optimism, but we must remember that this luxuriant growth is due very largely to the occurrence of generous rains experienced last month.

One does not usually notice much sign of the presence of our insidious cane-grub until the end of February or beginning of March, at which time, unfortunately, it is too late to combat its ravages.

Arrangements are being made, however, to help growers who may be interested enough in this matter to wish to fumigate small areas of caneland likely to be grub-infested this season; the secretary of the Cairns Canegrowers' Association having been kind enough to assist us again in this useful branch of experiment work.

We are hoping to be able to treat plots of from 1 to 2 acres with paradichlor., and also to test, in field practise, the influence of calcium cyanide on grubs of the grey-back cockchafer (*Lepidoderma albohirtum* Waterh.).

This latter fumigant will consist of the flaked form, and is to be applied by means of a hand injector. Upon coming into contact with moisture in the soil, fumes of hydrocyanic acid gas are at once liberated, such fumigation being maintained from the flakes injected for about twenty-four hours, allowing time for this gas to penetrate sufficiently to kill all grubs located within a radius of about 9 inches from points of injection.

The cost of such application (allowing for a maximum dosage of one scruple of the poison to each injection) works out at about £3 7s. per acre for material and application.

Growers wishing to use carbon bisulphide should lose no time in procuring supplies of this insecticide, so as to be in readiness to seize the opportune moment or crucial time for injecting same, when the soil happens to be in just the right condition for successful fumigation. During the past two weeks (26th December to 9th January) the ground has been in capital state for treatment with either paradichlor. or carbon bisulphide; and although at present (12th January) wet weather has again supervened, we may still be fortunate enough to get another week or two suitable for this work towards the end of January or beginning of February.

Natural Enemies of Cane-grubs.

Possibly our canegrowers may be interested to learn somewhat about the complex natural factors that serve to control the undue increase of cane-beetles; and which, were it not for the interference of man, would inevitably prevent this species from ever multiplying to an injurious degree.

Firstly, those of primary importance in this connection are brought about by the occurrence of abnormal meteorological conditions, such as prolonged droughts, heat waves, unseasonable excessive wet, &c., acting either independently or in association.

The comparative scarcity of cane-beetles during the last couple of years must, for example, be attributed to the operation of this phase of natural control. A very similar climatological check took place also in the year 1915-16, from which decided setback the cane-beetles did not fully recover until 1919.

At such times this cockchafer sometimes perishes literally in millions, cheeks of such nature being often felt over an area of perhaps a thousand square miles.

Secondly, the part played by certain native animals and birds helps to thin the ranks of the enemy very materially.

Amongst these controlling agents may be mentioned species of the genera Perameles, Phascologale, Petaurus, &c.; together with a dozen or more species of birds.

Equally important, perhaps, are some of the lower forms of animal life, including such enemies as predaceous centipedes, beetles, &c., and various hymenopterous and dipterous parasites, which attack both the grub and beetle condition of this pest. Among such are included our well-known digger-wasps of the genera *Campsomeris scolia, Discolia,* &c., two or more common species of Asilidæ; one or two of Elateridæ; and several species of tachinid and dexiid fly parasites.

Lastly, an appreciable percentage of grubs of *albohirtum* and *frenchi,* our two most formidable cane-beetles, are annually destroyed by fungus and bacterial diseases.

Chrysomelid Attacking Cane.

Since recording last month the occurrence of *Rhyparida morosa* from three different sugar-growing centres, we have just bred another species of Chrysomelidæ from larvæ lately collected by Mr. G. Bates at Proserpine. This little beetle has not, so far as I am aware, previously figured as a cane pest, so may be considered as another addition to our list of insects attacking this crop.

It is slightly smaller than *morosa,* being less than a quarter of an inch in length, from which it differs also in being yellowish brown, with more prominent eyes, outer edges of pronotum rounded, and elytra more coarsely punctulate. It is reported by Mr. Bates to have caused notable damage this season to young cane at Proserpine.

With regard to its activities in the future, I am inclined to think that this beetle, like *morosa,* is probably well controlled by various parasites, &c., and that any abnormal numerical increase, such as that noticed for the first time this season, is very likely due to some unusual occurrence of influence affecting the economy of certain natural enemies of this insect.

Opossum Eating Cane-beetles.

In connection with the subject of natural enemies of our cane-beetles, it may be of interest to record that beetles of both *albohirtum* (grey-back) and *frenchi* are caught and greedily devoured by the "Lesser Flying Opossum (*Pelaurus breviceps*). Happening to have one of these charming little animals in captivity, I have been able to make a few interesting observations respecting its dietary.

Upon capturing a grey-back beetle it is not eaten piecemeal, but merely drained of its succulent contents; the chitenous exoskeleton being afterwards rejected as an empty shell, and remaining practically unbroken. This species of opossum measures 7 inches in length of body, while the tail is about 8 inches. Owing to its extreme docility, beautiful soft fur, and lovely eyes it makes a most dainty little pet.

Controlling White Ants.

This branch of control work continues to receive consideration, our recent laboratory experiments having yielded data of more or less economic interest. Some of these results will be given in my next report. The study of remedial measures both in field and laboratory, against such insects as termites, wireworms, and root-borers might well engage the undivided attention of an Entomologist.

AN ENTOMOLOGICAL SURVEY.

An account of a visit to Proserpine and Ayr Districts, November, 1924, *by Mr. G. Bates, Assistant to Mr. E. Jarvis, Entomologist at Meringa.*

Proserpine.

Twenty-five farms were visited in the following areas:—Waterson, Up River, Saltwater, Preston, Strathdickie, Glen Isla, Tawvale, and Kelsey Creek.

A hundred Tachinid Flies (*Ceromasia sphenophori*) in test tubes, and a number of cane sticks containing fly pupæ, for liberation in this locality.

The beetle-borer (*Rhabdocnemis obscurus*, Boisd.) is not doing as much damage in the Proserpine district as further north, and as most of the cane was harvested there was a difficulty in finding suitable places to liberate the flies. Borers were found doing most damage in Saltwater area and were also found at Preston, Strathdickie, and Waterson.

The flies were liberated on 17th November, in a ¾-acre block of cane, mixed varieties, slightly infested with borers, on W. Drury's farm at Saltwater.

The box containing fly pupæ was established in a small block of Goru at Saltwater, about 2 miles from where the flies were liberated. There was more borer-infested cane on this farm than anywhere else, and the liberation of tachinid flies should assist greatly towards remedying the trouble.

Grubs.—The primary pest of this district is grubs of the grey-back beetle (*Lepidoderma albohirtum*, Water.). All parts of the district are subject to attacks, but most damage was observed at Kelsey Creek, then Waterson, and Strathdickie. In following the plough and digging under cane stools, several species of grubs were discovered. *Lepidiota caudata* Blackb., was found in alluvial soil at Kelsey Creek. At Strathdickie, in alluvial soil, pupæ and adults of the Christmas Beetle (*Anoplognathus boisduvali*, Boisd.) and a few grubs of an *Anoplognathus*, sp., were being ploughed out, besides pupæ and adults of the grey-back (*L. albohirtum*). Four species of scarabæidæ beetles were obtained from ploughed land, the species *Gnathaphanus pulcher*. Dej., being very common. Larvæ, pupæ, and adults of the Elephant Beetle (*Xylotrupes australicus* Thomp.) were also obtained.

At Saltwater, while following the plough, larvæ of a small Telephorid beetle under cane stools were present in large numbers. It is not known if these are responsible for injury to cane or not. Specimens were obtained and bred through to adults.

At Kelsey Creek and Waterson, the grub of a small beetle belonging to the family Chrysomelidæ, is causing a great deal of damage to young plant cane. This grub attacks the eyes of the set and the young shoot, gnawing at it and tunnelling about until the shoot dies. The cane generally strikes, but when a few inches high begins to die, and on digging up a plant these tiny white grubs are found in the soil, among the roots, and tunnelling right up the stalk. Some idea of the damage may be gathered from the fact that one grower at Kalsey Creek planted 6½ acres of 1900 Seedling and Clark's Seedling in July, and at the time of my visit, 75 per cent. of the cane was destroyed. Of another block of 7 acres planted in July, 75 per cent. was destroyed.

At Waterson one grower has had to replant 8 acres out of 18, owing to the damage caused by this grub. These grubs were particularly plentiful during August and September, when thirty or more could be found under each plant.

Emergence of Beetles.—Greybacks (*L. albohirtum*, Water.) emerged about 14th November after good falls of rain, and about a week later were very plentiful on certain feeding trees. Specimens of feeding trees were obtained. On 16th November small numbers of the Brown Beetle (*L. frenchi*) (?) were on the wing. Christmas Beetles (*A. boisduvali*) were first seen on poplar gums on 17th November, but on the 20th large numbers could be found at Strathdickie. Two other species of *Anoplognathus* were taken in company with *A. boisduvali Dasygnathus australis* Macl. was obtained from behind the plough, and several specimens came to artificial light. On 20th November *Anomala australasiæ* Blackb. were fairly plentiful, and on the 25th a large number of specimens of a small green beetle (*Colloodes rayneri*) were obtained.

Wire Worms Monocrepidius sp.—This insect, which attacks the eyes of sets, thus preventing "striking," was troublesome at Strathdickie and Tawvale last July and August.

Pentodon australis, Blackb.—This beetle was causing damage to sets last year at Preston, during September and October, but has not been in evidence this year.

Ayr.

Farms were visited in the following areas:—Airdmillan, Dick's Bank, Brandon, Klondyke, Ivanhoe, Kalamia, Plantation Creek, and Jarvisfield.

Pests.—The primary insect pests of this district are grubs of the greyback beetle (*L. albohirtum*, Water.) and the large White Ant (*Mastotermes darwiniensis* Frog.).

The grub damage this year is comparatively light, and is confined to one part of the district—*i.e.*, along the banks of Plantation Creek. Up to 3rd December there were no cane beetles on the wing.

White Ants (*Mastotermes darwiniensis* Frog.).—This insect is responsible for much damage in some parts of the district. Farms at Jarvisfield suffer most, but termites are also found at Brandon and Ayrdale, in the Pioneer Mill area. This pest is troublesome to cane from time of planting up to harvesting, eating the sets, and tunnelling up the growing stalk right to the cabbage, leaving only the rind. All dead timber, logs, &c., seem to contain these termites, and even green trees have been eaten down. One farmer at Jarvisfield is poisoning all posts and other harbours which contain white ants with a mixture of arsenic and molasses, one part of arsenic to six parts of molasses, by measure. This mixture, he says, is giving good results. Another farmer is burning all timber, logs, &c., which are infested with white ants. Some thousands of termites were collected, and brought back to Meringa for experimental purposes.

CANE DISEASES AND PESTS.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received the following report (20th January, 1925) from Mr. W. Cottrell-Dormer, who is investigating cane pests and diseases:—

Diseases.

The Proserpine district as a whole appears to be fairly free from serious diseases. However, Mosaic disease was present in the Kelsey Creek locality and at Cannon Valley. In the latter case it was doing very severe injury to most of the infected cane. It was probably introduced into the locality some two or three years ago, and owing to lack of knowledge it has spread rapidly on the affected farm. A great deal has been written on the subject of Mosaic disease of late, but too great a stress cannot be laid upon its nature and the conditions of its occurrence. As has often been stated, Mosaic disease is recognised in sugar-cane by the peculiar manner in which the leaves are mottled by irregular markings usually a little longer than broad, of no definite shape, and in colour a lighter green than is natural to the leaf. These markings are, as a rule, more distinct on the inner leaves of the affected stems than on the outer ones. The white bands often seen on leaves in cool weather, especially in M. 1900 Seedling and D. 1135, are not due to Mosaic nor do they bear it any resemblance. Mosaic disease is so-called since it belongs to a group of similar diseases affecting other plants, viz.: Potato Mosaic, Tobacco Mosaic, &c. Mosaic is an infectious disease, but is entirely dependent, as far as is at present known, on insects for its transmission from plant to plant. Only one insect has as yet been discovered which is capable of effecting this purpose and that is the very common little blue corn aphis. This aphis is a very prolific insect and wherever its food plants occur will breed in great numbers, the chief food plants being Johnston grass (*Sorghum halopense*), sorghum, and corn. All of these plants are subject to Sugar Cane Mosaic disease though not as much as sugar cane itself. Thus directly a grower observes Mosaic disease in his fields he should, as far as possible, destroy all Johnston grass growing in or near the field and cease planting corn or sorghum in its vicinity. So important is this step in the control of Mosaic disease that in Porto Rico, where the disease is very prevalent, a law has been passed prohibiting the growing of corn or sorghum in or near cane fields. In the outbreak at Cannon Valley this has, through lack of knowledge, been neglected, with the result that the disease has spread very rapidly. Besides the precaution just discussed, roguing of diseased plants, where these are not too numerous, and careful seed selection should always be practised. Only two stools were found infected with the disease at Kelsey Creek in the variety B.208.

Leaf Stripe disease was met with on one farm up the Proserpine River in a small block of Pompey. Only a few stools showed the disease, but these were quite numerous enough to infect many more if they were left in the field, as the fungus which is found growing on the under side of affected leaves would then mature and form spores which would soon be disseminated by wind and insects amongst the surrounding stools. All these affected stools were gathered and carefully burnt. Foot Rot disease (*Marasmius* sp. ?) occurs to a slight extent throughout the district but is not causing appreciable damage.

Insect Pests.

The most serious insect pest found actually doing damage at the time of the writer's visit is a small Coleopterous (beetle) larva or grub which eventually becomes a little light brown beetle belonging to the family Chrysomelidæ. This little grub has proved very destructive to cane planted during the months of August and late July. It occurs in very great numbers in the soil in certain parts of the district and plays havoc with sets and young shoots, causing very great percentages of misses in otherwise healthy fields of plant cane. Heavy losses have thus been suffered by many farmers in affected localities. From careful observations made in December it would seem that, at that time of the year at least, the adult beetles depend only on She Oaks for their food, the leaves of which they devour with great relish. This fact was first brought to my notice by a very observant grower at Kelsey Creek (Mr. B. G. Valmadre). It is also of practical interest to observe that the insect was only found doing damage in localities where this tree occurs. This knowledge throws open a line of direct attack against this pest should it continue to be so very serious. However, the destruction of She Oaks is not to be commended until further confirmatory observations have been made. In the meantime growers armed with injectors should be able to protect their plants with small applications of carbon bisulphide and paradichlor.

Other Pests.

In addition to the ubiquitous wallaby, which does considerable damage to cane in dry weather, it would appear that the opossum has become very troublesome in certain parts of this district, and especially in the Up River locality where growers look upon this animal as a rather serious pest.

POTASH ON RED SOILS.

The Director of Sugar Experiment Stations in Queensland (Mr. H. T. Easterby) states that remarkable results have been achieved by the use of potash upon the red soils of the Woongarra district of Bundaberg at the Sugar Experiment Station. When these soils were analysed some years ago they showed a very low percentage of available potash, in places as low as 13 lb. per acre. The use of potash was thus indicated from the chemical results, and experiments were undertaken to confirm this finding by field practice.

Experiments were laid down in which potash was the sole manure applied. The average yield from plant, first ratoon and second ratoon crops to which 300 lb. of sulphate or muriate of potash were applied amounted to 22.43 tons of cane per acre. From the plots to which no potash was applied the yield per acre was only 8.37 tons of cane, or an increased yield of 14.06 tons of cane per acre for the use of potash. The cost of the potash manure at the rate of 300 lb. per acre was only £3 per acre, while the revenue for 14 extra tons of cane would be about £31 10s.

In another series of experiments the average yield for plant, first ratoon and second ratoon crops, from the application of 300 lb. of sulphate of potash per acre was 20.29 tons of cane per acre, while the plots receiving no potash only gave an average yield per acre of 10.28 tons, showing an increase of 10.01 tons of cane for the use of potash. In this experiment, plots were also treated with 600 lb. of mixed fertilisers, containing 100 lb. sulphate of ammonia, 100 lb. nitrate of soda, 100 lb. muriate of potash, and 300 lb. of superphosphate. Generally speaking, mixed fertilisers give very much better results than single elements, but in these red soils the potash is so low that the higher quantity of potash applied alone gave a more favourable result. For instane, in this case the 300 lb. of sulphate of potash applied per acre gave an increased yield of 3.14 tons of cane per acre more than where the 600 lb. of mixed fertiliser was applied.

The vital necessity for potash upon the red soils of Childers and Bundaberg has been advocated for a long time, and these experiments prove that such advocacy is warranted.

It is not contended that dressings of potash alone will always give higher results than mixed fertilisers upon the red soils, but we believe they will do so at first where the potash content is low as it is in the two districts mentioned.

On the Northern alluvial soils where the available potash is higher, potash alone would not give such an increase in yields.

ENTOMOLOGICAL HINTS TO CANEGROWERS.

By EDMUND JARVIS, Entomologist.

Collecting Cane Grubs.

During ploughing operations collect the grubs when plentiful.

Those of the "Grey-Back" will be in the second and third stages (head ¼ in. and ⅜ in. wide), while grubs of *frenchi*—the small brown cockchafer, so common last December—are mostly in the second instar. All specimens, however, should be picked up, as grubs of the latter beetle will damage cane during September to December next. It is well to remember that collecting the grubs of cockchafer beetles is practised as a matter of course in other sugar-growing countries.

Protect Your Beneficial Insects.

Do not destroy soil-frequesting larvæ, &c., of insect friends, which are parasitic or predaceous on grubs that injure your cane. Some of the commonest of these may be easily recognised by the following brief descriptions and accompanying illustrations:—

(1) White, maggot-shaped inactive larvæ, about an inch long, which when ploughed up are often found attached to dead or dying cane-grubs. (Fig. 1.) These spin cocoons (Fig. 2) from which emerge digger-wasp parasites.

(2) Dark-brown cocoons, from ¾ to 1½ in. long, composed of silk hardened to the stiffness of paper. (Fig. 2.) These are often exposed by the plough, and contain either male or female digger-wasps. (Fig. 3.)

(3) Shining white maggots, about 1½ in. in length, but more slender than those of Fig. 1, and able to tunnel with ease through soil by meals of a pointed beak. (Fig. 4.) These predaceous larvæ of "Robber Flies" (Asilidæ) pierce and suck the life-juices of various cane-grubs.

(4) Large flattened wire-worms (Fig. 5), from 1 to 2 inches or more long, having yellowish-brown shining bodies and six small legs close to the head-end. These slippery, very active creatures remain in the ground two years or longer before transforming into beetles. They are inveterate enemies of cane-grubs, seizing them with their sharp sickle-shaped jaws and then cutting deeply into the body and greedily imbibing its succulent contents.

The Best Way to Combat Weevil-Borer.

Watch the growth of cane on river flats, which is where beetle-borers are most likely to occur; and if discovering evidence of this pest having commenced attack on the basal portion of sticks communicate at once with the entomologist at Meringa Laboratory.

Tachinid fly parasites will be released by the Sugar Bureau free of cost on areas affected by this insect, on condition that the grower will agree to leave at least a quarter of an acre of grub-infested cane uncut for these parasites to breed in. This area should be allowed to remain for about three months, and must not be burnt.

Look Out for Leaf-eating Caterpillars.

Larvæ of *Cirphis unipuncta* Haw., *Laphygma exempta*, or other noctuid moths may at any time make their appearance in plantations of maize or sugar-cane. Various remedial measures against these pests were described last month.

Termites Boring Sugar-cane.

Continue to combat this insect by means of such common-sense methods as burning infested logs or timber close to headlands. Try to locate the source of invasions in canefields, which can often be traced to infested roots, stumps, &c., either in the field or on headlands. Read the Monthly Report for this month (February to March, 1925) in which results of laboratory experimentation against *Mastotermes darwiniensis* Frogg. are described.

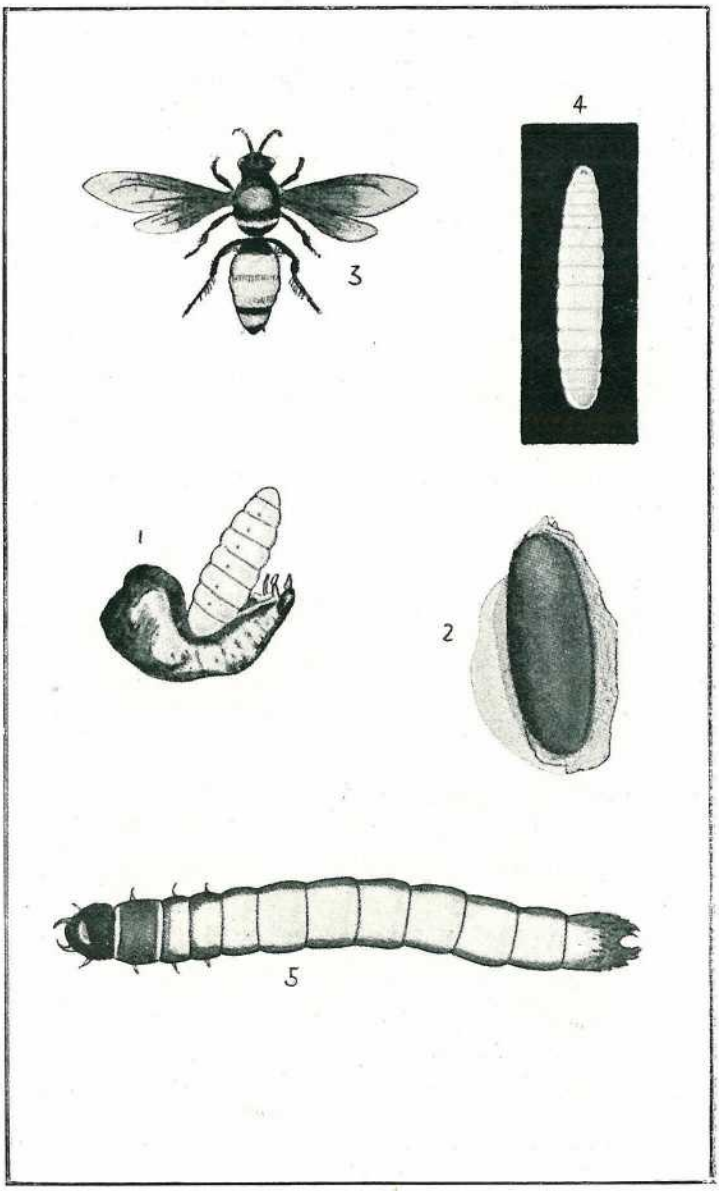


FIG. 1.—ENEMIES OF THE CANE GRUB (See Test).

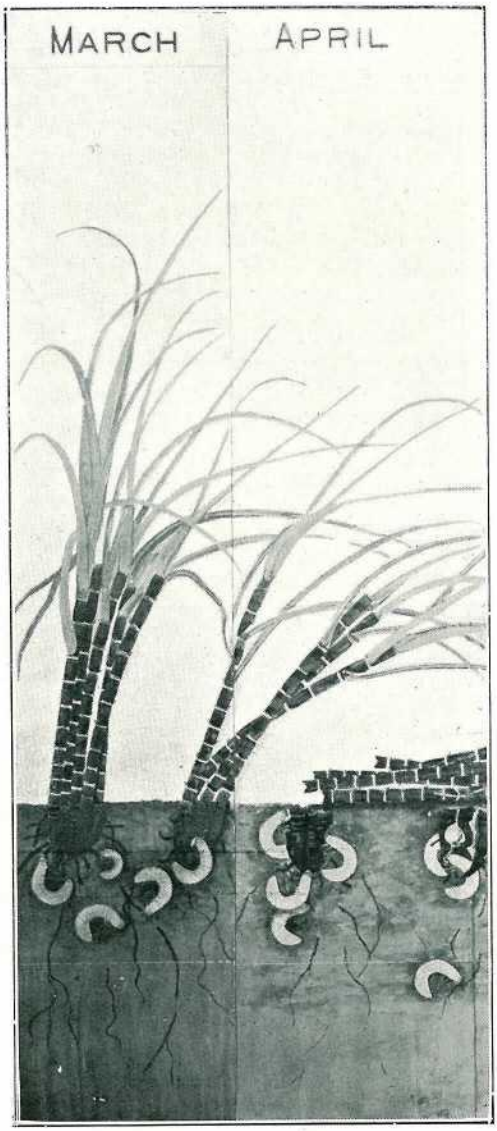


Fig. 2.

CANE AT MACKAY.

On his return to Brisbane from a short visit to the Mackay and Bundaberg sugar areas, the Director of Sugar Experiment Stations (Mr. H. T. Easterby) reported that the crops were making excellent growth. At Mackay, a record season is anticipated, the present estimate being about 650,000 tons of cane for crushing. This would mean a yield of some 70,000 tons of sugar for that area. The recent hot weather had dried the soil to some extent and more rain would now do good. The Bundaberg crops had also made fine progress since last month's inspection and good rains had again recently been experienced. On the whole the crops look healthy. The cane has a fine deep green colour for the most part, and is much ahead of what is has been at this time during the past four years.

The cane at the Mackay Sugar Experiment Station presented a very fine appearance and the many experiments being carried out were attracting considerable attention. At Bundaberg, some highly interesting work is also in progress.

The annual Field Days of both these stations will be held in June.

FIELD REPORTS.

The Northern Field Assistant, Mr. E. H. Osborn, reports (*19th January*, 1925) :—

Lower Burdekin, Home Hill.

The whole district is gradually expanding and many solid new buildings were noticed, both in the town proper and also upon numerous surrounding farms. The season just finished had been a record one, 148,500 tons having gone through the rollers, but the density figures were rather under the average, particularly so in the variety, Goru. Probably the best average returns for combined weight and density were obtained by N.G. 15 (Badila), some fine crops of which had been harvested. Quite a large proportion of the ratoons were being fertilised and well worked up for next season.

One particularly heavy crop of N.G. 15, second ratoons, manured with some 4 cwt. of meatworks, and belonging to Mr. H. V. Hansen, gave good returns. A crop of the same variety, third ratoons, and manured with 2 cwt. of ammonia per acre, also gave a satisfactory yield. Each of these blocks is adjacent to the river.

Generally the cane seemed to be rather more forward than that on the Ayr side, and present indications point to a big crop for 1925.

Invicta Mill, Giru.

In comparing rainfall figures it is noticed that Giru's figures for the year were 60·54 inches against 48·80 inches for Ayr Post Office, whilst Mr. J. Wiseman's farm at Jarvisfield registered a modest 37·49 inches.

Naturally, the Giru cane (very little of which was irrigated) looked very well indeed. With so many good blocks of cane noticed, it was rather hard to individualise, but a block of 130 acres of early planted Badila, belonging to Messrs. Dementine and Beccaris, showed fine growth. Another fine strike of Badila was 30 acres of May plant of Mr. J. L. Humprey's, whilst a 21-acre paddock of H.Q. 426 of Mr. R. Walton's showed promise of a heavy crop. All these paddocks were very clean and well cultivated.

From many inquiries made, it seemed that very few cane beetles were observed during November or December, although good rains had fallen in each month, and it looks as if the coming season would be fairly free from grub attack, but at time of writing it is rather unwise to prophesy.

White ants are still causing trouble upon a few farms in the area, principally around Jarvisfield. Burning off the dead timber on headlands, &c., has done a lot to check them. Experiments in connection with the eradication of this pest have been engaging the Meringa Laboratory staff for some time, and it is to be hoped that they will lead to success.

Top rot in Badila is causing more loss than any other in the Burdekin area, and, unfortunately, so far no apparent means of minimising its losses seem feasible, and it certainly seems to offer ground for much further investigation. In several paddocks of young cane the loss caused through this disease was very marked.

Leaf stripe in B. 208 is scattered throughout the area, but is far more apparent in ratoons than in plant. Generally speaking, when noticed in plant crops the particular part of the paddock affected had suffered from a shortage of water. Growers cannot be too careful in seed selection with this cane for its value to the Burdekin is very large, and the greatest care should be taken that in every case none but the very best seed should be used.

B. 208, N.G. 15 (Badila), H.Q. 426 (Clark's Seedling), M. 1900, Goru, S. Singapore, and Q. 813 are about the principal canes grown, and give good returns upon particular soils. The two former have probably been the most satisfactory during the past season, although some very high density returns were also obtained from H.Q. 426.

Q. 813 has also given some excellent returns, both for tonnage and density, and justified the reputation that it has for being a quick striker and grower, combined with high density, in poor to medium soils. In rich soils it is inclined to grow too rank. E.K. 28 has been planted out in small quantities by many growers, and the ensuing season should give a fair idea of its commercial value as far as the local areas are concerned.

A very fine 4-acre block of it was noticed upon Mr. D. Ahern's Airedale farm. One watering had been given, and it looked beautifully green and healthy with a splendid top. The owner had previously used a paddock for seed purposes only, which he considers gave him a return of about 40 tons per acre.

Ingham Railway Line.

Quite a lot of very good plant cane was noticed and some very promising ratoons as well. One of the most promising crops seen was a forward paddock of H.Q. 426 and H.Q. 409 of Mr. V. Teilby's, whilst a small block of September plant H.Q. 426 of Mr. W. Goodwin's would take beating for general appearance and careful cultivation. Further up the line at Waterview, Mr. A. Holland has about 41 acres to harvest this year, 26 acres of Badila plant looking very well, whilst the ratoons also are very promising.

This grower has just completed building a very solid traffic and tramway bridge, 71 feet in length, over Station Creek. Three-quarters of a mile of permanent tramline are being laid down from the railway siding at Yuruga to here, whilst probably another mile of field rails will be required to harvest all the crop.

H.Q. 426 and N.G. 15 are the principal canes grown, but several small lots of H.Q. 409 were also noticed. Q. 813 was seen to be growing upon Mr. H. F. Heck's farm at Bambaroo and showed remarkably fine growth. H. 146, E.K. 1, and E.K. 28 were also being tried out here. Of these canes Q. 813 should grow very well upon many farms. H.Q. 409 was also grown in small lots last year, and gave satisfaction with its tonnage and density figures; moreover, in both early and late plantings it had given a fair strike. N.G. 15 (Badila) grows very well upon the better class of soil adjacent to the creeks and watercourses. Some very heavy crops of this were cut last year.

Wallabies cause the most damage. White ants upon a couple of farms caused minor losses, the large amount of dead timber adjacent to many of the headlands forming a natural breeding ground for them.

In travelling around this particular part of the district it is really surprising to see the progress that has been made since the Giru Mill started to take cane from

here. Last season some sixty-seven suppliers forwarded cane, whilst there are probably another thirty who have planted or want to plant cane for this factory. The majority are married, and are nearly all of British stock. Neat homes and carefully cultivated cane paddocks show that, given a chance to dispose of their cane, a fine type of agriculturist is permanently settled upon the land, and this is what is urgently wanted in North Queensland.

For comparison the following rainfall figures are interesting:—

MONTH.	ROLLINGSTONE.	BAMBAROO.	INGHAM.
	Inches.	Inches.	Inches.
January	7·99	10·18	7·39
February	9·35	9·02	11·73
March	21·31	13·97	15·11
April	6·89	2·39	9·77
May	..	..	·79
June	·73	·55	1·20
July	·01	·14	·50
August	5·20	4·64	5·61
September	1·92	1·38	1·84
October	1·00	1·90	1·75
November	4·09	5·00	2·99
December	5·67	5·08	6·82
	65·06	54·25	65·50

The Southern Field Assistant, Mr. J. C. Murray, reports (28th January, 1925):—

Bucca.

Conditions at this centre are very promising for next crushing. Soils were saturated, and the cane, plant and ratoon, was growing vigorously. Growers have had a good season.

Cane varieties looking well at Bucca are H.Q. 285, M. 189, Q. 813, M. 1900 Seedling, and D. 1135. Farmers are recommended to experiment with Q. 1098 and E.K. 28, although the three best canes at present in Southern Queensland are Q. 813, M. 1900 Seedling, and H.Q. 285. Some growers may consider this statement debatable, but in judging a cane all the features that go to make a variety a planting success should be considered.

Losses are reported from Mosaic (Yellow Stripe disease) and "Leaf Stripe disease" (*Schlerospora sacchari*). The latter is recognised by the stripes being almost as long as the leaf, with a downy mildew underneath the leaf. Mosaic is now well enough known not to need a further description. Growers are advised to note carefully the above distinction. In both cases careful plant selection and the eradication of affected plants is necessary.

Gin Gin.

There is every promise of a good yield next season. Here, as elsewhere, the farmers have had good rain. The soil is full of water and creeks and springs are running strongly. The cultivation is good on the whole, but greater use could be made of soil improving agents such as lime, especially on the heavy loams round Drinan's Siding. It is noticeable that where lime is used there is always a far less "foot rot," than where the soil is of bad texture and untreated. It is generally advisable to use green manures and lime in combination.

Mosaic was showing in places. The usual methods of eradication are recommended. The variety M. 1900 Seedling was showing a disease in places that the writer could not identify, but the following is a description:—

The shoots are short and stunted and the cane is absolutely unable to grow.

Fibre bundles in cane coloured red.

Heavy growth of adventitious roots from the nodes.

Trash adhesive.

If the disease persists the farmers are advised to destroy affected stools and bring plants from high, well drained soil.

Goodwood.

The growers here are busy keeping down the prolific weed growth induced by the heavy rain. The cane is growing well and the next season should be a good one. Considerable use is being made of green manures and fertilisers, sulphate of potash and bonemeal mixed giving good results in the latter respect. Young Brothers are growing green manure crops fairly extensively, a factor which should increase fertility and minimise erosion on these slopes.

Cane varieties making a good showing here are Q. 855, Q. 813, M. 1900 Seedling, H.Q. 285, and D. 1135. Of these, the firstnamed looks very promising and is a variety that the farmers could extend.

Growers should watch keenly for Leaf Stripe. This is affecting a considerable number of stools at Goodwood, and these should be immediately eradicated.

Portions of the cane cut on the Goodwood area this season have not ratooned well, and some stools refused to "come away" at all. An examination of the latter showed a red rot, due to a fungus parasite, in the flesh of the cane underground, and the writer attributed the poor ratooning to this cause. The damage done is unimportant, but where cane does not ratoon for an explicable reason farmers are advised to rest the area and invigorate with a leguminous crop before re-planting.

Childers.

Grubs are causing considerable loss in portions of the Childers district, particularly South Isis. The active feeding period ranges from October to May, that is, with reference to the larvæ. Farmers are recommended during this period to cultivate as much as possible and try injections of carbon bisulphide. They are also recommended not to remove the remains of any grubs that have been attacked by the muscadine fungus. When grubs are bad, the working into the soil of cane trash is a good measure. Farmers are advised to submit specimens of beetles that are flying about the lights, and obtain particulars of their life cycles, depredations, &c., from Mr. Jarvis, the Entomologist to the Bureau of Sugar Experiment Stations at Meringa, viâ Cairns.

Varieties making a good showing are H.Q. 285, Q. 813, M. 55, 7 R 428 (Pompey), Badila, and M.1900 Seedling. D. 1135 is looking well in places, but "gumming" is spreading in this variety. The first named is looking remarkably well. This cane was first introduced to the Isis district about 1913, but its value was not recognised until recently.

A considerable amount of fertilisation is being done in this area. Good results from bonedust are being obtained. It is inadvisable to place more than a small amount in the drills at planting. The bulk should be applied in the interspace about a foot away from the cane when it is about 18 inches high. This prevents the roots from bunching round the plants by encouraging the lateral feeders to reach out, thus spreading the root system, and rendering the cane less vulnerable to grub attack.

Fungoid parasites are active, causing losses on a small scale on the older soils. A red rot, similar to that showing at Sarina, is appearing in the M. 1900 Seedling. Recommendations with regard to this disease appeared in last report on the Sarina district. Farmers are advised to be more careful in plant selection than at present. If necessary, the services of an officer of the Bureau are generally available to assist in the matter of disease recognition. This observation applies generally to the districts under review.

Dallarnil.

Cane is ratooning well, and the plant cane is making vigorous growth. Most of the cane land in this district is new and requires no special manurial treatment. The one weak feature about planting operations here is the presence of Mosaic disease, mostly in the old varieties, Rappoe and Striped Singapore. Both these canes are very susceptible to disease, and the farmers are recommended to take precautions against the spread of this malady. The further planting of these varieties is to be deprecated. In addition to being susceptible to disease they are not, on an average, of the same sugar value as the cane commended earlier in this report. M. 1900 Seedling is making a good showing at Dallarnil, also Q. 1098. It showed a density of 16 c.c.s. on being tested at Bundaberg Experiment Station.

The Southern Field Assistant, Mr. J. C. Murray, reports under date, 19-3-25:—

Nambour-Maroochy.

Very heavy rains have fallen in the districts since January. Weed growth is heavy, although the farmers have their cane clean by virtue of continuous chipping. Cane is rapidly growing to a heavy crop and there will inevitably be an early crushing season.

Very keen interest was shown on the part of the growers, many of whom are new to the district, in the matter of varieties, fertilization, and diseases of cane.

Several field demonstrations were carried out and well attended. Affections such as gumming, mosaic, various fungoid parasites, and sap-sucking insects (potential media of infection) were pointed out to the farmers. Varieties were discussed, there being a necessity to do more variety experiment in these districts. A cane recommended in last month's report, H.227, is growing on at least two farms in this district, and the writer advocates its cultivation as much as possible. In appearance H.227 is not unlike D.1135, having the same hardy characteristics, is a little fleshier in the leaves, and is generally thicker than D.1135. As pointed out in previous reports, it is not immune from disease, but not subject to rapid injury if attacked. Another cane making a good showing on the Maroochy River is Q.1098.

Staple varieties looking well in these districts are M.1900 and H.Q. 285. The former was, in places, showing "Red Rot" disease, caused by a fungus. Cane that had been attacked invariably showed signs of first having been bored or cracked, into which the fungus entered.

Lime is being used successfully on the river and creek soils. Growers are getting results from basic superphosphate and mixed fertilizers containing a predominance of phosphoric acid.

Farmers are recommended to submit soils to the Bureau for analysis from time to time and to take samples as follows:—Take a spade and make three or four holes about a foot deep and a foot square wherever the sample is required, first cleaning and levelling the surface, and then press the spade from top to bottom obtaining a fair sample of about 6 lb. from each hole. These samples should then be mixed thoroughly and a sample of about 8 lb. in weight selected. This should be placed in a clean bag with the name and address of the owner in with soil on a piece of cardboard. Address to the Director, Bureau of Sugar Experiment Stations, Brisbane, with a covering letter with particulars (forms may be obtained from the Bureau or from the secretary, L.P.A., or other farmers' organisations). There is nothing technical about the information required; any farmer can supply it on reading carefully the questions asked on the form. As a number of growers are quite unaware of the fact, they are informed that they may obtain literature on all matters relating to cane cultivation, varieties, fertilization, insect parasites, &c., from the Bureau.

Bundaberg.

The cane here looks green and vigorous, although ratoons are not as forward as they should be. Heavy rains have fallen. Ploughing at present is a case of making haste slowly; in fact, a farmer would do more harm than good working his team with the soil in its present condition.

Fertilizing results are at present satisfactory, especially on those blocks treated with sulphate of potash. This applies to the average red scrub soil around Bundaberg. On the poorer or partially sterile portions of the scrub soils that occur, the following mixture is recommended:—

	Per acre.
Sulphate of ammonia	150 lb.
Nitrate of soda	100 „
Sulphate of potash	150 „
Bonemeal	250 „

This is the amount to be applied per acre and the recommendation is based on the analysis of a fairly typical sample of this class of soil. The following figures show the weights, total and readily available:—

Lb. per acre, 1 ft. deep—	Total.
Nitrogen	2,067
Potash	2,434
Phosphoric acid	1,216
	Readily available.
Potash	101
Phosphoric acid	97

As can be observed from these data, these soils are poor and, in addition to fertilizing, require thorough cultivation and, where possible, green manuring.

Mosaic is at present spreading. This may be due to a noticeably large leaf-hopper infestation. M.1900 Seedling appears to be very subject to infection by insect media. Q.813, while not apparently readily infected, positively refused to grow where the disease is hereditary. This applies particularly to the older soils, where the indigenous fungi always assist disease to retard growth. With regard to this disease, however, one thing is certain, that it is possible to get plants 100 per cent. clean if the growers will always make a practice of field survey before planting. It is a very ineffective way examining each individual set, because quite a number of apparently healthy plants may be taken from an affected stool.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF FEBRUARY, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING FEBRUARY, 1925 AND 1924, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Feb.	No. of Years' Records.	Feb., 1925.	Feb., 1924.
North Coast.	In.		In.	In.
Atherton	9·46	23	5·96	6·10
Cairns	15·11	42	14·93	10·43
Cardwell	16·86	52	14·01	11·77
Cooktown	13·23	48	17·89	7·07
Herberton	7·42	37	8·91	5·67
Ingham	15·56	32	15·06	11·73
Innisfail	21·87	43	27·79	15·81
Mossman	15·61	15	19·32	8·50
Townsville	11·43	53	11·96	9·54
Central Coast.				
Ayr	8·60	37	15·12	15·69
Bowen	8·49	53	20·23	15·80
Charters Towers ...	4·30	42	7·13	13·54
Mackay	11·35	53	9·55	21·19
Proserpine	10·63	21	22·13	26·14
St. Lawrence ...	7·90	53	3·50	9·95
South Coast.				
Biggenden	3·44	25	3·67	14·81
Bundaberg	5·99	41	5·96	9·85
Brisbane	6·26	74	2·78	9·26
Childers	5·68	29	3·30	16·43
Crohamhurst ...	13·85	30	7·63	7·69
Esk	5·25	37	3·84	7·00
Gayndah	3·97	53	2·20	18·05
Gympie	6·51	54	3·70	11·10
Caboolture	7·25	37	7·42	10·06
Kilkivan	4·87	45	2·08	7·83
Maryborough ...	6·44	53	4·70	10·04

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Feb.,	No. of Years' Records.	Feb., 1925.	Feb., 1924.
South Coast—continued:	In.		In.	In.
Nambour	8·71	28	9·57	8·29
Nanango	4·17	42	1·75	6·58
Rockhampton ...	7·33	37	3·72	8·31
Woodford	8·60	37	5·95	7·16
Darling Downs.				
Dalby	2·81	54	1·87	3·37
Emu Vale	2·15	28	3·18	5·99
Jimbour	2·73	36	1·06	4·51
Miles	2·57	39	1·50	9·00
Stanthorpe ...	3·21	51	3·12	4·68
Toowoomba ...	4·24	52	2·65	7·08
Warwick	3·06	59	1·85	5·08
Maranoa.				
Roma	3·01	50	1·69	8·58
State Farms, &c.				
Bungeworgorai ...	2·34	10	1·70	7·09
Gatton College ...	2·74	25	5·92	12·06
Gindie	2·82	25	2·99	8·26
Hermitage ...	2·18	18	0·87	5·67
Kairi	8·38	10	11·58	6·79
Sugar Experiment Station, Mackay	9·95	27	9·19	21·18
Warren	3·89	10	...	5·95

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for February this year, and for the same period of 1924, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
Divisional Meteorologist.

GRADING, PACKING, AND HANDLING OF BANANAS.

By WILLIAM ROWLANDS, Fruit Packing and Marketing Instructor.

So many adverse reports relative to the inferior grading, packing, and handling of Queensland bananas have been broadcasted in the course of the last two years that it has been deemed absolutely necessary to place before every grower information dealing fully with the subject.

The methods described herein are the methods employed by many successful growers in Queensland who have earned a high market reputation as consistent suppliers of firm, clean, and well-packed fruit.

Bananas are grown in such large commercial quantities throughout Queensland that it is not profitable to produce or market any bananas unless they are of good eating quality. A few purchases of immature or otherwise unsatisfactory bananas may turn consumers to other fruits, consequently growers should use every effort to keep the markets free of inferior or defective products.

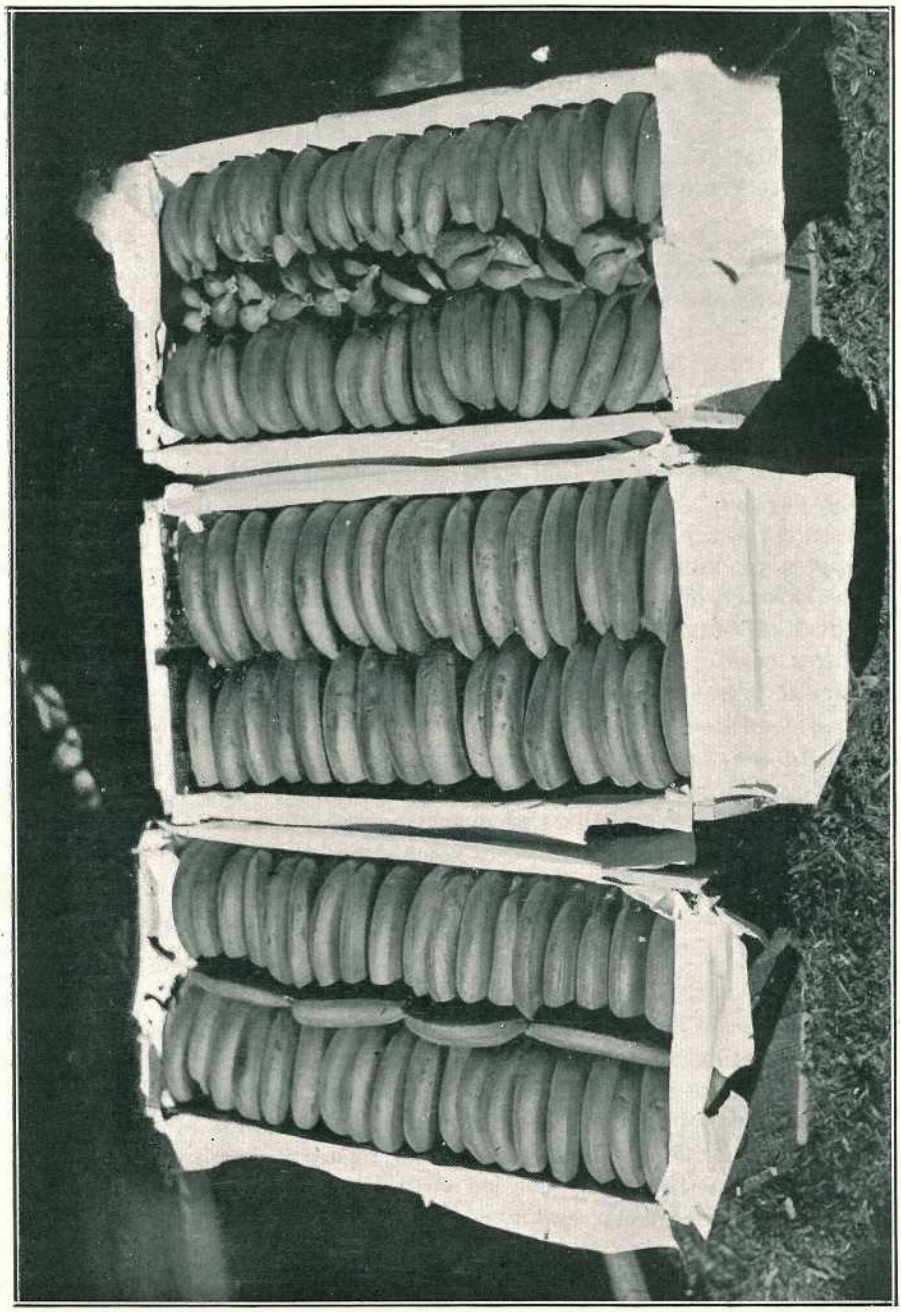
This article is designed to aid growers in preparing their bananas for market in such a way that they may obtain higher average returns with fewer losses.

Growers must bear in mind from the start that it is absolutely essential to grow and produce bananas of good quality if they wish to gain the confidence of consumers and retain markets.

URGENT NEED FOR BETTER GRADING AND PACKING.

It is generally agreed that the marketing troubles with which we are dealing have arisen from and are concerned with the problem of securing a steady and properly prepared output of bananas of uniform grade, quality, and appearance. It would not be very difficult to obtain these results if all the growers in Queensland produced crops of the same quality, handled them in the same way, and were both competent and willing to grade and pack them correctly; such conditions, however, rarely exist. Growers have been sending to market bananas of poor quality; fruit which they themselves would refuse to eat. If growers of this type can get their inferior fruit on to the markets they feel they have profited; but, unfortunately, that does not end the business. The wholesaler will have difficulty in disposing of the poor fruit, while the retailer will lose on it. If it reaches the housewife she will throw it away and turn to other fruits, thus decreasing the sale of further consignments. In all these cases the grower eventually loses, directly or indirectly.

Plate 1.



Three cases of well-packed Bananas as opened in Melbourne.

Should his fruit be bought on his grade marking without close inspection on the part of the buyer, he apparently has secured returns as good as those of brands quite satisfactory; but it will not be long before all buyers fight shy of his particular brand, except at a price much below the market value of fruit true to grade.

At first thought it would seem reasonable to expect agents or distributors to eliminate poor brands and refuse to handle inferior fruits, but there is, as a rule, so much competition among them that they are unable to bring about the reforms they know to be desirable.

The weaknesses in the methods now in general use, which are preventing a much needed improvement in the marketing of our bananas, argue for a more efficient system of handling, grading, packing, and inspection.

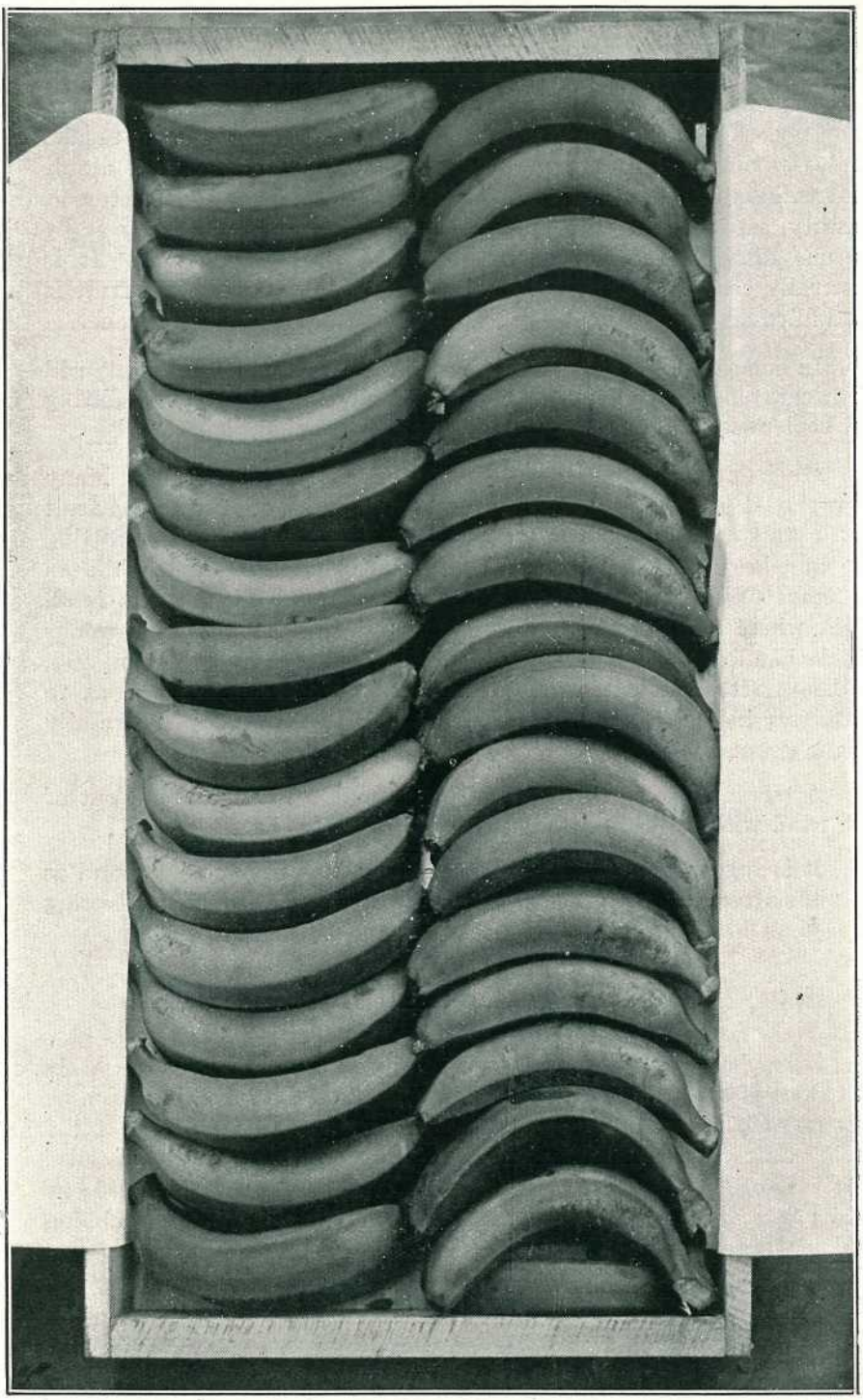
CARE IN HANDLING.

Many growers realise that care in handling during harvesting, grading, packing, and carting is necessary if they are to obtain profitable results; while others, either through ignorance or because of carelessness or indifference, subject their fruit to early decay and spoilage through needless rough handling during these operations. A great deal of rough handling is due to lack of knowledge of what constitutes careful handling. It is not generally realised that it is necessary to preserve the skin of bananas or any other fruit in a sound unbroken condition. Growers must awaken to the fact that it is their business to see that each of their harvesters, graders, packers, and carters does his share to eliminate rough handling. The writer has noticed that growers and others when carting use a full case of bananas for a seat and has also noticed cases stacked bulge side up with cases placed on top swaying to and fro from plantation to railway siding. This is a bad practice and should be avoided. Cases so ill-used may be opened by the agent to sell the whole of that particular consignment.

Mr. George Williams, Instructor in Fruit Culture, has described the Chinese method of handling in the North in the early years of the Queensland banana industry. When the industry flourished in North Queensland production was almost entirely in the hands of Chinese, who, with their usual thoroughness, gave due regard to handling. Fruit from the field was invariably carried vertically and stood on end the way in which it had grown, and so was allowed to remain long enough to allow the tissues to toughen. The yoke was commonly used to carry bunches from the plantations by the Chinese.

Among freshly cut bunches the fingers or individual fruit on being but slightly twisted from their natural alignment are more or less fractured at the connection and decay may in consequence set in.

PLATE 2.



Method of packing bottom layer of "Special."

CUTTING.

An all-important matter to be first considered is the correct time for cutting the bunch from the plant. The best judgment must be exercised in selecting bunches in the right state of maturity to carry properly. Experience on the part of growers is essential if good results are to be obtained. As a matter of fact, it is difficult to make a rule that will state just when to cut, for so much depends on such factors as locality, aspects, and seasonal conditions. Conditions that may apply in one district may not necessarily hold good in another. It is generally conceded that the bunch is ready to cut when the fruit is well-filled and rounded out instead of having an angular appearance.

In summer it can be cut when slightly less filled as the fruit will then carry better and not ripen up so rapidly in transit; but during the cooler season the fruit should be well filled before it is cut.

Much damage may be done to bananas during this operation. Many growers let the bunch fall to the ground, thereby rupturing the fruit at the stalk end. Nearly every grower has a different method of cutting the bunches from the plant. Some growers cut the bunch while an assistant prevents it from falling to the ground. This system is all right where there are two persons engaged, but where the grower is single handed the bunch should be firmly grasped by the stem, and, if heavy, it should be allowed to rest against the body so as to distribute its weight more evenly and enable it to be lowered carefully to the ground.

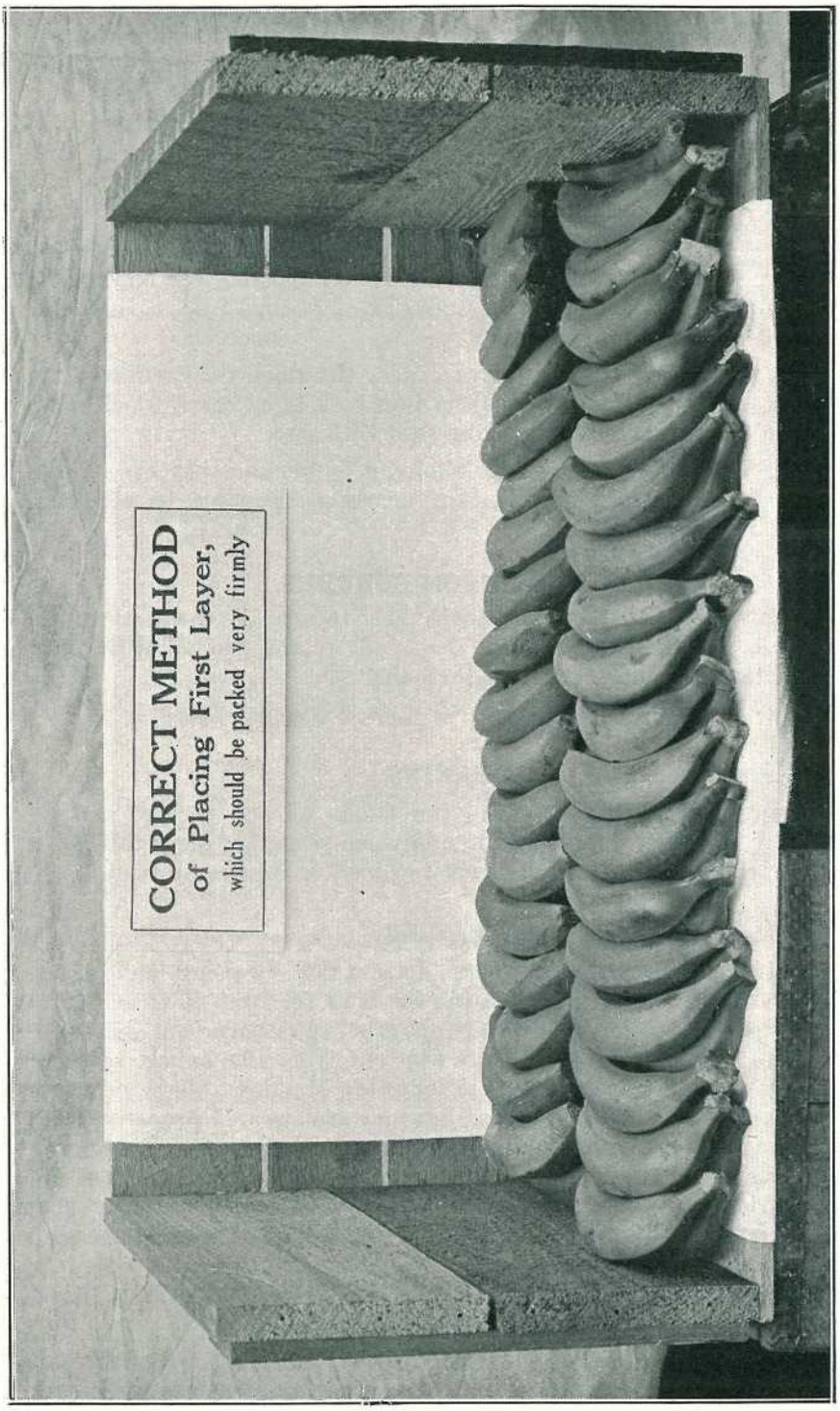
After cutting, bunches should be placed in the shade and out of the wind while awaiting removal to the packing shed.

It is suggested that the stool should be cut as near the ground as possible after removing the bunch to prevent the exuding sap affecting other bunches, and also to lessen harbourage for the beetle borer.

FROM PLANT TO PACKING SHED.

It has been noticed on many plantations that many growers are in the habit of carrying bunches on their shoulders, also stacking them on top of each other on a slide. This practice is considered one of the main causes of rupturing the fruit, thereby producing "blackend." For instance, a grower was observed sliding his fruit to his shed; he was using bags and straw between the bunches to prevent rubbing and marking, and although he was careful and no marks were seen at the flower end, he was doing considerable damage to the stalk end of the banana. When the damage was pointed out to him he was surprised. Others may be doing the same; they may grade well, pack correctly, and still all their good work may be undone by stacking bunches on top of each other on the slide, laying them on their side,

PLATE 3.



"CHOICE."

carrying them on their shoulder, or otherwise handling them roughly. The following methods are recommended:—

1. Use wire ways (wire and pulley) where practicable to convey bunches to the shed. Care should be taken in preventing the bunches bumping and bruising. Considerable damage is often done to bunches when stopped at the shed end when a single wire is used. Sudden jerking of the fruit at this point often causes much damage.
2. Carry bunches to the slide track head, there cut the fruit off into "hands," and stack them on the slide; besides eliminating the risk of bruises and other injuries, more fruit may be loaded on the slide. This method has proved very effective.
3. On cutting a bunch leave it near the stool, then reduce it to "hands," and place them into baskets or boxes which may be carried to the packing shed with ease.
4. When unloading on to trimming or packing benches at the shed, grade the fruit as nearly as possible to required standards.

CUTTING FROM BUNCHES.

When cutting hands from the bunch do not (1) throw them on the bench, and (2) do not push the hands to the ground with your knife, after releasing them from the bunch.

A little care in this operation will show beneficial results.

CLEANING.

Growers are urged to clean the hands of any foreign matter caused by insects or decayed fruit, and when removing the petals from the flower end they are advised not to pinch or injure the fruit.

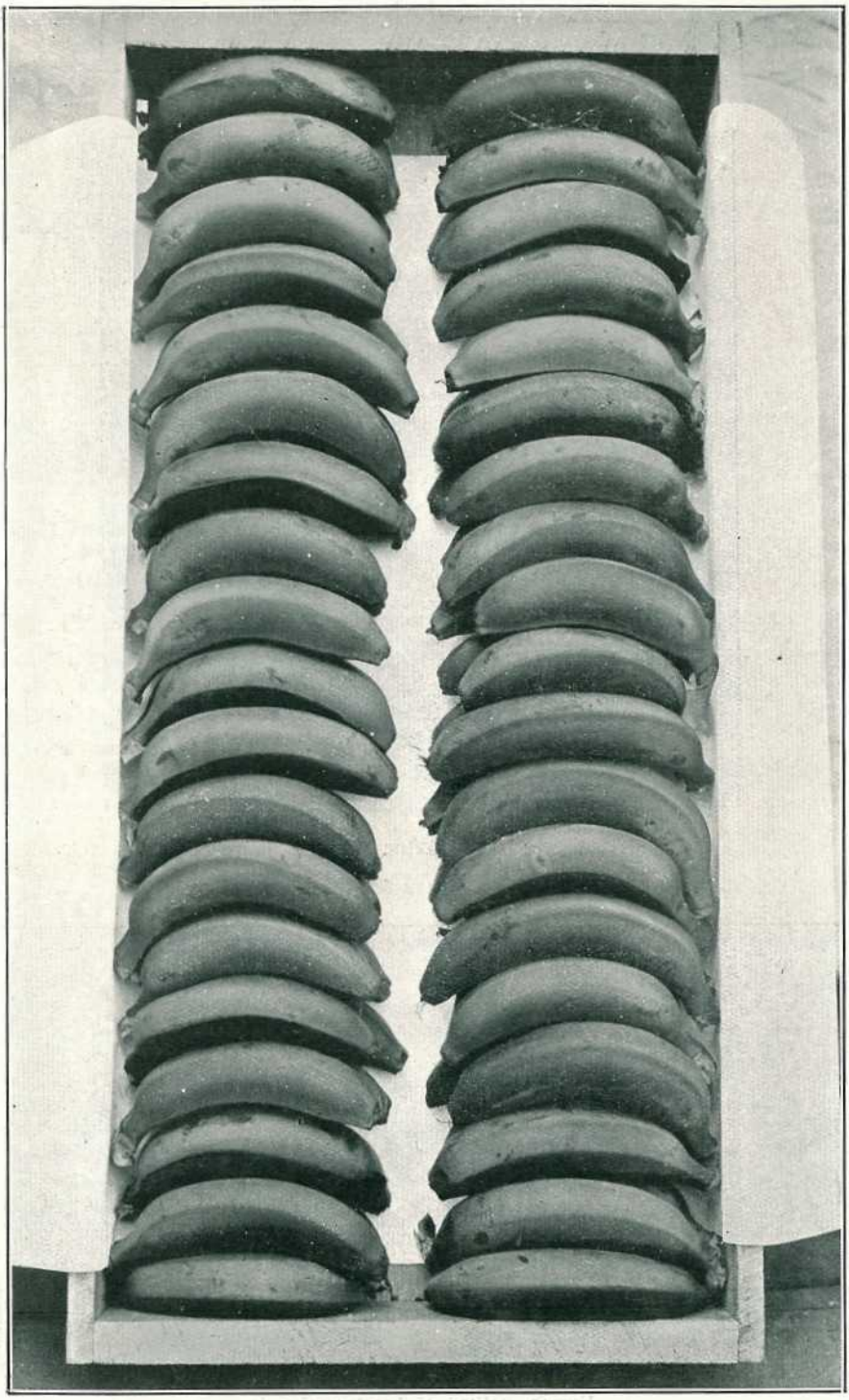
SWEATING.

It is considered by southern dealers that bruising and other injuries may be avoided by sweating the fruit for from 40 to 50 hours prior to packing. The wisdom of this practice is borne out by many successful growers in Queensland who cut from the bunch, say, on Saturday and start packing on the following Monday. These growers are strongly of the opinion that if bananas are sweated properly, firm packs are assured and less bulge is required in their cases. Therefore, it is recommended that **all bananas should be sweated at least 40 hours prior to packing, remembering that to sweat properly the bunches must be cut into hands. Sweating cannot be done on the bunch.**

BREAKING AND CUTTING OF FULL HANDS INTO SMALLER HANDS.

Observations on the Melbourne market in May and September of this year disclosed surprising and extensive injuries at the stalk end

PLATE 4.



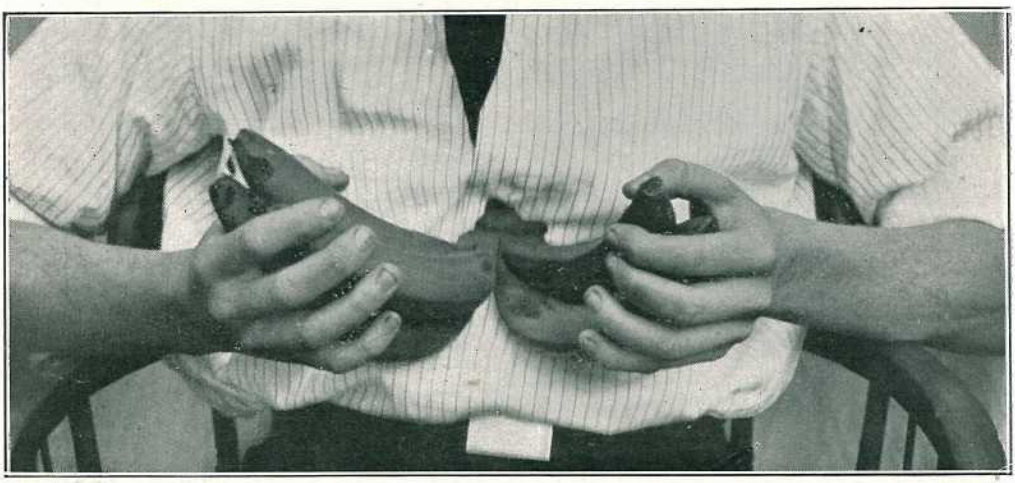
Showing even centre necessary to obtain a firm pack.

of the fruit. Retailers call the trouble "Blackend," which must not be confused with "Squirter," which is now engaging the attention of the University scientists in Brisbane and Melbourne.

PLATE 5.

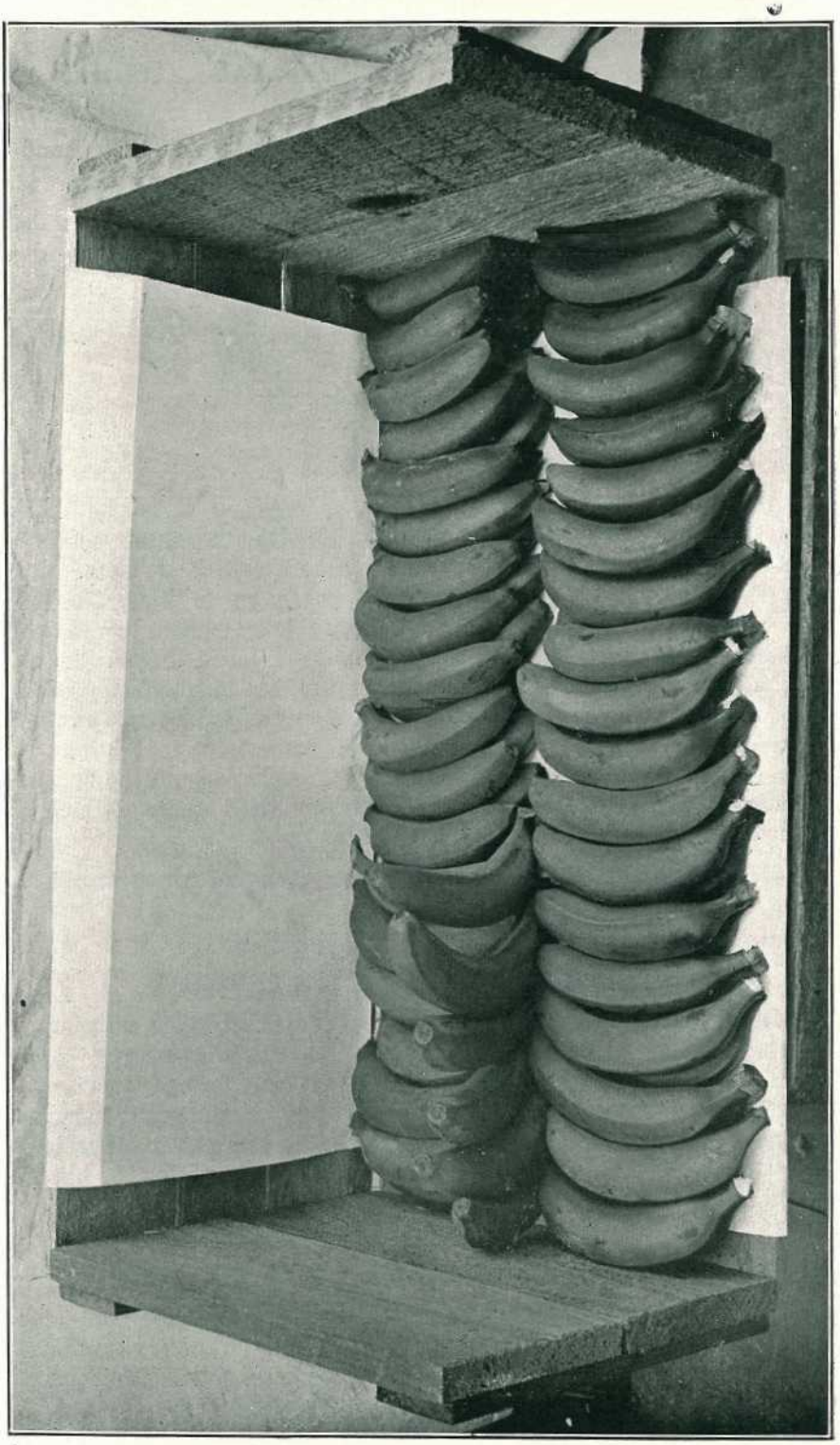
Correct method of breaking hands of Bananas.

PLATE 6.



Wrong method of breaking hands.

PLATE 7.



Showing placing of centre Bananas.

When it is known that 80 per cent. of Queensland bananas after ripening show "Blackend," growers will realise how serious the trouble is. "Blackend" may be caused by breaking the hands. There are also many other ways of producing this defect. (See note on "Blackend.")

To eliminate "Blackend" altogether use a knife and cut the hands into the required number of fruit.

Where it is not practicable to cut every hand or fruit, the illustration (Plate 5) shows how to hold the hands when breaking to minimise the risk of "Blackend."

It will be noticed that the bananas are held firmly at the stalk end, not at the flower end of the fruit.

GRADING TO SIZE.

Perfect sizing is essential if perfect packing is to be done. Therefore, size bananas to the required grades into three separate compartments on the packing bench before starting to pack—viz., "Special," "Choice," and "Standard" as shown in Plate No. 17. The graders should throw out all undesirable specimens which are broken or otherwise injured. If packing from a mixed bench, specimens not up to the grade intended to pack are sure to be included. Conscientious growers who would not pack any inferior fruits if they knew it, have been observed to pack small bananas 4½ inches long in their first grade from a mixed bench. The packer should be free to give full attention to securing a pack of standard quality which is both firm and attractive.

Grade first and eliminate rubbish, then pack and watch results.

ELIMINATION OF INFERIOR FRUITS.

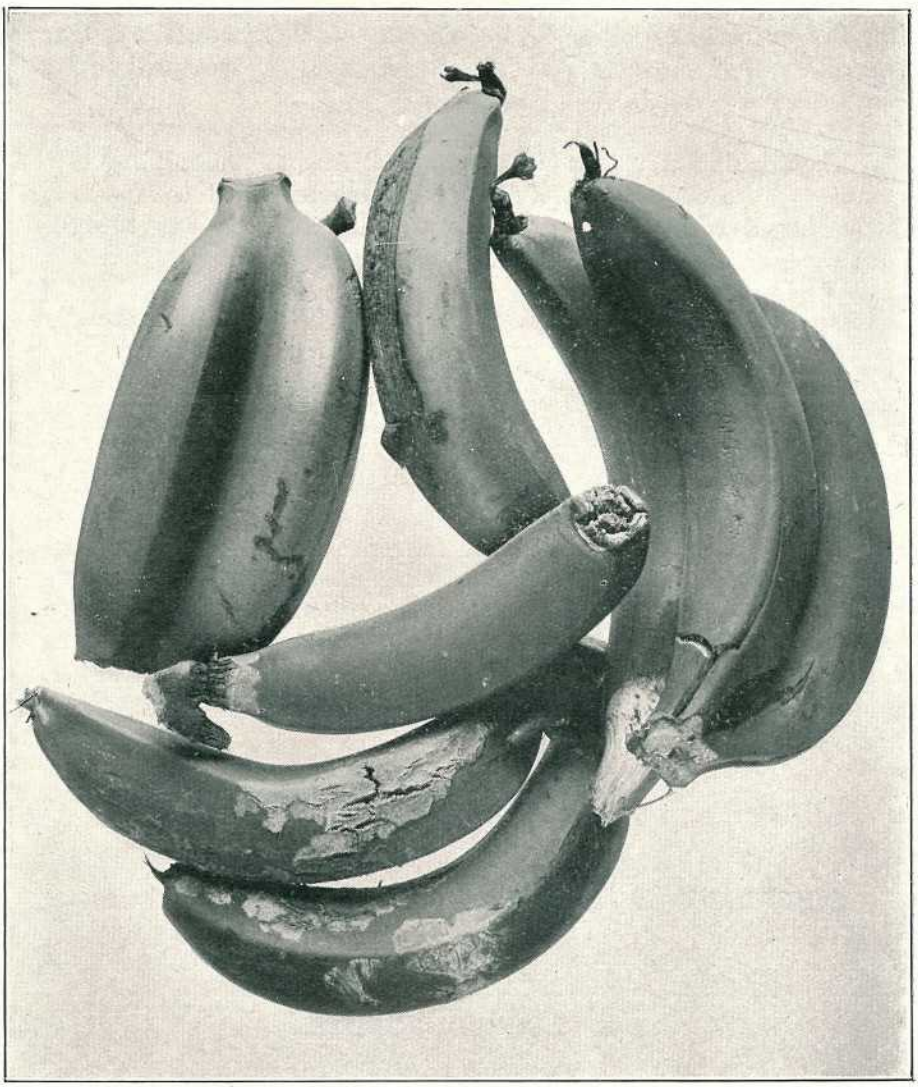
Do not include in your packs bananas that are broken or injured. Eliminate "cigar end," "immature fruit," or "twin bananas." (See Plate No. 8.) These included in your cases only bring your brand into disrepute among buyers. Send few, if any, second-grade bananas to the Southern markets. Shipments should be confined to "Special" and "Choice." This practice will improve your returns for the higher grades.

PACKING.

For some considerable time agents in the Southern Markets have been advising growers to pack their bananas in several different ways, for instance:—Some Adelaide agents suggest "full hands"; Melbourne,

"fours" and "sixes"; Sydney, "singles." But the retailers in Melbourne and Sydney say the number of fruit on each hand, whether "full hands," "fours," "sixes," or "singles," does not matter providing the fruit arrives in good order.

Plate 8.



Showing damaged fruit that should not be packed.

The ideal pack where the hands are nice and even, in my opinion, is in "full hands," but considerable difficulty is experienced in packing a firm case owing to the different shapes of the bananas, so that if the hands are spreading and straight bananas predominate, breaking the hands has to be resorted to.

However, it would be an advantage to growers if a standard pack were evolved—say, breaking the hands carefully into two, three, and four fruits, and packing as suggested in this pamphlet. There is always a number of single bananas which may be used for packing the centres of the cases.

A tight and efficient pack can only be brought about by packing the first layer in each case firmly; should this layer be slack it does not matter how firm the remaining layers are, the case will arrive slack.

The packing of a case of bananas is similar to the building of a house. If the foundation is faulty the structure will collapse. A little extra care with the bottom layer will go a long way towards obtaining an efficient pack.

Growers are advised to study illustrations 2, 3, and 4 and carefully note the end bananas in the first layers, as these key fruits prevent any movement of the fruit in the layer.

When the first layer is finished the second layer should be placed concave downwards (as shown in Plate 9).

Do not place the fruit directly on top of each other, but place them in the crevices or spaces. If bananas are placed directly on top of each other, the first handling the case receives will cause the pack to shift and become slack. It is possible to place 90 per cent. of the fruit in crevices. Do your packing in layers. (See Plate 9, not as shown in Plate 11.) A very firm pack can be obtained by packing in layers.

Much could be written on packing but growers are advised to study the illustrations carefully, as they are self-explanatory.

IMPORTANT.—Do not place small or inferior fruits in the centre of your cases.

BULGE REQUIREMENTS.

A question often asked by growers: Is the bulge required? The answer is **yes.** A slight bulge is necessary owing to shrinkage, but not so much as that seen on many consignments going South.

It has been noticed in Melbourne that the fruit is still slack even where a large bulge has been put on the case. It does not matter how much bulge is put on the case, if the fruit is not sweated it will arrive slack and marked.

Plate 9.

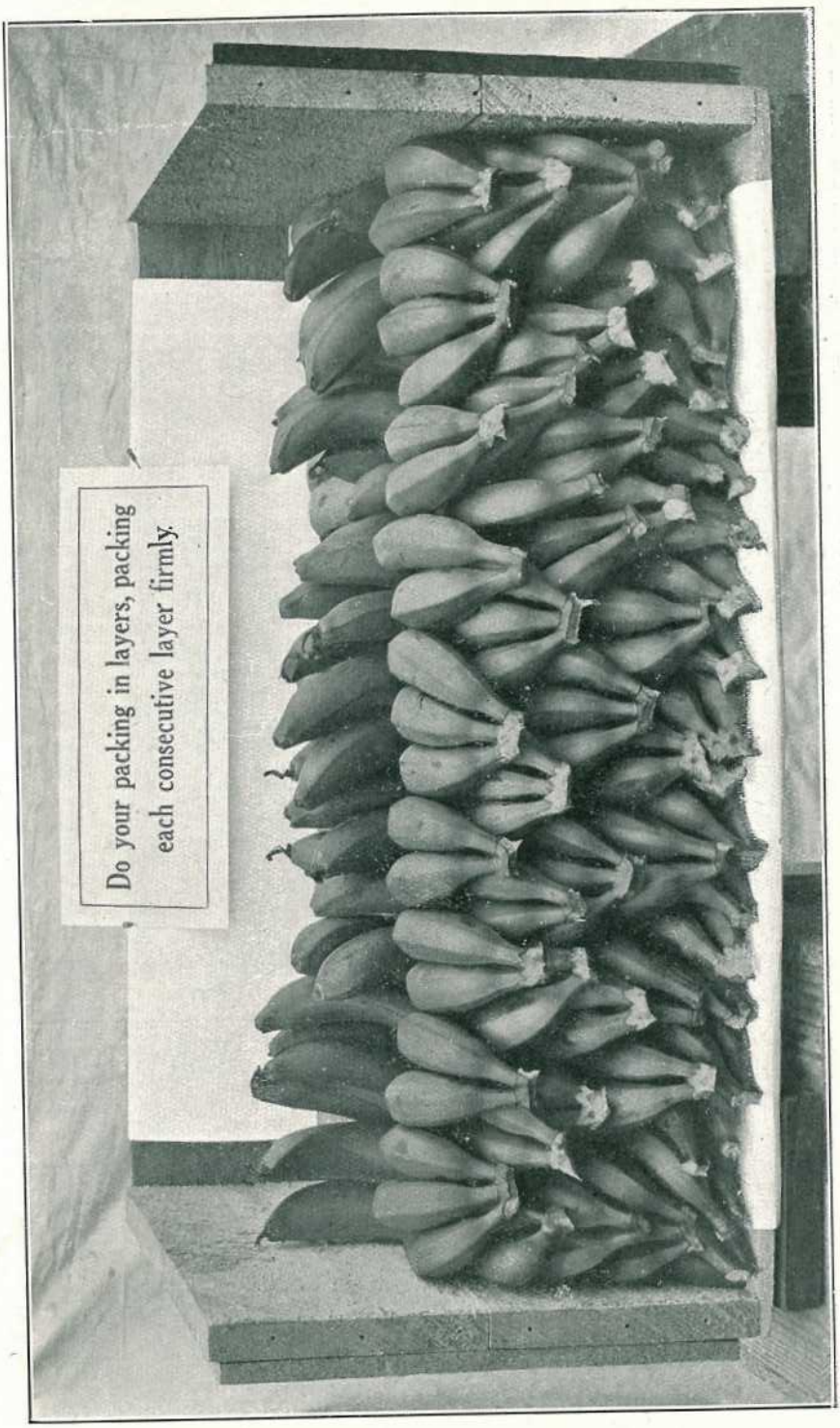
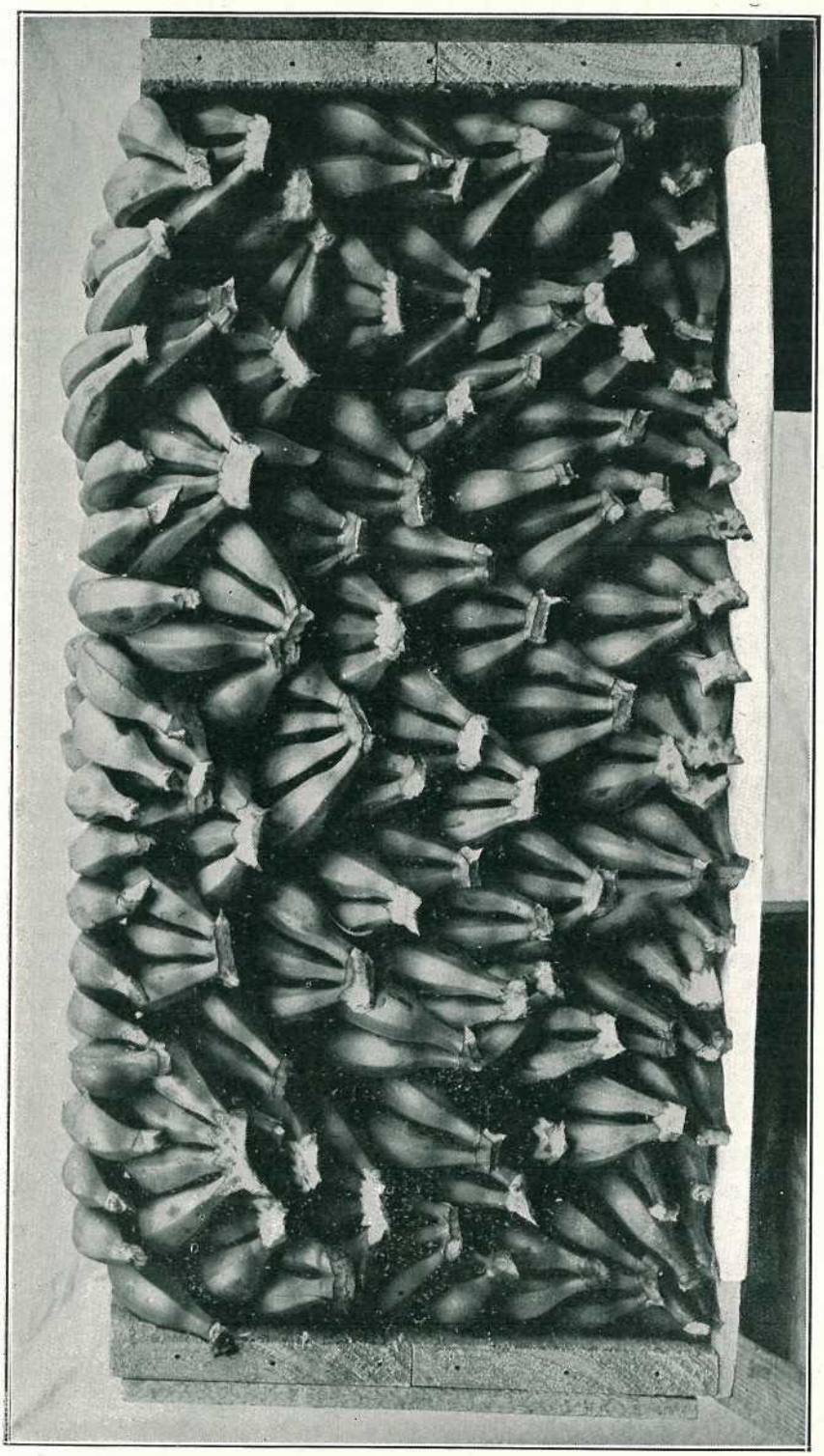

Do your packing in layers, packing each consecutive layer firmly.

PLATE 10.



Showing finished case opened at side. Note slight bulge at top and bottom.

Growers should therefore—

(1) Cut the bunches one day earlier.

(2) Sweat the hands at least 40 hours.

(3) Pack in layers firmly.

(4) Do not place the bananas directly on top of the other in the layers.

(5) Fill the centre of case properly.

Growers employing labour, whether for harvesting, handling, grading, packing, or carting, are urged to impress on their employees the necessity for following the advice given in this pamphlet.

A copy of this pamphlet should be always kept handy for reference.

BLACKEND.

"Blackend" is a defect much in evidence in the Southern States. Almost 80 per cent. of our bananas are affected. This injury is not at the flower end of the bananas, but at the stalk end connecting the hands. (See Plates 15 and 16.)

"Blackend" may be caused in many ways, but all causes may be eliminated by the growers and others concerned in handling the fruit on the plantations. The main causes are summarised:—

(1) Cutting the fruit from the plant, allowing it to fall to the ground.

(2) Carrying bunches on the shoulder.

(3) Stacking bunches on top of each side on slides or wagons.

(4) Rough breaking of the hands into smaller hands.

(5) Throwing full hands on to your packing table.

Growers are advised to watch their several handlings for rupture and other injuries, and to do their best to eliminate these causes of defective shipments.

FROM PLANTATION TO RAILWAY.

Absence of tarpaulins or any other protective weather covering on fruit wagons has been noticed in banana districts. Fruit going into trucks in a wet condition creates humidity in the truck, and it is hard to estimate the extent of damage caused by this avoidable condition. It may have something to do with "squirter," or may not; however, every conscientious grower knows that considerable damage must be caused by fruit going into trucks wet, and it is unnecessary to stress the obvious. Remedy—**Supply covers.**

PLATE 11.

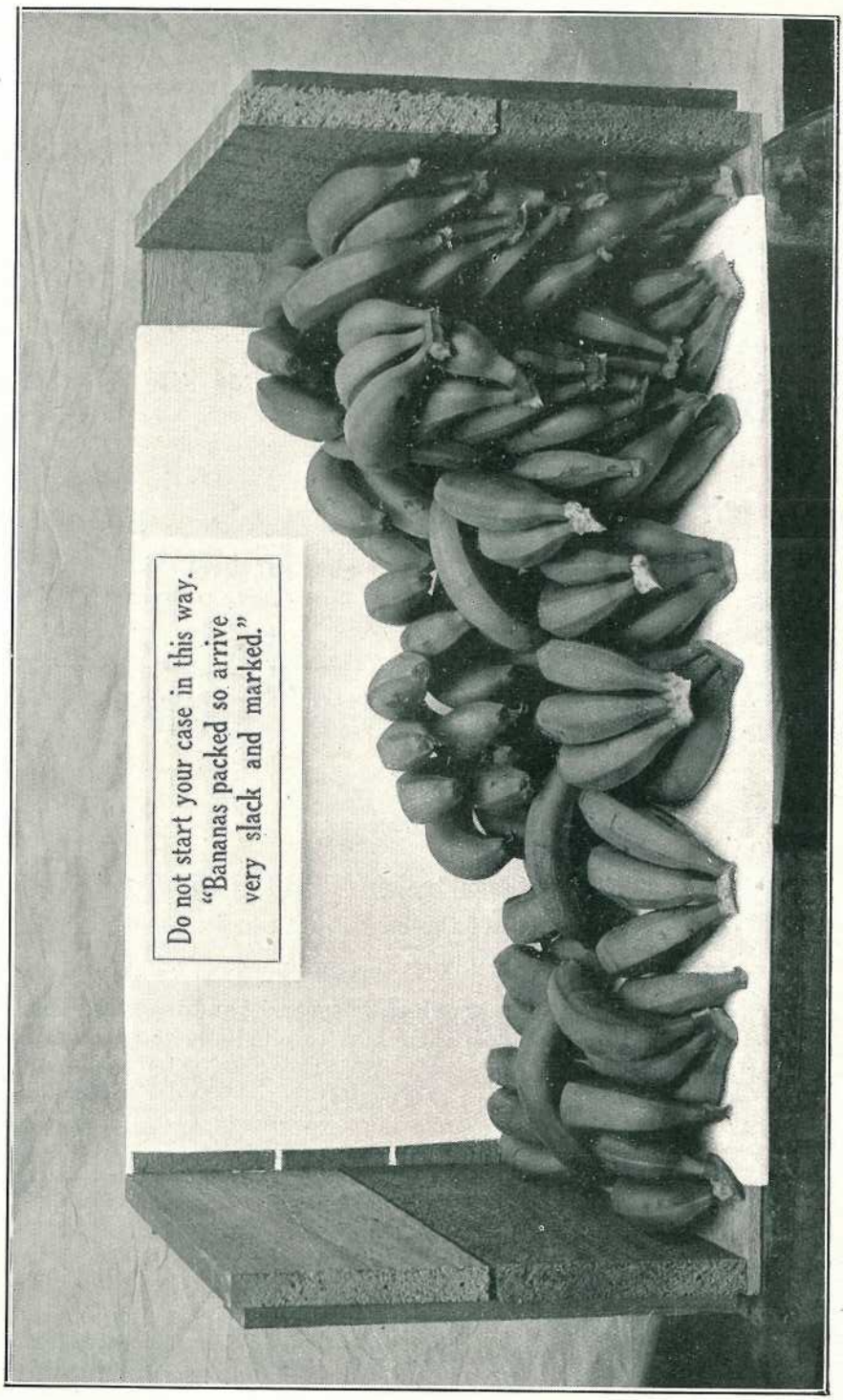
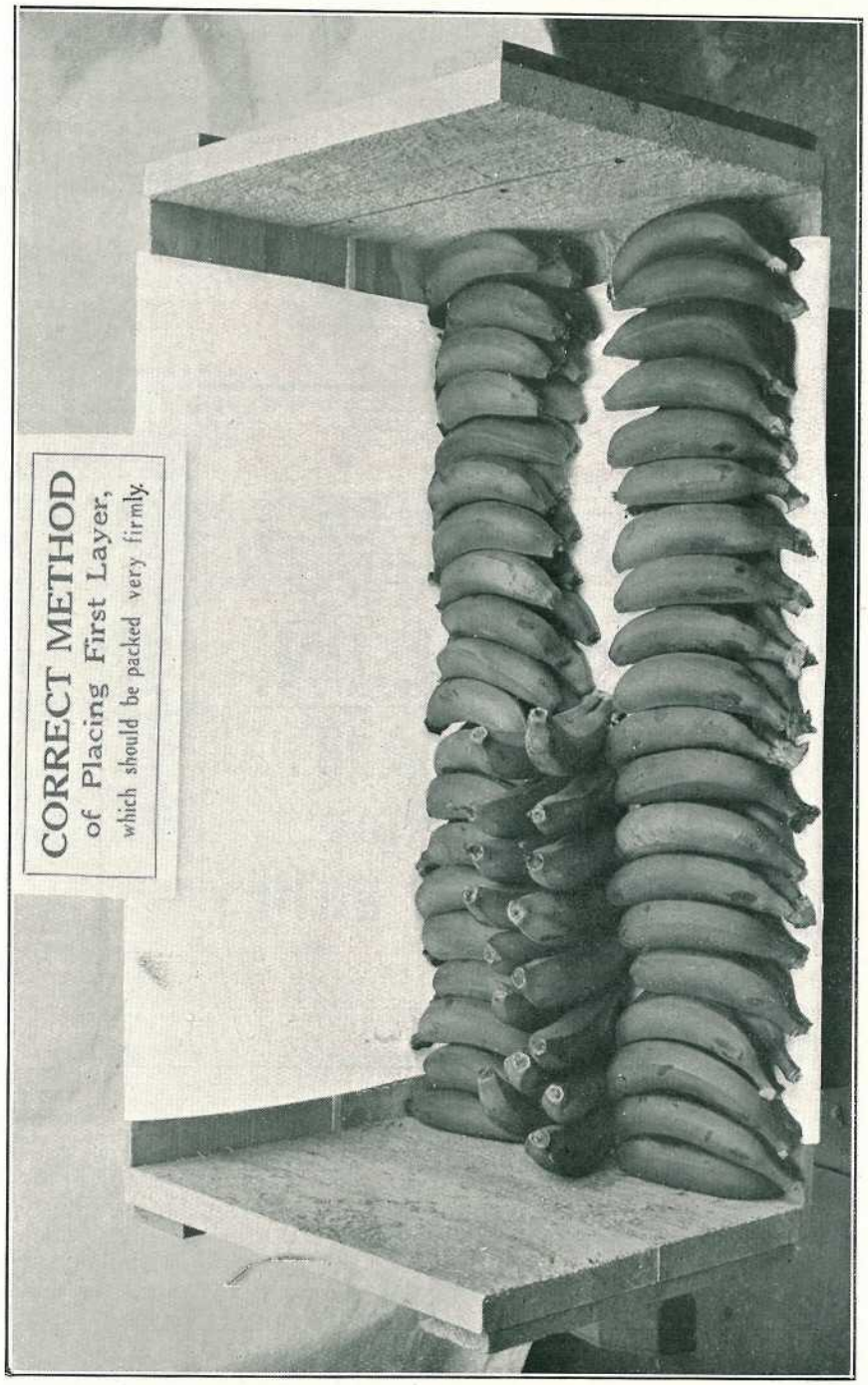

Do not start your case in this way.
"Bananas packed so arrive
very slack and marked."

Plate 12.



STANDARD GRADE.

BRANDING AND NAILING.

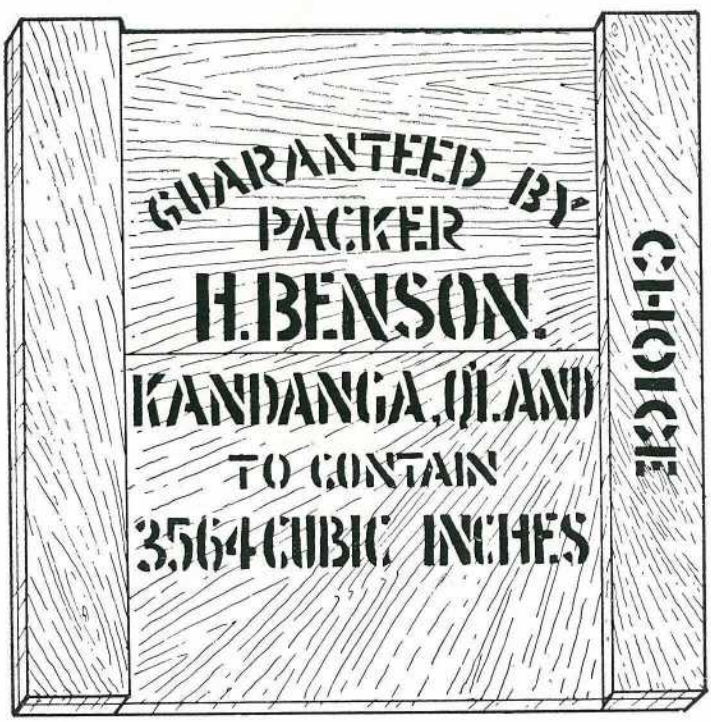
Branding.

The attention of growers is drawn to unnecessary branding and also the crude methods used.

Many growers brand their cases well and leave no room for complaint, while others slum this operation by placing one brand over the other, making it almost impossible for carters and railway men to sort out and stack into separate dumps in Melbourne, Sydney, and Adelaide.

There is no need for the agent's name and address on each case. What growers should see to is putting their own names and addresses on plainly. (Under the Fruit Cases Act this is necessary.) Examples:—Plates Nos. 13 and 14.

PLATE 13.

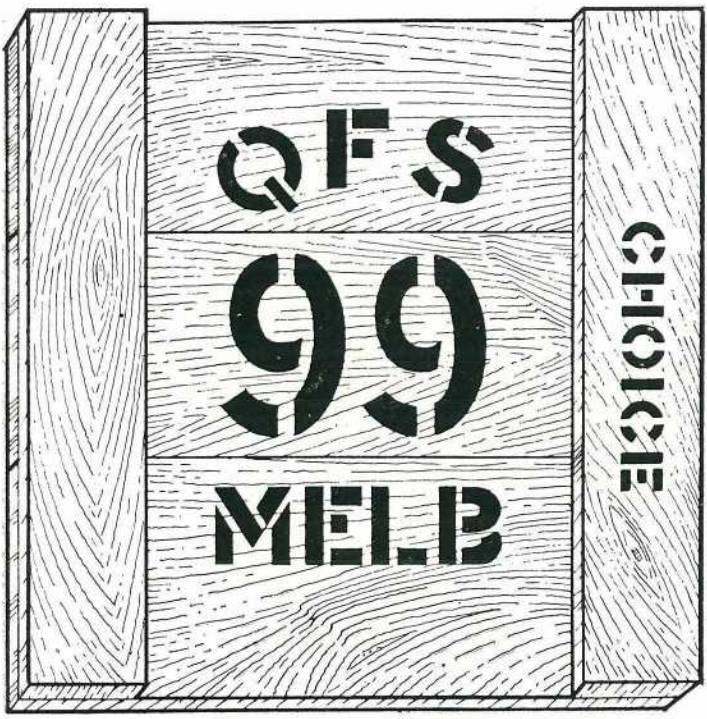


Nailing.

Owing to so many breakages occurring during transport it is absolutely necessary to bring this matter before the growers. Many breaks occur through the cleats not holding, casemakers forgetting to clinch the nails on the inside. Some growers are using only 1½-inch nails, and after seeing so many broken and pillaged cases in Melbourne, the opinion of the Fruit Marketing and Packing Instructor is that no nails under 1¾-inch should be used. If difficulty is experienced in getting the nails to hold, rust them prior to using.

Over 200 cases weekly are renailed and fruit is never put back the same as it leaves the plantation, so the growers' attention to this simple, yet important, detail is obviously needed.

Plate 14.



Grade standards for Cavendish Bananas are as follows:—

"Special" shall mean sound fruit, free from blemish and properly packed, having a minimum length of eight inches and a minimum circumference of five inches.

"Choice" shall mean sound fruit, properly packed, having a minimum length of over seven inches to eight inches and a minimum circumference of four inches.

"Standard" shall mean sound fruit, properly packed, having a minimum length of five and a-half inches to seven inches and a minimum circumference of four inches.

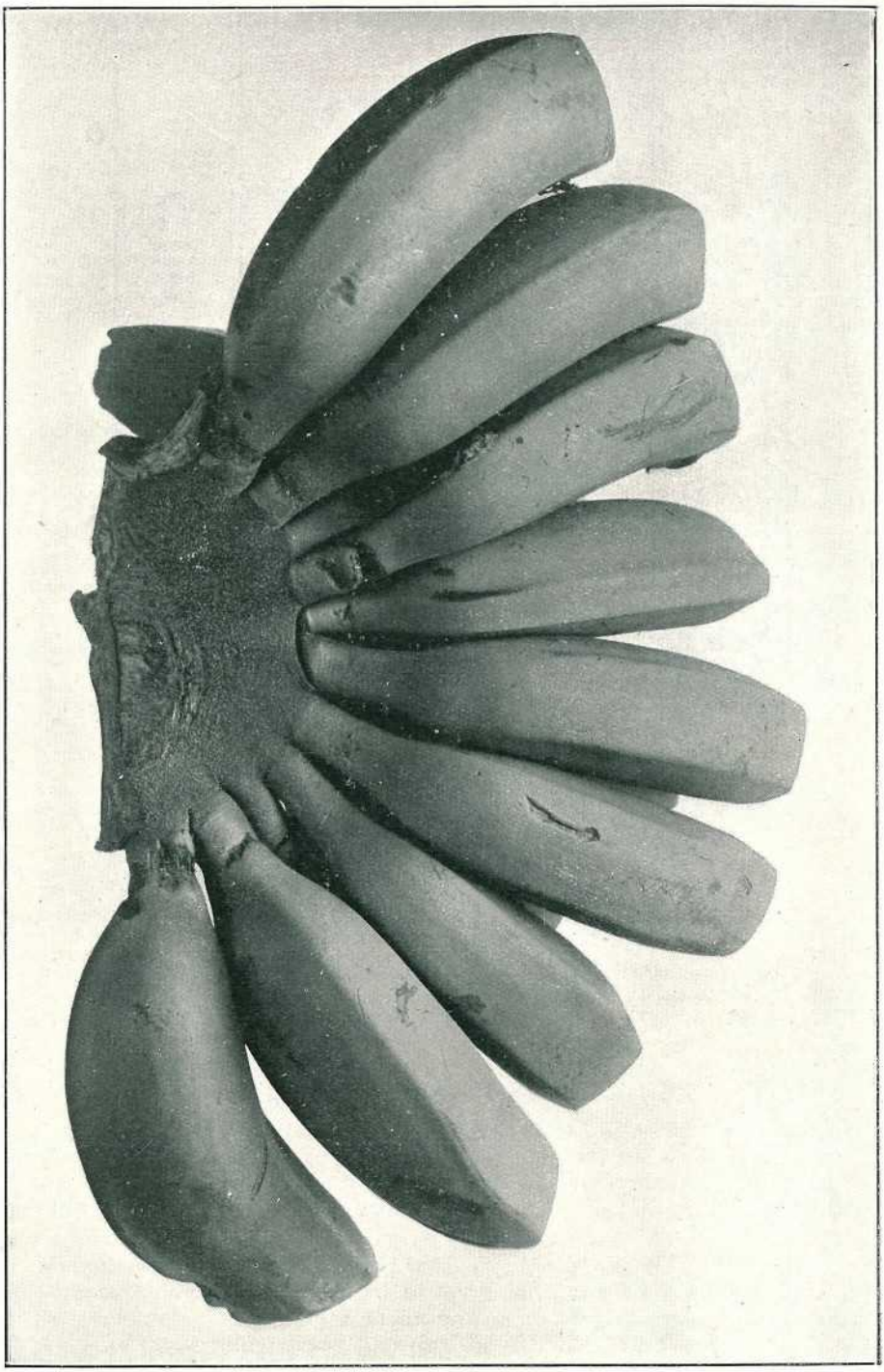
Note.—All measurements for length are to be taken on the outside of the curve from the junction of the fruit at the stem-end to the top of the fruit. Plate No. 17 shows the minimum size of the fruit for each of the above grades.

THE RETAILER'S POINT OF VIEW.

Particular attention is drawn to the fact that the cases are almost invariably opened on the side for inspection by buyers. The placing of good bananas, therefore, at the top and bottom of the case, without regard to the middle, results in the bananas being sold at the value of the inferior bananas in the middle.

The point to be driven home is that no grower can deceive the buyers. All the fruit has to be handled by the retailer, who examines each single banana before exposing them for sale. In Victoria the regulations prohibit the mixing of different sized fruits when offering for sale, consequently retailers are at considerable loss and inconvenience with badly graded fruit. Because of the fact that Queensland

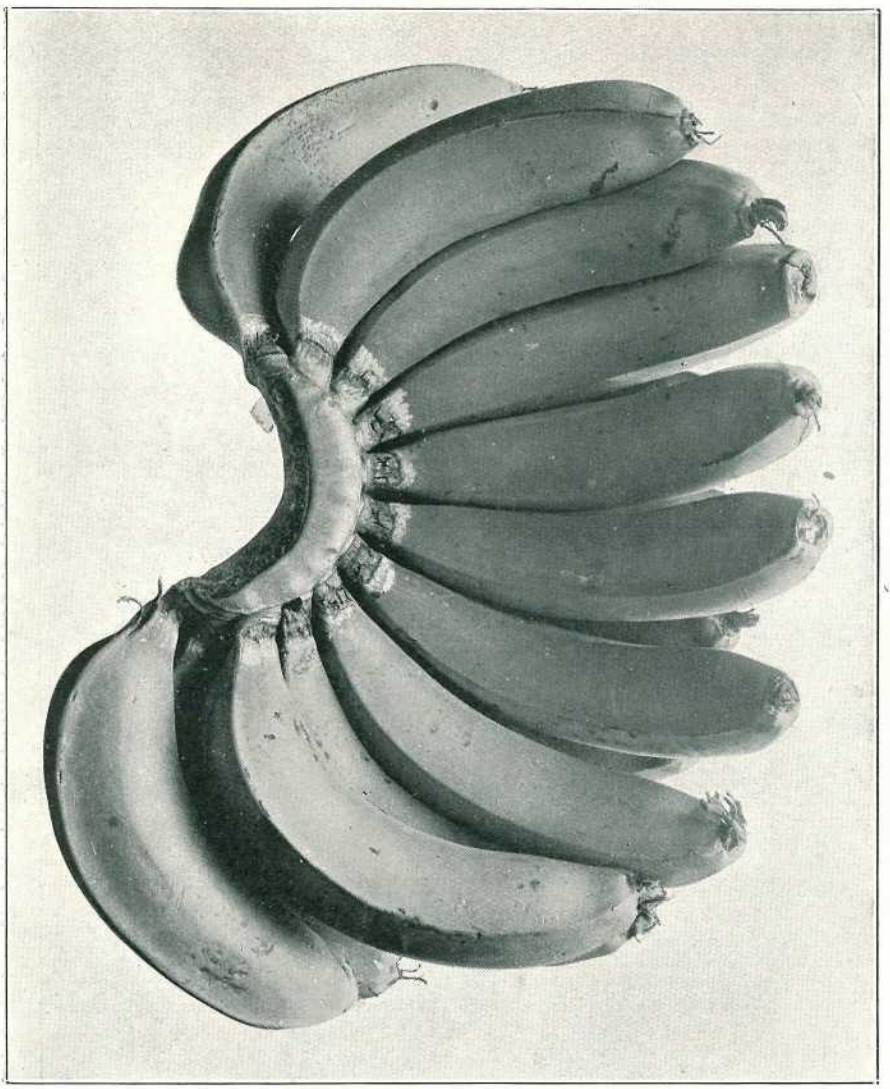
PLATE 15.



Showing damage through careless handling, which results in "Blackend."

bananas are, in general, so unreliable in this respect, the retailer has little interest in their sale; and, instead of being a pushing salesman for this class of fruit, buys it only because he is compelled to stock it for those of his customers who demand it.

Plate 16.

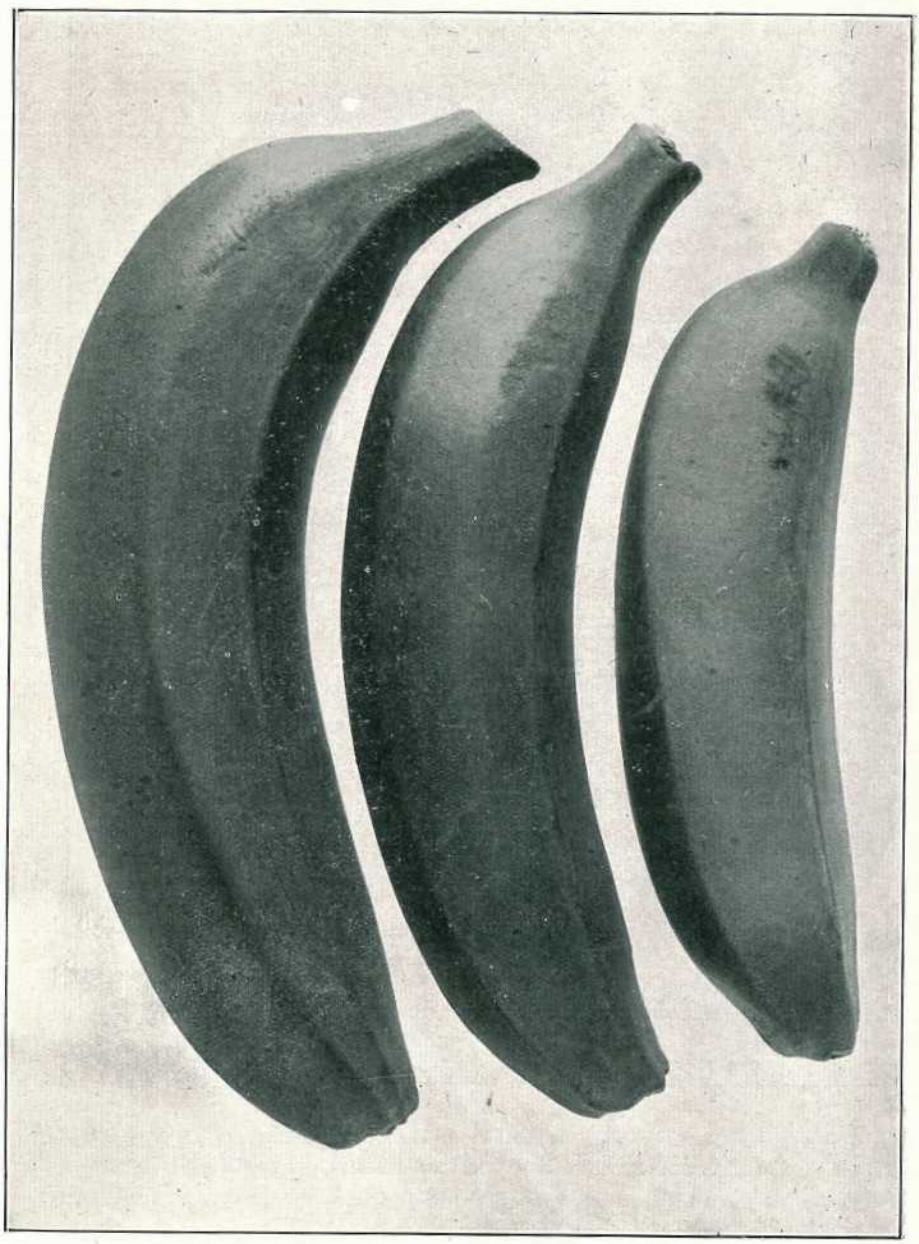


Showing damage to stem connections through careless handling.

Only an honest pack can survive the actual test of retail sales, and the grower is forced into the position—whether he likes it or not—of having to give an honest, well-graded pack, if he wishes to maintain a satisfactory price for his product.

PLATE 17.

1. "SPECIAL." 2. "CHOICE." 3. "STANDARD."



Showing minimum size of Bananas allowed in the grades.

TURKEY REARING.

P. Rumball, Poultry Instructor.

There has been a serious falling off in the number of turkeys kept in Queensland during recent years, of which ample evidence is supplied by the Registrar-General in his annual reports. During the season

1921-22 there were 19,626 turkeys.
1922-23 „ „ 15,712 „
1923-24 „ „ 10,898 „

This decline in numbers cannot be attributed to the lowered value of turkey flesh, as excellent prices are generally realised for good birds in the local markets, and in seeking the cause, one is forced to the conclusion that faulty methods of breeding and disease are the principal factors, although seasons have probably played their part.

Suitable Localities.

The farm, by reason of offering turkeys ample range, thereby enabling them to indulge in some of their wild traits, is its natural home. Free range also enables turkeys to gather considerable quantities of their own food in the form of grass, insect life, and when stubbles are available, grains. Districts in which the soil is of a light nature and undulating is more suited to turkey raising than low-lying wet country. Scrub country offers ideal conditions, especially where there is a good supply of green feed and water.

Housing.

It is natural for turkeys to roost in the open, but, when there is no suitable belt of timber to afford protection, certain housing methods should be adopted to obtain the best results. These houses need not be very elaborate, but should be so constructed as to permit of a free circulation of air. Old open-fronted lofty barns are well suited for this purpose, but in districts in which turkeys have to be protected from the fox it may be advisable to adopt the following system:—Enclose an area of land, about ½ an acre, with a 6-foot netting fence, and build a shed in the middle. This shed should face north, and be open in front with a 6-inch space between the back of the top wall and roof. The dimensions would vary according to the number of birds to be housed, but each bird should have a floor space of 15 square feet. The house should be 9 feet high in front and 7 feet at back. Perches should be about 3 feet high, all on the same level and 3 inches wide. Suitable nests could be placed around the enclosure and made to look as natural as possible with the help of bushes. The turkeys could be confined to these quarters at night, and allowed range during the day.

Breeding Stock.

There are several varieties of turkeys, but the American Bronze holds pride of place. This is a large and hardy breed, which has supplanted most other breeds, and appears to be well suited to our climate as well as our markets. Mature stock should only be used for breeders, two years and over being more suited than stock only a year old. One vigorous tom can be mated with as many as ten hens, but probably six to eight females on the average would give better results.

In selecting, strength and vigour, coupled with the knowledge that your stock are from healthy parents, is of primary importance. The head should have a clean and healthy appearance, body compact and long. Sturdy shanks and strong toes with fair-sized bone indicating stamina.

Extra heavy show specimens do not make the best breeders. What is required, is stock in good hard condition and not fat; on the other hand, stock that are thin should never be used, as the lack of condition may be due to some inherited weakness. Hens weighing 16 to 18 lb. and Toms 25 to 30 lb. in fair condition will be found to give satisfactory results.

Avoid in-breeding and endeavour to obtain occasionally new Toms from reliable stock, but before buying make sure that he comes from healthy parents, and take further precautions by isolating him for some two or three weeks. The best hens raised on the farm should be reserved for breeding purposes, and not sold because there is a good market.

Setting Hen.

Vermin must be carefully guarded against and when nesting in enclosed quarters, both the hen and the nest should have a good dusting with insect powder for a start, and again a few days previous to hatching. By taking these precautions you assure the young poults of a start in life free from vermin, which is a great aid to successful rearing. A turkey will only cover properly fifteen to eighteen eggs, and it is a good plan to set a few eggs under broody hens at the same time as the turkey is set, and when hatched to give all the chicks to the turkey, as she can comportably mother about twenty-five. Food, water, and grit should always be handy to the setting hen, and if the tom is at all savage it is advisable to protect the nest and young.

Rearing.

It is found best to let turkey hens mother the chickens. When hatched, the young poults should be left undisturbed until thoroughly dry, they then may be temporarily removed to induce the turkey to remain on the nest, if it is found that the eggs are hatching irregularly. After the hatch is complete a coop which affords protection from wind, rain, and dampness should be provided. This coop should permit of a free supply of air and be moved on to new ground daily. The hen and poults should be confined to the coop for ten days to a fortnight, but if the weather is fine the poults may be allowed a little liberty when the dew is off the grass; after this period it is generally safe to allow range, providing the grass is not too long and wet. When they have reached the age of five weeks, entire liberty can be given, allowing them to roost in barns, houses, or trees, according to the policy adopted.

Feeding.

No food should be given for at least forty-eight hours after hatching. Hard grit, charcoal, and water should be the first food provided. The hard grit assists in mastication and charcoal has no equal as a bowel corrector. Turkey chickens will gorge themselves if allowed, and this gorging is responsible for a considerable amount of trouble. Turkeys in their wild state would gather their food very slowly, and it is found best to imitate them as far as possible by only feeding the young chicks a little at a time and fairly frequently. This prevents them from over-loading their digestive organs and helps to retain that keenness of appetite which is essential to successful raising of poultry of all kinds.

Stale bread soaked in milk and then squeezed fairly dry is the most handy food on the farm and also gives excellent results. This can be fed five times a day for a few days, and variety can be made by the replacement of some of the meals with chick grains, mashes of bran and pollard mixed with milk, to which can be added a small amount of minced meat and tender green feed. This mash should be made crumbly and not sticky. When on range the quantities of food will vary according to what they can gather for themselves, but surplus milk can be fed at all times either thick or fresh, but it is as well to always feed it in the same condition. Green feed should be fed in abundance to both growing and adult stock, but where range is allowed on good green pasture it is not so important.

Grains should always be fed at night and so induce the flocks to return to their camps. Oats, maize, and wheat are suitable for this purpose.

In the management of turkeys, especially in the rearing of young stock, cleanliness is essential. Food should not be allowed to lie about or become decomposed, and a strict outlook must be kept for vermin of all sorts.

Diseases in Turkeys.

Turkeys are subject to practically the same diseases as other classes of poultry, but mention is made here of the most common and devastating diseases affecting the problem of turkey raising.

Black-head, Dipatitis, White Diarrhoea, &c.

This disease was given the popular name of black-head owing to the darkened appearance of the head of affected birds. The general adoption of the name is unfortunately misleading, as the darkening of the head is not noticed in all cases.

Old and young stock are affected, but heavy mortality is principally met with in young stock a few weeks old. The external symptoms are drowsiness, lack of vigour, and loss of appetite. Diarrhoea is nearly always present and of a yellowish colour, though sometimes white, due to the abnormal percentage of urates. The

disease usually appears in the intestinal tract, the ceaca being the most seriously affected. The liver quickly becomes affected. In view of the seriousness of this disease it is important in all cases of death from unknown causes, that the bird be opened and examined, and from a study of the accompanying plates the grower can without doubt ascertain if his losses are due to black-head.

Cause.—Bacteriologists do not agree as to the particular organism which causes this disease, but they do, however, assert that it can be transmitted from mother

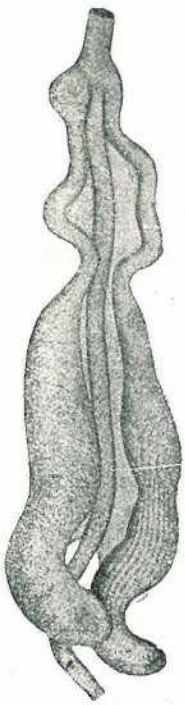


Fig. 1.

Fig. 2.

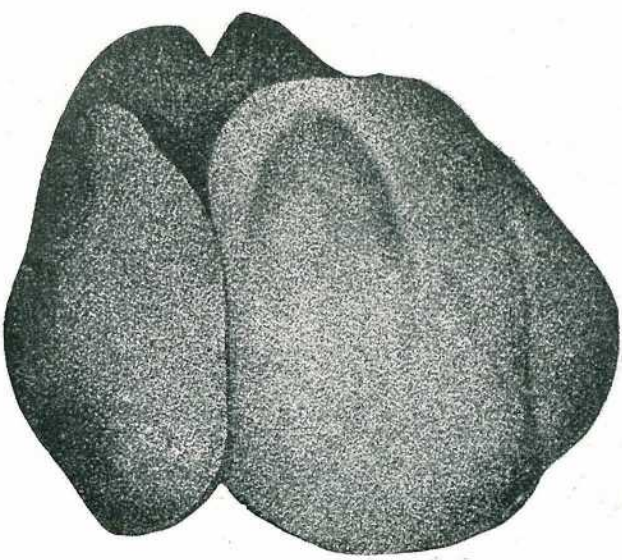


Fig. 3.—Liver of Healthy Turkey.

to progeny by means of the infection of the egg, hence the necessity of obtaining stock free from the trouble. It is also readily transmitted from one bird to another through food coming in contact with the droppings from diseased stock.

Medicinal treatment has not proved successful, but where stock has been recently infected the following remedies may be adopted as a means of arresting the disease:—Thorough cleanliness of quarters and disinfection with a 5 per cent. carbolic acid solution. A teaspoonful of hydrochloric acid to a quart of drinking water often gives good results. Sour milk, by its action in keeping the intestinal tract in an acid condition, is also of value.

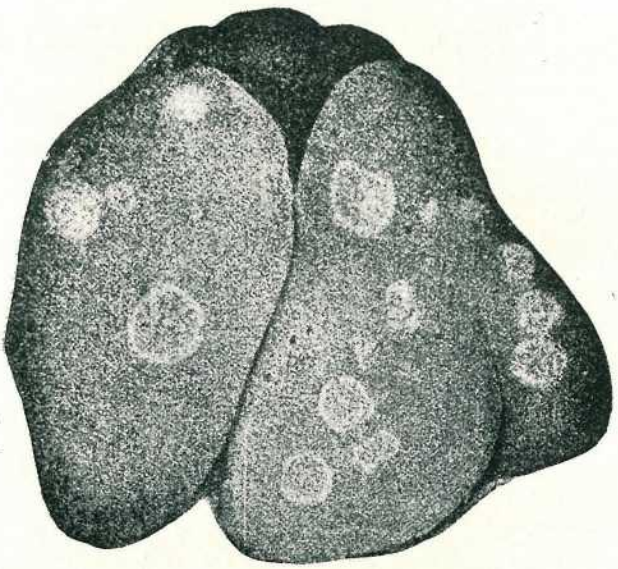


FIG. 4.—LIVER OF DISEASED TURKEY.

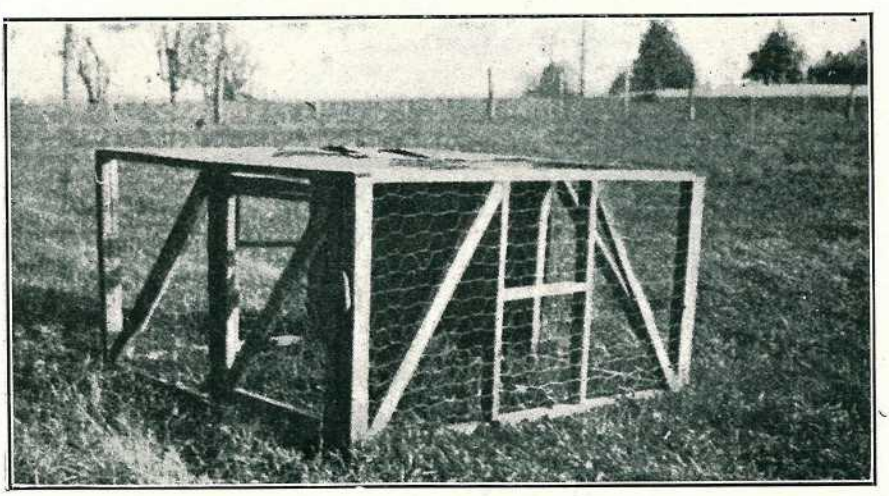


FIG. 5.—TURKEY BROOD COOP.

This coop meets every practical requirement of the turkey grower. It is sanitary, low in cost, easily moved, and affords complete protection with a minimum of confinement.

EGG-LAYING COMPETITIONS.

N.U.P.B.A., ZILLMERE.

FINAL SCORES.

The 1924-5 Egg-laying Competition conducted by the Queensland Branch, N.U.P.B.A., was concluded on 28th February. Prizes and certificates were gained as follows:—

Oakleigh P.F. (W. E. Woodward), Sunnybank, White Leghorns, 286 eggs, first prize (highest individual score, any variety).

W. Wakefield, Mount Gravatt, White Leghorn, 252 eggs, second prize, White Leghorn.

E. Walters, Moorooka, first prize, Black Orpington Section, 241 eggs.

J. Hutton, Kingsthorpe, second prize, Black Orpington, 239 eggs.

R. Duff, Waterworks road, highest aggregate score, any variety, 691 eggs.

Messines P.F. (H. E. Oldmeadow), first prize, Other Varieties, Rhode Island Red, 215 eggs.

Certificates.—

K. A. Sommerlad, Hornsby, N.S.W. (White Leghorn)	251 eggs.
A. Hodge, Kelvin Grove road (White Leghorn)	245 „
W. Wakefield, Mount Gravatt (White Leghorn)	244 „
F. P. Cumming, Clayfield (Black Orpington)	238 „
R. Duff, Waterworks road (White Leghorn)	237 „
G. Williams, Ipswich (White Leghorn)	235 „
R. Duff, Waterworks road (White Leghorn)	230 „
J. Pryde, Indooroopilly (Langshan)	175 „

The President's Gold Medal for most typical bird in the competition was awarded to Mr. T. H. Brotherton, East Brisbane.

The competition was only run for eleven months to allow of an earlier start this year, but as Mr. Woodward's bird has made such a good showing she will be retained the full twelve months so as to have an official record of her year's laying.

WHITE LEGHORNS.

Pen No.	Owner.	Month.	Eleven months' total.	Pen No.	Owner.	Month.	Eleven months' total.
104	Oakleigh P.F. ..	25	286	41	R. C. Cole	16	210
82	W. Wakefield ..	22	252	65	E. Tracey	22	210
97	K. A. Sommerlad ..	22	251	79	J. E. G. Purnell ..	5	209
21	A. Hodge	14	245	25	H. T. Britten ..	16	208
84	W. Wakefield ..	19	244	1	F. J. Williams ..	18	206
88	R. Duff	20	237	61	Carinya P.F. ..	18	205
95	G. Williams ..	20	235	48	R. C. J. Turner ..	16	202
89	R. Duff	17	230	174	S. L. Grenier ..	16	202
11	W. J. Berry ..	18	229	56	J. Hutton	17	201
20	A. Hodge	16	228	13	G. Marks	18	200
105	Oakleigh P.F. ..	14	226	80	J. E. G. Purnell ..	15	200
92	C. A. Hodgson ..	19	225	99	K. A. Sommerlad ..	19	200
12	W. J. Berry ..	12	224	64	E. Tracey ..	16	199
90	R. Duff	20	224	6	H. T. Pember ..	3	198
101	A. S. Walters ..	18	221	16	J. T. Webster ..	9	198
73	E. C. Raymond ..	18	214	51	J. Earl	8	198
19	A. Hodge	14	212	106	W. L. Howard ..	7	198
58	A. Staib	12	211	68	Kidd Bros.	19	197

WHITE LEGHORNS—*continued.*

Pen No.	Owner.	Month.	Eleven months' total.	Pen No.	Owner.	Month.	Eleven months' total.
74	E. C. Raymond ..	16	197	71	J. R. Wilson ..	12	B207
40	R. C. Cole	21	196	42	R. C. Cole	16	B203
108	W. L. Howard ..	18	196	67	Kidd Bros. ..	10	B202
39	H. Fraser	16	195	75	E. C. Raymond ..	12	B199
78	M. F. Newberry ..	15	192	72	J. R. Wilson ..	19	B178
15	G. Marks	15	191	29	M. H. Campbell ..	8	B175
87	Enroh Pens ..	12	187	33	W. and G. W. Hindes	9	B173
34	J. L. Chapman ..	21	184	49	J. Earl	16	B165
10	W. J. Berry ..	18	183	35	J. L. Chapman ..	0	B161
69	Kidd Bros.	18	180	77	M. F. Newberry ..	17	B147
5	H. T. Pember ..	8	172	173	S. L. Grenier ..	10	B100
86	Enroh Pens ..	13	172	7	H. Sturman ..	13	B98
62	Carinya P.F. ..	17	171	24	A. Neil	0	B86
26	H. T. Britten ..	19	170	70	J. R. Wilson ..	21	BE247
47	R. C. J. Turner ..	0	164	66	E. Tracey	21	BE239
98	K. A. Sommerlad ..	9	160	102	A. S. Walters ..	19	E233
100	A. S. Walters ..	1	159	31	W. and G. W. Hindes	22	BE228
38	H. Fraser	0	155	55	J. Hutton	18	BE227
60	A. Staib	13	155	18	J. T. Webster ..	19	BE221
63	Carinya P.F. ..	17	155	54	G. E. Rogers ..	18	E221
83	W. Wakefield ..	8	150	37	H. Fraser	21	BE215
172	S. L. Grenier ..	8	150	53	G. E. Rogers ..	21	E214
59	A. Staib	19	146	32	W. and G. W. Hindes	16	BE203
76	M. F. Newberry ..	0	146	36	J. L. Chapman ..	14	E203
103	Oakleigh P.F. ..	0	131	85	Enroh Pens ..	6	BE199
45	P. F. Adams ..	0	128	8	H. Sturman ..	12	E188
46	R. C. J. Turner ..	0	124	9	H. Sturman ..	21	BE188
91	C. A. Hodgson ..	0	121	27	H. T. Britten ..	3	E186
93	C. A. Hodgson ..	0	116	2	F. J. Williams ..	16	E184
50	J. Earl (replaced 6-10-24) ..	18	96	3	F. J. Williams ..	12	E182
				96	G. Williams ..	18	BE178
14	G. Marks	22	B224	22	A. Neil	15	BE173
30	M. H. Campbell ..	12	B215	23	A. Neil	11	BE168
28	M. H. Campbell ..	16	B210	4	H. T. Pember ..	13	E157
52	G. E. Rogers ..	17	B208	57	J. Hutton	0	BE132

BLACK ORPINGTONS.

127	E. Walters	14	241	128	E. Walters	15	172
156	J. Hutton	19	239	112	W. R. Wilson ..	14	163
144	F. P. Cummings ..	18	238	148	E. C. Raymond ..	0	162
130	G. E. Rogers ..	8	228	137	W. S. Adams ..	7	160
126	T. H. Brotherton ..	11	226	124	T. H. Brotherton (replaced 30-8-24)	21	139
143	F. P. Cummings ..	15	223				
131	G. E. Rogers ..	11	219	141	J. Pryde (replaced 7-7-24)	16	126
113	W. R. Wilson ..	14	218				
129	E. Walters	17	216	121	J. Potter	4	123
149	E. C. Raymond ..	21	218	118	H. M. Chaille ..	2	87
150	E. C. Raymond ..	0	214	119	H. M. Chaille ..	5	B202
155	J. Hutton	12	211	142	F. P. Cummings ..	23	E265
110	T. Fanning ..	2	210	154	J. Hutton	13	E239
153	Enroh Pens ..	13	200	147	Everlay P.Y. ..	4	E231
133	C. C. Dennis ..	10	198	114	W. R. Wilson ..	6	E217
125	T. H. Brotherton ..	13	194	138	W. S. Adams ..	16	BE215
116	G. L. Campbell ..	5	190	123	J. Potter	10	E201
132	G. E. Rogers ..	18	189	136	W. S. Adams ..	13	E189
145	Everlay P.Y. ..	17	189	140	J. Pryde	2	E188
111	T. Fanning ..	0	187	109	T. Fanning ..	2	E182
146	Everlay P.Y. ..	11	186	135	C. C. Dennis ..	20	E151
152	Enroh Pens ..	17	184	122	J. Potter	17	E148
139	J. Prdye	0	182	115	G. L. Campbell ..	0	E143
134	C. C. Dennis ..	11	174	117	G. L. Campbell ..	0	BE140
120	H. M. Chaille ..	0	172	151	Enroh Pens ..	0	E126

B Signifies bird under standard weight.
E Signifies egg under standard weight.

OTHER VARIETIES.

Pen No.	Owner.	Month.	Eleven months' total.
159	Messines P. F. (R.I.R.) ..	16	215
169	J. Pryde (Lang.) ..	9	175
165	A. S. Walters (B.R.)	13	174
157	Messines P. F. (R.I.R.) ..	8	173
161	T. C. Ollier (B.R.)	15	173
168	W. H. Forsyth (S.W.)	14	172
167	W. H. Forsyth (S.W.)	7	166
160	T. C. Ollier (B.R.)	22	161
180	J. Ferguson and Sons (B.L.) ..	11	160
158	Messines P. F. (R.I.R.) ..	11	159
178	J. Ferguson and Sons (B.L.) ..	16	154
164	A. S. Walters (B.R.)	14	123
166	W. H. Forsyth (S.W.)	0	128
163	A. S. Walters (B.R.)	11	112
176	Everlay P.Y. (B.L.)	0	105
170	J. Pryde (Lang.) (replaced 23-6-24)	6	B144
175	Everlay P.Y. (B.L.)	17	E192
162	T. C. Ollier (B.R.)	8	E165
179	J. Ferguson and Sons (B.L.) ..	8	E132
171	J. Pryde (Lang.) (replaced 21-6-24)	8	E129
177	Everlay P.Y. (B.L.)	9	E127

C. KIDD, Hon. Secretary.

B Signifies bird under standard weight.

E Signifies egg under standard weight.

N.U.P.B.A. TOOWOOMBA SUB-BRANCH.

Single Test Egg-Laying Competition—Scores to 28th Feb., 1925.

BLACK ORPINGTONS.

Pen No.	Owner.	Feb.	Total.
41	Wilson, W. R. ..	24	249
24	*Carr, T. J.	20	247
51	*Holmes, R.	16	246
42	Wilson, W. R. ..	20	243
15	Macfarlane, K. ..	24	237
30	Adams, W. S. ..	24	233
25	Stephens, Moss ..	23	228
10	Everlay P.F. ..	22	225
23	Carr, T. J.	12	222
32	Radford, G. ..	20	222
40	Rogers, G. E. ..	21	220
45	Stephens, H. B. ..	9	219
28	Williams, W. D. ..	19	218
19	Maund, Mrs. L. ..	17	216
7	*Adams, P. F. ..	16	215
48	Head, J.	20	215
39	Rogers, G. E. ..	11	214
29	*Adams, W. S. ..	12	213
50	Ollier, T. C. ..	11	209
36	Rivett, R. R. ..	15	208
6	Walters, E. ..	17	203
9	Everlay P.F. ..	0	203
16	*Macfarlane, K. ..	13	201
22	*Walsh, H.	19	199
43	Smith, E. R. ..	20	198
20	Maund, Mrs. L. ..	0	192
49	*Ollier, T. C. ..	12	191
13	Burns, R.	10	185
47	*Head, J.	22	182
52	Holmes, R.	4	181
2	Hutton, Jas. ..	2	178
14	Burns, R. (dead) ..	12	178
3	McLay, J. A. ..	10	177
8	Adams, P. F. ..	21	176
27	Williams, W. D. ..	4	174
37	Short, J. W. ..	15	167
44	Smith, E. R. ..	13	167
38	Short, J. W. ..	17	165
1	Hutton, Jas. ..	10	164
5	Walters, E.	0	160
21	Walsh, H.	16	160
18	Champion, S. H. K.	15	149

* Signifies bird laying under-weight eggs.

BLACK ORPINGTONS—*continued.*

Pen No.	Owner.	Feb.	Total.	Pen No.	Owner.	Feb.	Total.
33	Potter, Jas. ..	0	148	31	*Radford, G. ..	2	101
4	McLay, J. A. ..	15	144	35	Rivett, R. R. ..	1	82
26	Stephens, Moss ..	16	140	17	*Champion, S. H. K.	0	41
34	*Potter, Jas. ..	0	132	12	Webb, A. W. (dead)	0	16
11	Webb, A. W. (dead)	0	122	46	Stephens, H. B. ..	0	1

OTHER VARIETIES.

70	*Dibbs, H. (Lang.) ..	28	284	69	Dibbs, H. (Lang.) ..	15	177
53	Warrian C. G. (Rock.) ..	22	265	54	Warrian, C. G. (Rock.)	4	146
66	*Becker, W. (Lang.)	26	228	71	Brand, V. (R.I.R.) ..	2	143
60	Le Pla, A. W. (R.I.R.)	18	221	72	Brand, V. (R.I.R.) ..	8	136
57	*Maund, Mrs. L. (Col. W'dotte) ..	14	204	63	Rafter, J. J. (B.L.)	17	134
64	Rafter, J. J. (B.L.)	23	195	67	Everlay P.F. (B.L.)	17	121
68	*Everlay P.F. (B.L.)	18	194	58	Maund, Mrs. L. (Col. W'dotte) ..	16	120
59	Le Pla, A. W. (R.I.R.)	9	188	55	Carr, T. J. (S.W.)	2	103
61	Harrington, J. (B.L.)	19	186	62	*Harrington, J. (B.L.) (dead)	0	42
65	*Becker, W. (Lang.)	0	184				
56	*Carr, T. J. (S.W.)	17	181				

WHITE LEGHORNS.

132	*Short, J. W. ..	19	277	99	*Newton, J. W. ..	18	203
112	*Chapman, S. ..	23	263	79	*McBean, S. ..	21	202
73	Dippel, D. H. ..	17	255	126	Maurer, G.	16	201
114	Cole, R. C.	19	251	101	Turner, R. C. J. ..	21	200
118	Goggins, J. ..	23	250	128	Stilton, E. J. ..	10	200
91	Stilton, G.	20	247	75	Wilson, W. ..	13	199
131	*Short, J. W. ..	16	247	78	Howard, R. B. ..	12	199
122	Grant, W.	17	244	97	Hunt, G.	12	199
110	*Enroh Pens ..	18	242	104	*Fallon, P. J. ..	18	199
121	Grant, W.	19	242	107	Adams, P. F. ..	18	198
123	King, J. E.	18	239	74	Dippel, D. H. ..	19	196
113	Cole, R. C.	20	231	95	Adams, W. S. (dead)	0	194
124	King, J. E.	19	229	106	*Hutton, Jas. ..	11	194
105	Hutton, Jas. ..	9	226	90	Ellis, L. E.	14	193
129	Manning, H. G. ..	17	226	103	*Fallon, P. J. ..	19	193
130	*Manning, H. G. ..	22	226	92	Stilton, G.	18	190
88	*Warrian, C. G. ..	23	223	102	Turner, R. C. J. ..	8	188
96	Adams, W. S. ..	19	221	83	Carinya P.F. ..	15	185
111	Chapman, S. ..	14	221	116	Taylor, Jas. ..	3	185
100	*Newton, J. W. ..	18	220	76	Wilson, W. ..	9	182
85	Rivett, R. R. ..	18	219	84	Carinya P.F. ..	19	181
115	Taylor, Jas. ..	7	214	81	Smith, E. R. ..	9	180
109	*Enroh Pens ..	19	213	77	Howard, R. B. ..	12	169
125	*Maurer, G. ..	12	212	89	Ellis, L. E.	11	167
87	Warrian, C. G. ..	21	209	98	Hunt, G.	16	165
117	Goggins, J. ..	19	209	119	Rogers, G. E. ..	8	162
80	McBean, S. ..	21	208	94	Williams, D. W. ..	9	161
93	Williams, W. D. ..	11	208	108	Adams, P. F. ..	3	152
120	Rogers, G. E. ..	22	207	127	Stilton, E. J. ..	2	151
86	Rivett, R. R. ..	14	204	82	Smith, E. R. ..	8	150

* Signifies bird laying under-weight eggs.

JOSEPH GARNER, Government Supervisor.

MOUNT GRAVATT COMPETITION.

In the course of January 4,582 eggs were laid, an average of 16·9 eggs per bird. Broodiness and moulting stock have been factors in reducing the output, but on the whole the figures are satisfactory. Two deaths occurred. Individual scores:—(U opposite the total figures indicates that the eggs are under the standard weight of 24 oz. to the dozen, and X opposite individual scores indicates that the figures are the total score of dead and replaced birds.)

SECTION 1.

White Leghorns (except where stated).

Name.	A.	B.	C.	D.	E.	F.	Monthly Total.	Grand Total.
W. and G. W. Hindes ..	211	231	233	246	224	193	115	1338U
S. Grenier	209x	195	228	202	183	215	122	1232
T. H. Craig	204	216	210	227	160	207	123	1224
G. Marks	245	205	206	187	198	174	116	1215
W. Wakefield	134	214	218	197	220	225	131	1208
Mrs. L. Anderson ..	211	202	208	212	181	192	128	1206U
W. H. Flowers	178	157	208	220	226	217	121	1206U
H. Fraser..	219	182	198	217	203	174	119	1193
G. W. Cox	211	180	223	151	232	192	121	1189
H. T. Britten	231	223	166	192	197x	181	117	1190U
T. W. Honeywill ..	189	225	185	200	202	177	127	1178
R. C. J. Turner	206	209	180	209	159	213	116	1176
L. Bird	196	204	202	123	225	219	134	1169
Oakleigh Poultry Farm..	148	219	172	183	218	204	113	1144
J. E. G. Purnell	185	185	146	203	215	200	105	1134
Mrs. R. E. Hodge ..	183	200	160	212	183	182	106	1120
John J. McLachlan ..	179x	164	230	183	206	152x	105	1114
Kidd Brothers	197	195	165	203	158	191	86	1109
B. Driver	180	146	149	230	199	198	114	1102
A. A. Storling (Anconas)	152	144	215	195	164	185	94	1055U
H. P. Clarke	180	153	174	196	176	174	109	1053
A. Neil	212	189	187	188	92	184	103	1052U
L. J. Silman	189	200	154	177	169	155	100	1044
W. D. McHardie (Anconas)	191	168	143	177	181	176	108	1036
J. W. Newton	179	176	144	150	165	195	92	1009U
W. D. Melrose	117x	153	214	221	87	184	81	976U
T. W. Biddulph	223	204	106	174	109	135	85	951
Geo. Williams	123	40	204	202	187	187	98	934
Chris. A. Goss	8	227	112	116	206	191	75	860
Ancona Club, Pen 2 ..	169	149	110	111	171	133	94	843
Ancona Club, Pen 1 ..	113	155	156	180	87	16	60	708

SECTION 2.

Black Orpingtons (except where stated).

Name.	A.	B.	C.	D.	E.	F.	Monthly Total.	Grand Total.
James Hutton	230	251	226	182	182	210	102	1281
James Potter	186	213	193	166	226	175	91	1159U
Mrs. A. E. Gallagher ..	182	212	171	198	204	171	127	1138
R. Burns	164x	188	192	192	176	192	110	1104
H. G. Stevens	203	184	175	159	186	156	124	1063
Carinya P. Farm ..	129	152	187x	166	182	206	72	1022U
Kidd Bros.	176	178	168	178	182	135	82	1017U
Mrs. A. Kent	191	232	100	153	135	173	113	984
E. Walters	138x	138	126	218x	221	136	52	977
T. W. Lenny	184	139	192	113	131	168	68	927U
H. M. Chaille	165	163	201	142x	210	37	99	918U
J. Ferguson	86	142	140	183	178	182	67	911
W. and G. W. Hindes ..	156	94	189	130	204	125	58	898U
E. C. Stead (W.) ..	103	178	132	181	145	139	99	878U

W. D. DELL.

APPLE TREE WOOLLY APHIS AND ITS SUBJUGATION BY *APHELINUS MALI* (Hald.)*

BY HUBERT JARVIS, Entomologist, Stanthorpe.

Introductory Note.—Hitherto, in dealing with the occurrence of the highly pernicious Woolly Aphis of the apple, procedures recommended by the department have involved periodical spraying; and in the case of trees badly infested heading them back, and reconstituting them with a new apple variety, by grafting scions of the latter upon them, this necessitating the throwing of these trees out of bearing for a considerable period, even when the grafts "take."

Its occurrence in our orchard has also necessitated all apple-trees being grown on blight proof stock (*e.g.*, Northern Spy), a procedure not promotive of the success of apple-growing in many cases.

As distinct from this, the entomological method, as developed by Mr. H. Jarvis of this office, and with our concurrence, has been to confront the Apple Woolly Aphis with a formidable parasite, and so effect its extermination, and thus at once augment the fruit-bearing capacity of its host-plant (the apple) instead of suspending this, for the time being, and also obviate the costly and arduous work of spraying.

The valuable undertaking that the Stanthorpe Entomologist has already accomplished in this direction is set forth in the appended memorandum and merits our highest commendation.

It should have the effect, moreover, not only of banishing a very serious enemy of the fruit tree named, but also of rendering it practicable henceforth to grow the apple at Stanthorpe on stocks everywhere suitable to the soils and conditions that obtain there—a procedure that hitherto, owing to the continued presence of this pest, was not only impracticable, but it involved the use of a stock, the Woolly Aphis resistant Northern Spy, itself most prone to so serious a disease as is Apple Root Gall, from whose attacks other apple stocks are comparatively immune.—HENRY TRYON, Entomologist in Chief, 11th March, 1925.

THE REPORT.

I have the honour to submit the following report on the Woolly Aphis Parasite (*Aphelinus mali*, Hald.) and its work in this district, during this season.

In April, 1923, application was made to Dr. R. J. Tillyard, M.A., D.Sc., &c., Entomologist in Chief of the Cawthron Institute, Nelson, New Zealand, for a consignment of the Woolly Aphis Parasite (*Aphelinus mali*), reported at that time to be doing such good work in controlling the Woolly Aphis in New Zealand.

Dr. Tillyard was good enough to promise a supply of the insects for this district, and arrangements having been made for their reception, aphides harbouring them accordingly arrived on 14th August, 1923. The material sent by Dr. Tillyard was at once taken to the Departmental Insectary, opened there, and placed in a special breeding cage designed by Dr. Tillyard for the purpose of rearing the parasites and meanwhile procured. Several of the individual aphids received were now examined, and living Aphelinus pupæ were found, within the dead aphis "shells," so every hope was entertained of a number of parasites hatching out.

On the 29th of August, 1923, eight parasites emerged from the material in the breeding cage, and daily henceforth further hatchings were recorded until 5th October, 1923. About 133 parasites were thus hatched from the consignment sent. These were liberated in three orchards, one situated at the Summit, one at Stanthorpe, and one at Applethorpe. At the time of liberation cold and very strong winds, from the west and north-west, were daily experienced.

In two of the orchards the Aphelinus failed to establish itself. In the remaining orchard, however, situated at Stanthorpe, it became established, although not in any great numbers. On 18th March, 1924, the nursery tree, in the Stanthorpe area, was visited by Mr. A. A. Girault (Assistant Entomologist, Brisbane) and myself, and three living individuals of *Aphelinus mali* were collected, one on the nursery tree, and two others on apple-trees, about fifteen yards distant from the nursery tree. Twigs, bearing dead Woolly Aphis, were cut from this tree and placed in the Insectary cage, and on 9th September, 1924, several specimens of Aphelinus hatched from this material; thus proving that it had established itself, and had survived the winter.

* This is a small hymenopteron, (Fam. Chalcididæ, s-fam. Encyrtidæ, Tribe Aphelininæ) measuring 1·2 mm. in length and 2·3 mm. across the wings. It is dark-brown, having the legs with the thighs (femora) varied with white or yellowish white, and the forelegs (tibiæ), and feet (tarsi) whitish coloured also.

The nursery tree was then, at this date, examined, and numbers of Aphelinus were found to be hatching daily thereon also. But now there were no leaves on the tree, and only a little Woolly Aphis, and no time was therefore lost in artificially infesting the nursery tree with the parasites' host-insect. This was done by collecting large quantities of aphis-infested twigs from other sources, and then placing them among the branches of the nursery tree, at the same time making incisions in the bark, to facilitate the establishment of the aphis.

The parasites were then let alone until early in November, when the work of distribution was commenced. By this time, there were hundreds on the nursery-tree, which had to be continually supplied with fresh Woolly Aphis, in order to maintain the numbers of Aphelinus on it. In spite, however, of this continual reinfestation of the nursery-tree the little parasites eventually caught up with the developing aphides and completely destroyed them.

From this time to the present date (March, 1925), its propagation being continuously effected, the increase of the Woolly Aphis Parasite has been rapid; and it is now, thanks to our united efforts in disseminating it, well established throughout the district.

The good work it is doing is remarkable, as is evidenced by the testimony of numerous growers, and also by that of the inspectorial staff of the Department of Agriculture. All orchardists who have now the parasite established in their orchards, are most enthusiastic in its praise, and it is only reasonable for us to hope that at last we really have a control measure for this unsightly and destructive pest (the temporary and local subjugation of which has hitherto involved the expenditure of much time and money). This hope regarding its control is supported by the recent account, by Dr. Tillyard himself, of the work of this Woolly Aphis Parasite in New Zealand. He, in fact, writes as follows:—

> "Only three years from the date of its original introduction the parasite has succeeded in practically eliminating the Woolly Aphis from large areas of orchard country in the Dominion. The unexpected and almost phenomenal success recorded from all parts of the country has been, I think, almost entirely due to the steady and persistent manner in which large numbers of carefully bred and packed specimens, in healthy condition, have been sent out from the Cawthron Insectarium."—"New Zealand Fruit Grower and Apiarist," 16th September, 1924.

I am very pleased to be able to state that we also have, too, experienced this almost phenomenal success, and that the work already accomplished in this district by the parasite is truly remarkable.

I am greatly indebted to every member of our inspectorial staff and to the Chief Inspector, Mr. T. W. Lowry. In spite of their heavy ordinary duties, all the inspectors have been unremitting in helping to distribute the parasite to as many orchards as possible, within their respective areas.

Mr. F. Becker has had entire charge of the work of distribution at Ballandean and Eukey, and has done excellent work in establishing Aphelinus throughout these areas.

It is thus hoped, by next season to see *Aphelinus mali* established in every single orchard in the Granite Belt. A special effort will also be made to introduce Aphelinus, the useful insect, to other dark-coloured aphids, and thus especially to associate it with the notorious Black Aphis of the peach.

One remarkable feature of the activity of this little parasite is its ability to cover long distances by flight. Inspectors St. J. Pratt, T. Jardine, and F. Becker all report having found Aphelinus established at spots long distances remote from the original centres of liberation. In some instances—as shown by inspection—the distance of 3 miles has been covered by the parasite.

This fact should materially help in its distribution.

Aphelinus—Control of other Aphides.

I consider that an effort should be made to extend the usefulness of this valuable parasite to other parts of Queensland, especially as a possible agent in the control also of the Orange Aphis and of the aphis injuriously associated with the banana.

Instances of *Aphelinus mali* attacking aphides, other than the Woolly Aphis of the apple in New Zealand are already on record.

In this connection Dr. Tillyard reports as follows:—

> "Several cases of *Aphelinus mali having successfully parasitised the Black Aphis of lemon-trees are reported,* and it would seem to be well established by now, that the *parasite will attack any dark-coloured aphis.* In view of the fact, the Commissioners for the Murrumbidgee Irrigation areas in

> New South Wales have recently written and applied for a consignment to enable them to cope with the Black Aphis, which is doing so much damage to the orange and lemon orchards there.''—Dr. Tillyard, ''New Zealand Fruit Grower and Apiarist,'' 16th September, 1924.

I have, then, every confidence in assuming, as above suggested, that *Aphelinus mali* (if it were found practicable to establish it) would prove of the greatest assistance to citrus and banana growers in Queensland in helping them to control the two aphides of their respective crops.

Details of Distribution.

The following is a list (not yet complete) of orchardists in the Stanthorpe district, who have received the Woolly Aphis Parasite this season, 1924-25. I give it, hoping that it may be of assistance to those who may be situated in the near neighbourhood of orchards where the parasite has been liberated and from which, as a source, a supply of the living insect could be obtained.

APPENDIX.

Applethorpe.—

Messrs. D. Pfrunder, P. L. Pfrunder, S. Green, A. Greenhow, J. W. Barlow, J. Bishop, Paton Brothers, H. Ludlow.

The Summit.—

Messrs. A. H. Paget, W. Burnett, W. Maggs, A. Simpson, L. H. Flood, A. Chapman, D. Taggart, R. Letters, G. Whitehead, F. M. Jones, G. Ross, —. Carruthers, —. Lineker, J. Woodmansey, F. Mathews, E. Jolly, W. King.

Thulimba.—

Messrs. J. F. Clegg, E. Donnely, J. Lumb, A. W. Baldwin, G. Ferguson, J. Tray, G. Phillips, A. Grant, Mrs. Yuille.

Cottonvale.—

Messrs. W. Nugent, B. Vise, F. Hopgood, E. Cotton, H. Woodford, R. W. Strain, E. R. Martin, G. Newlands.

Dalveen.—

Messrs. F. Stephens, C. Knight, F. Coomber, J. Campbell.

Severnlea.—

Messrs. J. Cran, A. Fleming, J. Marshall, J. Townsend.

Fleurbaix.—

Messrs. J. Anthony, F. H. Fernside, J. Young, E. C. G. McNaught, H. Hutchison, D. Waters.

Broadwater.—

Messrs. A. Searle, —. Penfold, W. Kilgour, R. Ward, J. Brownjohn, A. Brownjohn, A. J. Low, J. Schneider, J. McGregor, H. M. Jones, A. L. Teitzel, R. Clarke, —. Hamlyn Harris, W. Salisbury, J. Yates, J. Sweet, R. Dawes, R. Notley, P. Pine, G. Gow, C. Dunbar, J. Mehan, R. Nelson, J. Wright, J. Brown, A. March, J. Ross, E. Ward, J. Brock, L. Rowbotham, A. Greaney, W. Heydon.

Fletcher.—

Messrs. J. Gibb, H. Wright, H. Clarke, J. Jackson, H. Swan.

Glen Aplin.—

Messrs. A. Gemmell, J. O'Dwyer, T. W. Letchfield, W. H. C. Laird.

Ballandean.—

Messrs. A. E. Cowley, D. Marshall, E. Hobson, R. Ruegg, H. Mungall, R. Smith, T. Fletcher, A. Johnson, J. Johnson, F. Pethford, F. Clarke, W. Dean, J. J. Batten, W. Laynam, W. Bohn.

Amiens.—

Messrs. W. Cowie, L. W. J. McBeth, H. B. Mann, P. Marr, State Farm, W. Bourke, W. D. Fleteroft, C. Munn, S. Harding, E. Jamison, J. Brown.

Bapaume.—

Messrs. R. G. Grey, G. Batstone.

Eukey.—

Messrs. J. Ross, J. Rodgers, W. Ranger, A. A. Palmer, J. Palmer.

The majority of these orchardists received from thirty to forty parasites; in many cases over fifty were liberated in individual holdings.

FODDER CONSERVATION.

N. A. R. POLLOCK, H.D.A., Northern Instructor in Agriculture.

The value of a store of conserved fodder to meet a period of shortage is so universally admitted that the comparative neglect of the practice gives cause for wonder.

The lesson of the seasons, since settlement first took place in Queensland, is that periods of more or less acute shortage of pasturage recur at frequent intervals. A review of the past forty years will recall long dry periods with fodder shortage and great stock losses. The years 1888, 1902, 1915, 1919, 1923 were particularly disastrous, when even the regular rain blessed districts in the North, Centre, and South experienced one or more seasons of extreme shortage.

The losses of stock are not only disastrous to the owner but to the State as well, for the prosperity of one is reflected in the other. The pastoralist, with thousands of stock depastured on many square miles of country, may be of opinion that conservation of fodder is not practicable on large areas, and that the prices of fat cattle will not allow of the expense of hand feeding stock in a dry time. While admitting there is some reason in this opinion, it cannot be regarded for a moment as conclusive. Pastoral areas, as a rule, are not as heavily stocked, on account of recurring droughts, as they would be if a good season prevailed each year, or if stock had to travel shorter distances to water. It is among the weaker stock and breeders that the greatest dry times losses occur. While the loss of a bullock of marketable age may be set down somewhat definitely, the loss of the progeny of the breeder, which would reach marketable age in three, four, or five years, as the case may be, cannot be so clearly arrived at, and while at the time of a severe drought prices may be low, it is probable that through depletion of numbers, and other causes affecting the market, the prices a few years after may be much higher.

Conservation of Natural Grasses.

On every large holding there must be some area close to permanent water where the wealth of natural grasses can be conserved as hay during favourable seasons or fodder crops grown. By running the weaker and breeding stock on country near stores of conserved fodder and permanent water in dry times, losses would be greatly minimised. Stock owners are appreciative of the fact that where water is in infrequent supply over a run, water frontages are quickly eaten out and that with weak stock, the journey from feed to water in times of scarcity is a contributing factor to lowering vitality.

It is questionable if the feeding of the store of fodder to the segregated animals would entail any greater expense than the continuous patrol of the water supplies to keep them free from the pollution that would be caused by these weaker animals becoming bogged and dying.

While it may not be practicable to conserve enough fodder in one year to feed a large number of stock during a prolonged dry spell, it should be possible to do so if storage were made a yearly practice, since in our experience a cycle of good seasons generally follows seasons less favourable.

Possible Deterioration of Stored Fodder.

The possible deterioration of conserved fodder either as hay or ensilage need not be taken into account. The intervals between periods of scarcity are usually short enough to show that any possible diminution of the food value in stocks of fodder properly conserved would be negligible. The actual length of time over which a well protected stack of properly made hay, or a properly constructed silo filled with well made ensilage, may be kept without serious deterioration has not been determined, but it is quite safe to say that any stock of well cured hay or well preserved ensilage will come into use long before it will suffer any serious diminution in fodder value.

An Insurance Policy.

In time conservation of fodder may be regarded by the stock owner as a premium on an insurance policy against stock loss, which will mature within a more or less short period of time. This applies more particularly to the stock owner on the larger scale whose object is an income from the marketing of stock as stores, breeders, or fats, rather than from such products as butter, cheese, and wool. To the man on the smaller area the value of conserved fodder, more especially from cultivated crops as hay or ensilage, should make a greater appeal.

Land values, as a rule, are very much greater on the smaller holding, while costs of production have greatly increased with the general cost of living, rendering it more strongly imperative that a greater return from the land must be secured.

Hay

While silage is conserved fodder in its green and succulent stage, hay may be defined as conserved fodder in a dry form. As with properly made silage, little nutritive value is lost in properly made hay. Silage is fodder stored with its full amount of moisture, while hay is fodder with sufficient moisture dried out to prevent any adverse fermentation when stacked. While satisfactory silage can be made of most green crops, the same cannot be said of hay; crops such as maize and sorghum, though frequently stored in the dry stage, are not referred to in this connection. All plants that stock will eat in their natural condition, that will admit of reasonably quick drying, and that will permit of easy handling, can be made into hay.

Fodder Crops.

The principal crops that may be grown for hay are wheat, oats, rice, barley, Sudan grass, millets of Panicum and Setaria species, sundry exotic grasses and legumes such as lucerne, cowpeas, velvet beans, mung beans, field peas, and vetches. In most parts of the State natural grasses grow luxuriantly, and in almost any good seasonal year they will provide heavy crops that, when cut at the right time and properly cured, yield a most palatable and nutritious fodder. Of the last named the grasses of the Western Downs stand out as the most valuable in the world—Blue grass (*Andropogon Sericeus*), Mitchell grasses (*Astrebla* sp.), and Flinders (*Iceilma Mitchelii*) being especially valuable. Among others common to country nearer the coast are Kangaroo (*Authistiria* sp.), Wallaby (*Danthonia* sp.), Bunch spear (*Heteropogon* sp.), Native sorghums (*Sorghum fulvum* and *plumosum*), Brown top (*Pollini a Fulva*), other Blue grasses (*Andropogon* sp.), Spring grasses (*Eriochloa* sp.), various summer grasses (*Panicum* sp.), Chloris, and others of similar species and habit.

The nutritive value of any sample of hay depends on the nature and quality of the material from which it is made, the changes and losses, if any, incidental to the process of curing, and the changes which occur after it is stacked. Haymaking admits of several variations according to the variety of fodder and seasonal conditions when harvested. There are several conditions which must always be observed to insure a good product. To make the best sample the crop must be cut at the right time and the curing done so as to procure a bright green colour, good aroma, retention of the leaves and other fine parts, especially in legumes, with an absence of dust and mould. The proper time to cut is when the plants possess the greatest amount of digestible nutrients combined with palatability.

Cereals.

In cereal crops the proper time to cut is shortly after flowering, when the grain is in the soft or doughy stage; in lucerne, as soon as possible after the first flowers have appeared. In grasses of perennial habit, more especially those grasses which stand to grow tall and rank, the proper time is just prior to breaking into flower. This is most important since from the time of flowering the amount of woody fibre rapidly increases, digestibility decreases, and palatability in many cases disappears. With grasses of annual habit such as Flinders grass, summer grasses, Panicum, Chloris, and Eleusine sp., which are often more palatable to stock after flowering, cutting could be deferred until the seed is formed. It may be noted that in many annuals palatability is greater after seeding than before, a probable provision of nature to secure a perpetuation of the species. Legumes, other than lucerne, should be cut to secure the best advantage when the pods are well set but not ripe.

Hay Curing.

As previously mentioned the curing of hay lies in the abstraction, by drying out excess moisture which would cause deterioration by undue fermentation and the production of fungi or moulds. The amount of moisture in properly cured hay varies from 10 to 20 per cent., largely in proportion to the crop of which it is made. An indication of a good keeping quality is shown when in stacking it packs well when trodden down. As a general rule the hay should not feel damp to the hand, neither should it be so brittle as to break easily when twisted or bent. The time occupied in drying depends on the degree of succulence in the crops, and weather conditions. The dryness and temperatures of the soil, the humidity of the atmosphere, and intensity and continuity of sunlight and heat are all modifying factors which combine to prevent any set rule being established.

A consideration of the processes the plant undergoes in being cured will be helpful. Various changes rapidly set in as soon as the crop is cut, the most obvious as well as most important being the evaporation of moisture. After the plant is cut the leaves and stem remain alive for some time, and the leaves continue to draw moisture from the stem if not killed too soon. As the stems are the most difficult to cure it is obvious that the leaves should be allowed to assist in drawing off all possible moisture. Hence the necessity of protection from direct action of a hot sun or drying wind by raking into windrows and cocking loosely as early as is directed by weather conditions. Judgment is needed in cocking before the leaves are entirely dried out and their property of drawing moisture from the stems destroyed. Hay cocked in the hot sunshine entraps much warm air which greatly assists the transpiration of moisture. The size of the cocks will to an extent be governed by the succulence of the material, and they should be narrow and high rather than broad and low. Generally it is not necessary, unless rain falls, to interfere with the cocks before carting to the shed or stack, but if uncertainty is felt of the completeness of cure of the lower portion of the cock it may be turned over an hour or so before loading.

The rate of evaporation depends on the temperature, dryness of the atmosphere, wind, and the total bulk. Therefore, it is very variable and under favourable conditions is usually rapid. In parts of the North, in making grass hay, it is often possible to cut in the morning and stack before nightfall. The evaporation of moisture produces a bleaching action which reduces the original green colour; if the material is wet and dried again it is still further reduced if not entirely bleached. The direct rays of the sun will also have a bleaching effect. During the process of curing, fermentative changes occur in the mass whereby a large proportion of the carbohydrates which are present in the material before it is cut is rapidly resolved into soluble substances; aromatic compounds, probably due to the presence of essential oils, are formed, which, though perhaps of no great food value, impart flavour and render the hay more palatable and inviting.

The action of rain and dew on hay when curing is to bleach out these soluble and aromatic substances with a corresponding loss of nutriment.

In experiments carried out in Great Britain, it is recorded as much as 20 per cent, of nutrients in fresh grass are lost by weathering. In addition to loss of nutriment the wetting of hay tends to the production of objectionable moulds, which cannot be afterwards go rid of, and which, while making the hay distasteful, are also at times a cause of digestive troubles.

Brown Hay.

Brown hay is obtained by cocking before sufficient wilting has taken place or by stacking when insufficient moisture has been dried out, as a result greater fermentation produces sufficient heat to brown or even char the mass. The darker the colour the lower the nutritive value. This class of hay, though favoured by some users, has nothing to commend it, unless as in the case of some coarse fodders with harsh thick stems, that, owing to combined heat and moisture, are thereby softened and rendered more palatable. On account of the loss of nutrients in curing, brown hay is not so valuable as the bright green sample, and its production is not commended except in weather that will not admit of curing in the proper manner.

Successful Hay Making.

To sum up, the necessary operations in successful hay making are:—

Cut at the proper time when all dew is off.

Rake into windrows or into cocks as soon as sufficient wilting occurs.

Allow as much access to air as possible, without direct sunshine, amongst the curing mass.

Leave not more than from 10 to 20 per cent. of moisture in the finished stack.

Prevent wetting by dew or rain at any time after cutting.

In storing for home consumption it is desirable to build stacks convenient to where feeding is expected to be carried out, at the same time paying attention to the prevention of damage from fires by clearing or ploughing a break at a sufficient distance all round, and from floods by building above flood level.

While stacking hay it is a common practice to sprinkle salt and sometimes lime amongst it; the addition of these substances tends to check fermentation and to prevent the growth of moulds. In properly cured hay these additions are not essential, and their use can only be recommended when incompletely cured hay has to be stored in bad weather, or in a district where stock do not get all the salt they require.

CONCRETE FEEDING FLOORS.

E. J. SHELTON, H.D.A., Instructor in Pig Raising.

Visiting a large suburban piggery recently, the writer drew attention of the owner to the necessity of constructing a concrete feeding floor on which to feed the pigs that were not kept in sties and that were fed from troughs scattered here and there through the yards. It had rained during the morning of the visit, and the mud was ankle deep in the yard where the pigs were about to be fed. As it happened it was the midday feed (a sort of light sandwich luncheon), and consisted largely of greenstuff, cabbage, cauliflower, and lettuce leaves, carrot, and parsnip tops, a few potato peelings, &c. The farmer simply walked about the yard emptying the contents of the pig tin on the ground on top of at least three inches of mud, and in the mad scramble that followed as soon as the sows heard the dinner bell, there were soon no greenstuffs to be seen; what had not been devoured had been trampled in the mud, and of course the hungry ones were ploughing their noses through the slush and slime in search of some remnants of the midday lunch.

To say that the system was filthy and disgusting did not seem to worry our friend for he was content to let the sows take their chance; if they survived they were "good 'uns," if they failed to make good on the menu, well, they were simply thrown out as unprofitable and some other poor creature got the job.

Now all this filth and stench can be avoided, and it is guaranteed that a concrete feeding floor will pay for itself in a month, and the pigs will benefit in a hundred different ways. There is not only greater gain in weight if the pigs feed on a floor where the food cannot be lost, and where accumulation of filth can easily be prevented, but there is less loss of good food, and a greater profit from that which is consumed. We must also consider sanitation if we expect our pigs to be healthy. Concrete floors are hard, easy to clean, and can be flushed or hosed over in a few minutes after use, a bucket of disinfectant sprayed or thrown across the floor will keep it clean for next feed. The labour of feeding and keeping the yards in order is also considerably reduced, and this is a proposition that must be faced.

The size of the floor will of course depend on the number of pigs to be fed, hence no standard size can be recommended. In shape, the floor may be oblong or square. The latter is preferable. Make it big enough to accomodate about thirty sows or fewer than this if need be. Use a 1-2-3 or a 1-2-4 mixture in making the concrete, and in thickness have the floor laid on a good solid foundation allowing a clear 4 inches of concrete for the floor. The sides should be protected and this is best done by excavating the soil for a depth of say 8 inches all round and about 4 inches wide, and making a shallow foundation and protecting wall all round, this might be levelled off on the surface or formed into a shallow half round drain. The object of this outside wall is to prevent the pigs from rooting under the floor and heaving it up as they are liable to if it is left unprotected. The floor should have a fall from the centre to the outside of, say, half an inch per foot. The gutter round the outside could be connected with a drain to carry away the washings and thus enable the whole to be kept clean. If the yards are large enough it is an advantage to fence the feeding floor off, the food can then be scattered over the floor and be all ready for the pigs when the gate is opened, and the meal begins. These concrete feeding floors are a necessity on every pig farm, and their cost is a mere detail when compared with the advantages they offer.

A USEFUL WEED.

Mr. N. A. R. Pollock, Northern Instructor in Agriculture, writes:—"Under separate cover I am posting a specimen of a weed sent me from the Tableland and which I have not observed before. It is said to be growing prolifically amongst Paspalum. I would like it identified and to know whether it has any fodder value."

The specimen was submitted to the Government Botanist (Mr. C. T. White), who reports:—"The specimen forwarded is the "Black Medic" or "Minette" (*Medicago lupulina*), an annual plant, a native of the Mediterranean region. It is widely cultivated as a fodder and it should prove quite a useful addition to the Tableland pastures. It has not before been met with in Queensland, but for some years past has been naturalised in some of the Southern States. In the United States it is reported to be widely grown as a pasture plant in wet meadows and on stiff clay soils, where clover or lucerne will not thrive.

PRODUCTION OF NEW VARIETIES OF WHEAT.

By H. C. QUODLING, Director of Agriculture.

Breeding and evolution of new varieties of wheat to suit Queensland conditions have been carried out for a number of years by the manager of the State Farm, Roma, Mr. R. E. Soutter, who specialises in the work.

Wheatgrowers are faced with their share of problems, not the least of which is the choice of varieties calculated to give a maximum return under the varying conditions of soil and climate which have to be reckoned with over a series of seasons.

In catering for requirements the wheatbreeder has no light task; to him an increase in productivity is not by any means an insurmountable difficulty. Many other problems obtrude themselves. Those relevant to a general improvement in plant and in field characteristics, in yield and in milling quality would be of little value were they not associated with a capacity on the part of the new variety to resist rust. *In this State the rust problem transcends all others in importance,* a fact brought home to growers on many occasions by losses amounting in the aggregate, even in the case of one season only, to tens of thousands of pounds sterling. To avoid these losses and to stabilise the industry as far as production is concerned, is a matter which the Department of Agriculture had taken an active interest in for a lengthened period—actually more than a quarter of a century. Co-ordinated effort on the part of its officers is doing a great deal towards the improvement of existing varieties. Much, however, remains to be done. Actually what is needed at this stage is the whole-hearted co-operation of the growers who could do a great deal by experimenting with some of the new varieties, so that comparison with commonly grown wheats may be made on individual farms.

Years of painstaking study and work on the part of the wheatbreeder, based as it is on scientific principles, would be of little avail unless an organisation existed to carry out the work to its logical conclusion.

Apart from the milling and nutritive tests of new varieties carried out by the Agricultural Chemist, the second and subsequent field tests which a wheat, carrying the imprimatur of the breeder, has to go through in this State before it is considered advisable to try it out in general cultivation, are made by officers of the Field Branch of the department, who are trained observers. The duty of these officers is to establish a series of experimental wheat plots in different districts and to keep the group of new crossbred wheats under close observation and collate data. In this way the behaviour of their plant charges under varying conditions and environment can be ascertained. A gradual selective process is followed up by means of the elimination of the unfit, until a stage is reached admitting of field trials with a few of the best types. These, if satisfactory, provide a sufficiency of seed to distribute by sale, after grading, to growers. Seasonal and other exigencies which have to be met with, promptly determine whether a new wheat deserves recognition commercially. Judged by practical men in this way the merits and demerits of a variety soon manifest themselves.

The wheat briefly described have passed through their novitiate and are being offered to growers at 9s. per bushel freight paid from Brisbane to any railway station in the recognised wheat belt.

When ordering, a second or third choice should be made to avoid disappointment.

Cheques accompanying orders for seed should have exchange added and be sent to, and made out in favour of, the Under Secretary for Agriculture, Brisbane.

A limit of 6 bushels to an individual purchaser has been fixed for any one variety.

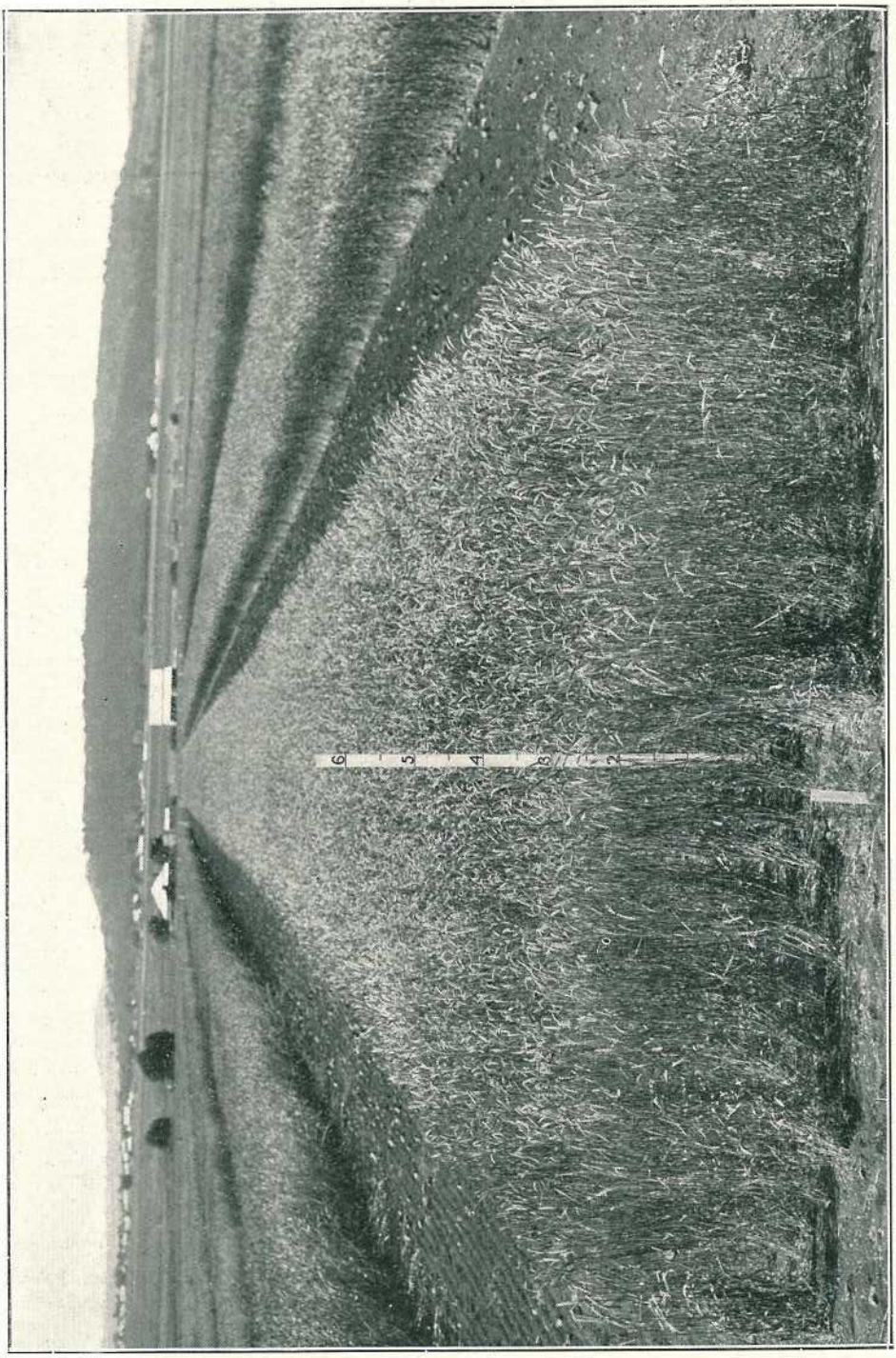


PLATE 51.—A PLOT OF BINDII WHEAT ON MR. O. HENTSCHELL'S FARM, ALLORA.

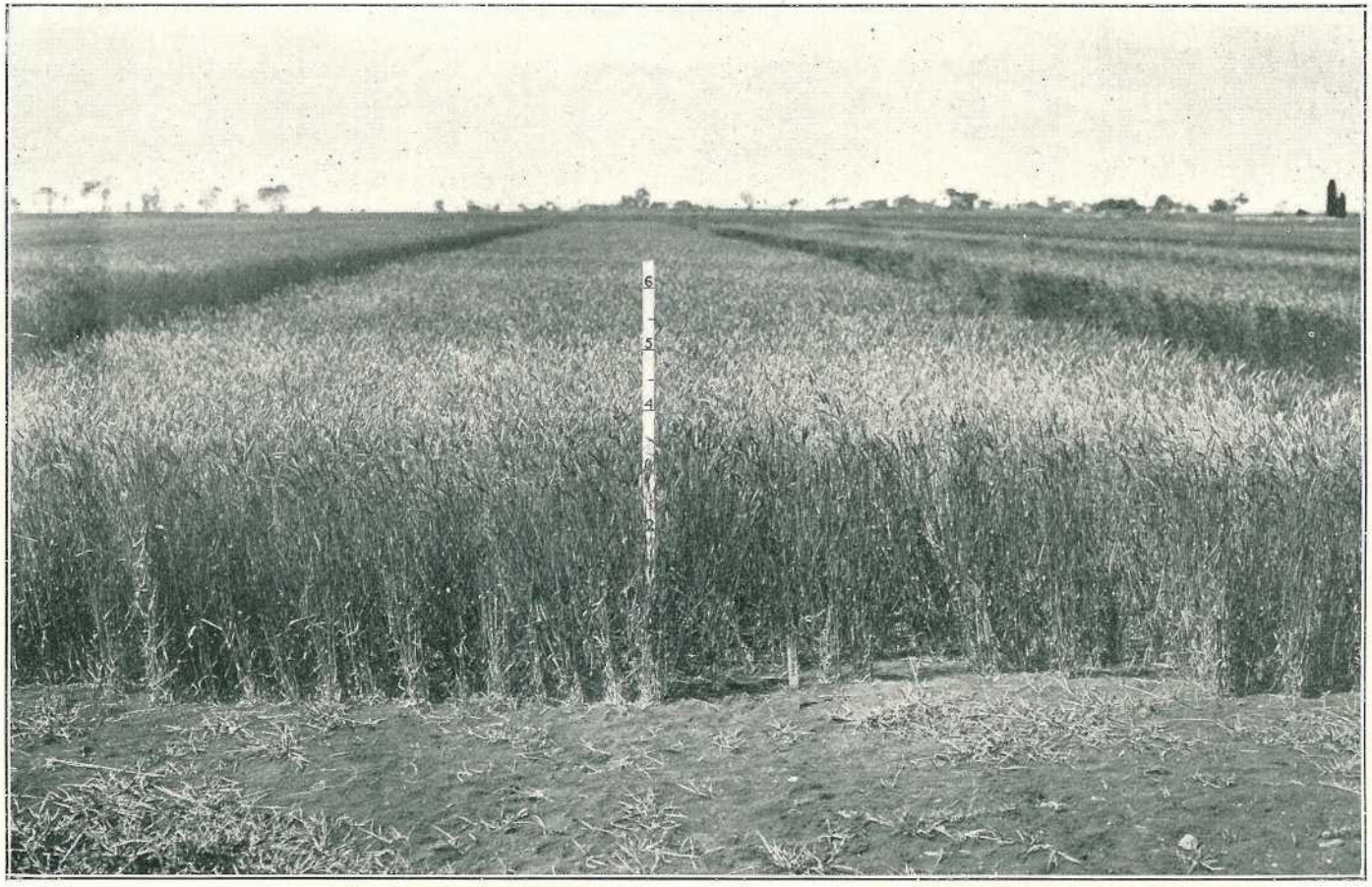


PLATE 52.—A PLOT OF "MARCO" WHEAT. MR. O. HENTSCHELL'S FARM, ALLORA.

Characteristics Necessary in a Wheat to Insure its Popularity with Growers.

Capacity to resist rust and Bunt (smut). Ability to withstand dry spells. Good milling quality, preferably with a hard textured, medium-sized, weevil-resistant grain. Firm, upright, strong walled straw; not inclined to lodge. A minimum amount of flag, preferably of a firm, somewhat erect nature. A good strong root system. Capacity to mature quickly, and with a minimum period of time between flowering and ripening. Evenness of ripening. Level-headedness of crop. A good, well-developed ear in which the grain does not readily discolour or bleach. Capacity to hold grain without shedding it in the field. It must be easy to harvest, and not too tough to thresh. Prolificness.

Descriptions of New Crossbred Wheats.

"Waterman" (S.E. x W. 8).—A Soutter's Early and Warren cross; white chaffed, non-bearded. Straw pale yellow, willowy in character. Grain slightly above medium size, smooth skinned, semi-translucent, medium hard.

"Watchman" (S.E. x W. 79).—A Soutter's Early and Warren cross; non-bearded, smooth white chaff, pale yellow straw. Grain round, plump, smooth skinned, creamy white.

"Redman" (B. x Man. 10).—A Bunge-Manitoba cross; white chaffed, non-bearded with a tapering head. Straw of medium fineness but tough. A fair stooler. Grain red, medium hard, full-bosomed.

"Redchief" (B. x M. 22).—A Bunge-Manitoba cross, non-bearded, white chaffed, having a tapering head; moderate stooler; straw tough but inclined to fineness. Grain red in colour; slightly under medium size, smooth skinned and medium hard, bright.

"Ringer" (B. x M. 12).—A Bunge-Manitoba cross; non-bearded, white chaffed, of medium stooling habits, straw willowy, grain of medium size, red in colour, plump and medium hard.

"Radio" (B. x Man. 29).—A non-bearded, white chaffed variety of medium stooling habits. Straw tough and willowy. Grain red, somewhat narrow; of medium hardness and slightly under medium size.

"Redskin" (B. x Man. 16).—Very similar in all characteristics to "Radio." Grain red, medium-sized, plump, and bright.

"Marco" (B. x Marquis).—A white chaffed wheat, resulting from the crossing of Bunge with Marquis, of fair stooling habits, straw of medium fineness, but tough. Grain red in colour; short and plump, and of medium hardness.

"Pinto" (B. 2 x Flo. T. 4).—A Bunge 2 and Florence cross; white chaffed wheat, tip awned and with a tapering head; straw inclined to fineness but tough. Grain above medium size, plump, red, medium hard, and of good appearance.

"Buffalo" (B. 1 x Flo. 2).—A non-bearded white chaffed Bunge-Florence cross, with tapering head; straw of medium fineness. Grain reddish in colour, full-bosomed, and medium size and hardness.

"Amber" (B. 2 x Amb. 22).—A Bunge 2 and Amby cross. A white chaffed, fine strawed variety; good stooler. Grain of medium size, plump, pale red in colour, attractive, with a smooth fine skin.

"Amberite" (B. 2 x Amby 22 Sel. 1).—A Bunge 2 and Amby cross; white chaffed, fine strawed, fair stooling variety. Grain of average size, plump, attractive, pale red in colour, with a good skin.

"Beewar" (Bunge 2 x War. 2).—A Bunge-Warren cross, white chaffed; straw willowy and of medium fineness. Grain white, of medium size and softness, plump, smooth skinned.

Note.—All the above wheats show slight signs of weathering, due to the wet season when ripening.

Period Recommended for Sowing on the Downs.

Third week May to end of first week in June—

Waterman, Redman, Redchief, Ringer, Radio, Redskin, Marquis, Amber, Amberite, and Beewar.

Second to third week in June—

Watchman, Pinto, and Buffalo.

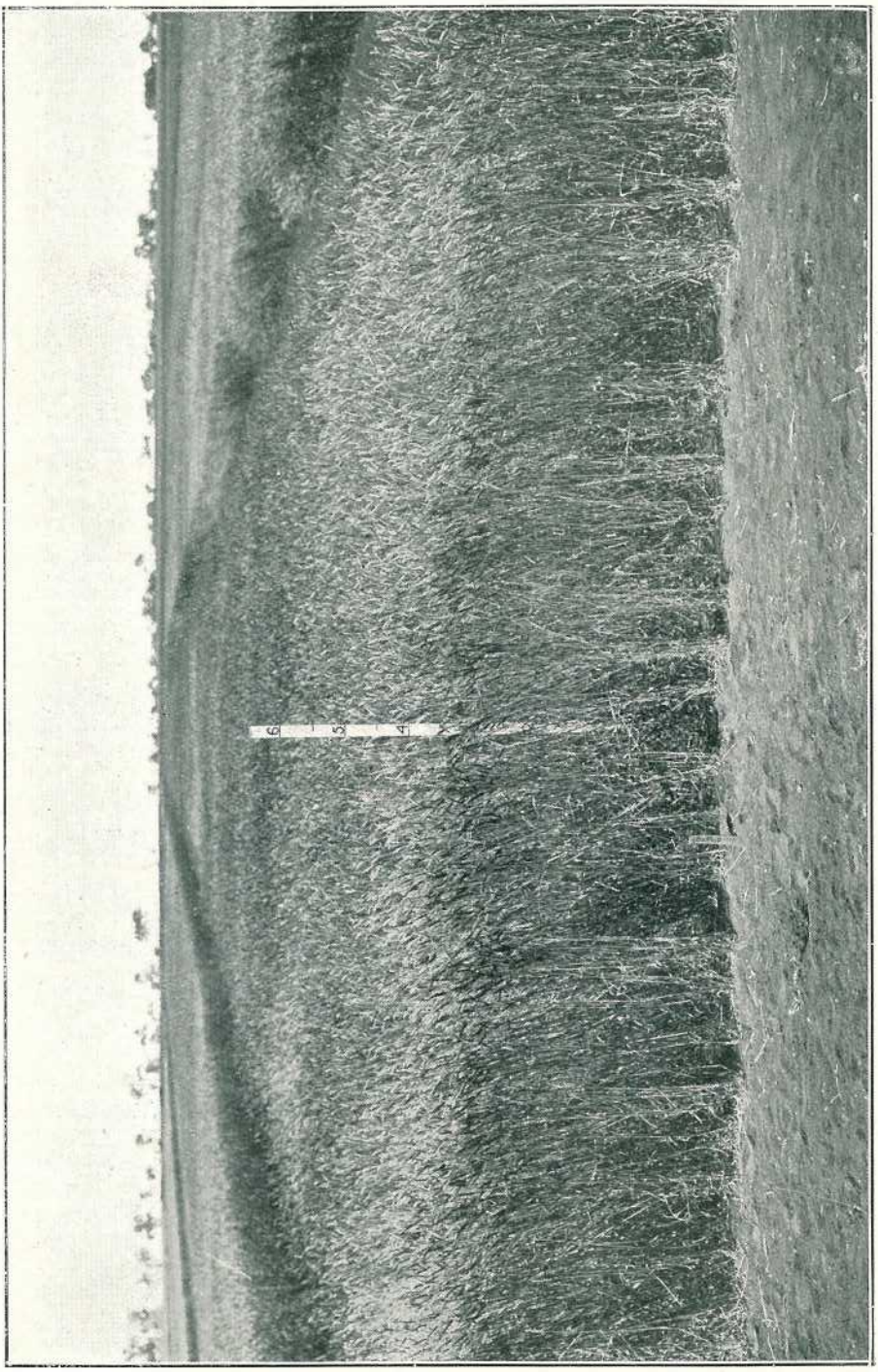


PLATE 53.—A PLOT OF "BUFFALO" WHEAT, ON MR. HENTSCHELL'S FARM, ALLORA

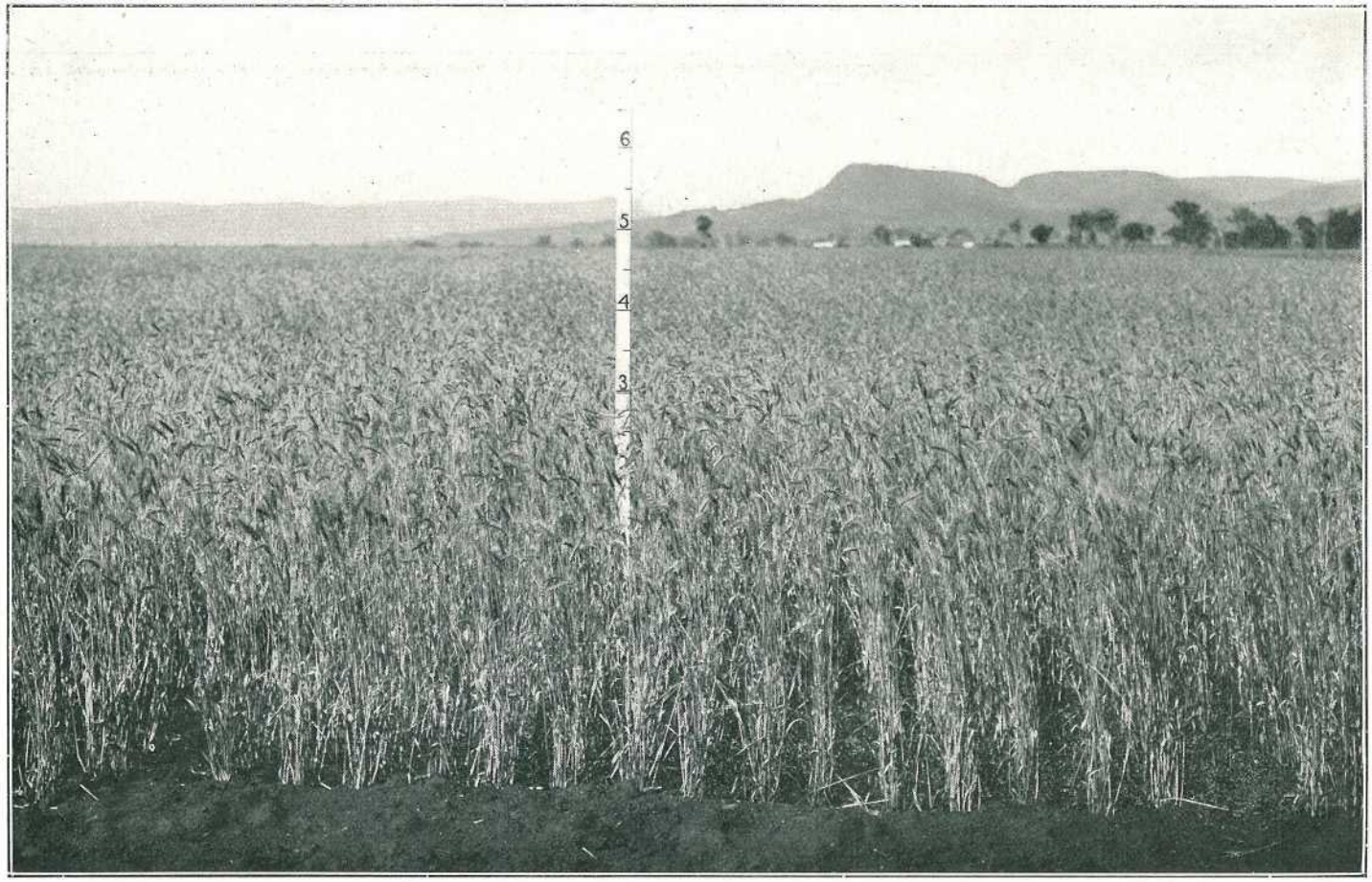


PLATE 54.—A PADDOCK OF "THREE SEAS" WHEAT (CRETAN x COMEBACK x CRETAN).

Plate 55.—A Roma Crossbred, Bunge$_2$ x Warren$_2$—named "Beewar."

Plate 56.—A Roma Crossbred Wheat, Bunge x Manitoba 29—named "Radio."

PLATE 57.—A CLOSE-UP OF "MARCO" WHEAT, A ROMA CROSSBRED.

PEATE 58.—A CLOSE-UP OF "BUFFALO" WHEAT, A ROMA CROSSBRED.

Plate 59.—A Roma Crossbred—Bunge$_2$ x Florence T4—named "Pinto."

Plate 60.—A Close-up of "Amber" Wheat, a Roma Crossbred.

QUEENSLAND AT WEMBLEY.

Mr. H. W. Mobsby, F.R.G.S., F.R.S.A. (Artist and Photographer, Department of Agriculture and Stock, Queensland), State organiser of the Queensland exhibits for the British Empire Exhibition, 1924, and who was appointed by the Australian Federal Commission as display officer at the Australian Pavilion, Wembley, returned to Queensland recently. Speaking generally of the Exhibition at Wembley, Mr. Mobsby said that it had achieved its object in directing attention to Australia commercially, and in attracting prospective migrants and tourists. It had enabled Queensland particularly to show its wonderful possibilities. Enquiries made it clearly evident that the British buyer is interested in Australia and desires to become a purchaser of our products. The Exhibition at Wembley was open from 23rd April to 1st November, and in the course of that period admissions numbered 17,403,119 persons. On the opening day the attendance was 150,000, and on the last day, 1st November, 94,499, although it was an extremely wet and foggy day. One of the biggest days was Whitmonday, when the admissions totalled 321,231. To the 20th August the total admissions were 10,285,000, of which 6,500,000 was the estimate of visitors who passed through the Australian pavilion. On a quiet day the result of a check taken at the doors showed a total of 11,000, whilst on a busy day, 17th May, 40,000 passed through the Commonwealth Pavilion.

The rush and turmoil of the month, early and late, prior to the opening day of a great exhibition is hard, for those unacquainted with the work, to realise, especially the day and night immediately before, when final preparations are in full swing.

Australia a Good Place to Live in.

"Australia, producing all this, must be a good place to live in" was an expression often heard. Our pavilion, said Mr. Mobsby, opened on time on 23rd April, but, unfortunately, our cotton, sugar, and tropical trophies, the designs of which were approved and decided on in Australia by the Commission, were not used. Other primary and manufactured products, such as beef, mutton, butter, cheese, minerals, timbers, grains, canned fruits, meats and preserves, dairy products, and flour, on the whole, were attractive to visitors and prospective migrants. A more practical result would have been obtained, however, had the proportion been 75 per cent. exhibits and 25 per cent. lay-out and decoration instead of the reverse. The arrival of the Commissioners, Hon. A. J. Jones, M.L.A., Minister for Mines, and Mr. Robert Joyce, Commercial Commissioner, made matters better for the exhibitors. Under their direction everything was displayed or rearranged, especially the cotton, sugar, timber, silk, honey, and other exhibits, which were deserving of more prominence—a matter that was apparent to many Queensland visitors.

Migrants for Qeeensland.

Immigration being a Federal matter, prospective migrants were referred to Australia House. Mr. Mobsby was instrumental in securing many for Queensland who booked their passages to this State direct. They were all fine types of settlers. Many inquiries were also made by those who wished to include Queensland in a tourist itinerary.

An Educational Centre.

As an educational centre Wembley proved itself a success. Organised parties of school children toured the grounds and buildings daily, gaining a vivid conception of the resources of the Empire, and the Australian States in particular. The exhibits as displayed at the 1924 Exhibition have been in the main held for 1925, such as the products of the Queensland State Cannery. These exhibits should, in Mr. Mobsby's opinion, be supplemented by large supplies for direct selling in the Pavilion. Canned pineapple in slices and jam were very popular. A strong demand for these products was created, and continued long after the stocks had been exhausted, thus showing the advertisement these goods gained. Honey is another product that Queensland should take advantage of in reopening a market in Great Britain, and with proper attention to grading and bottling this should command a ready sale, judging by the so-called "Australian Honey" that sold well. Very numerous inquiries were made by people interested in land settlement and industrial schemes, and other prospects in Queensland.

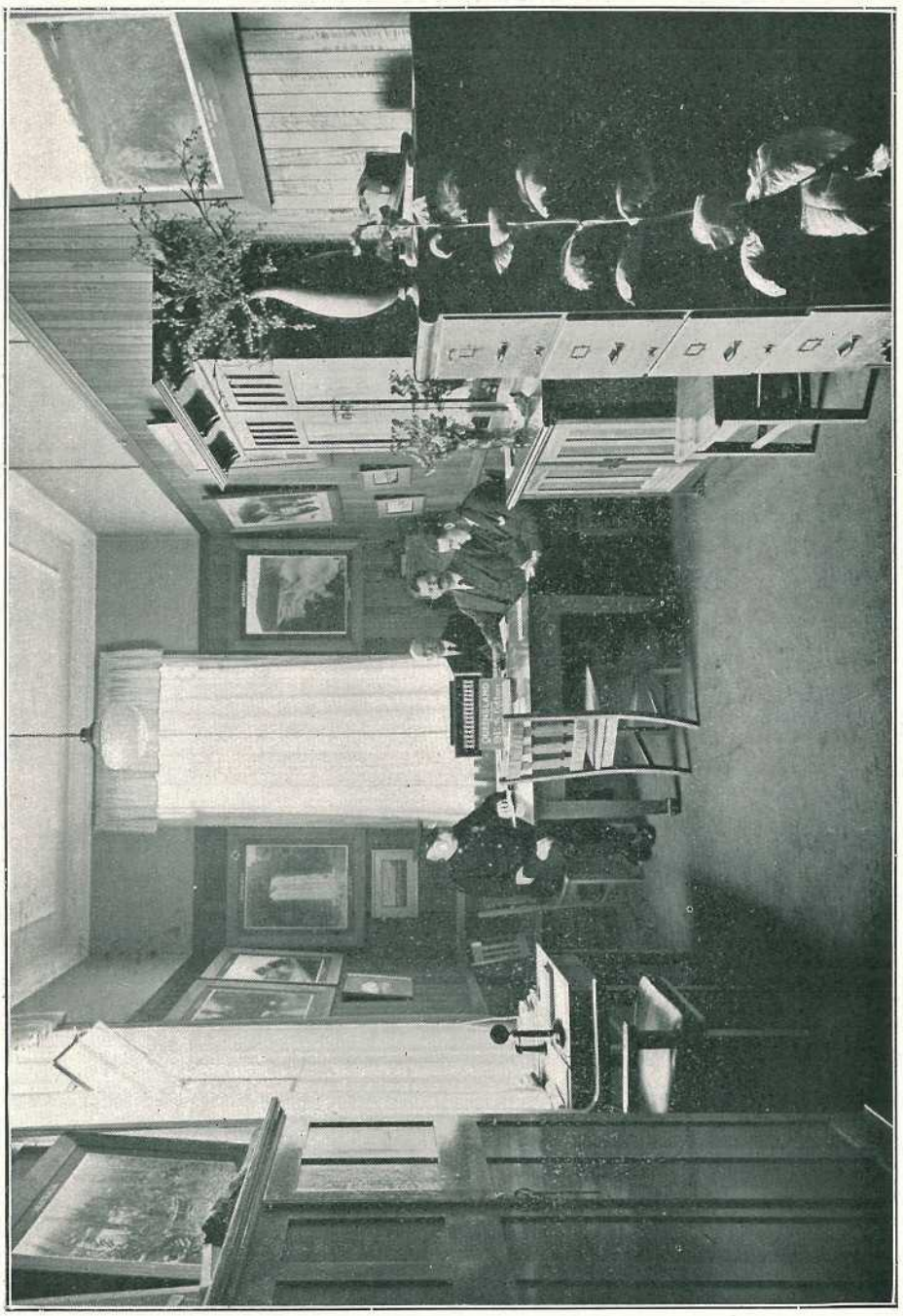


Plate 61.—Queensland Room, Australian Pavilion, British Empire Exhibition, Wembley, 1924.

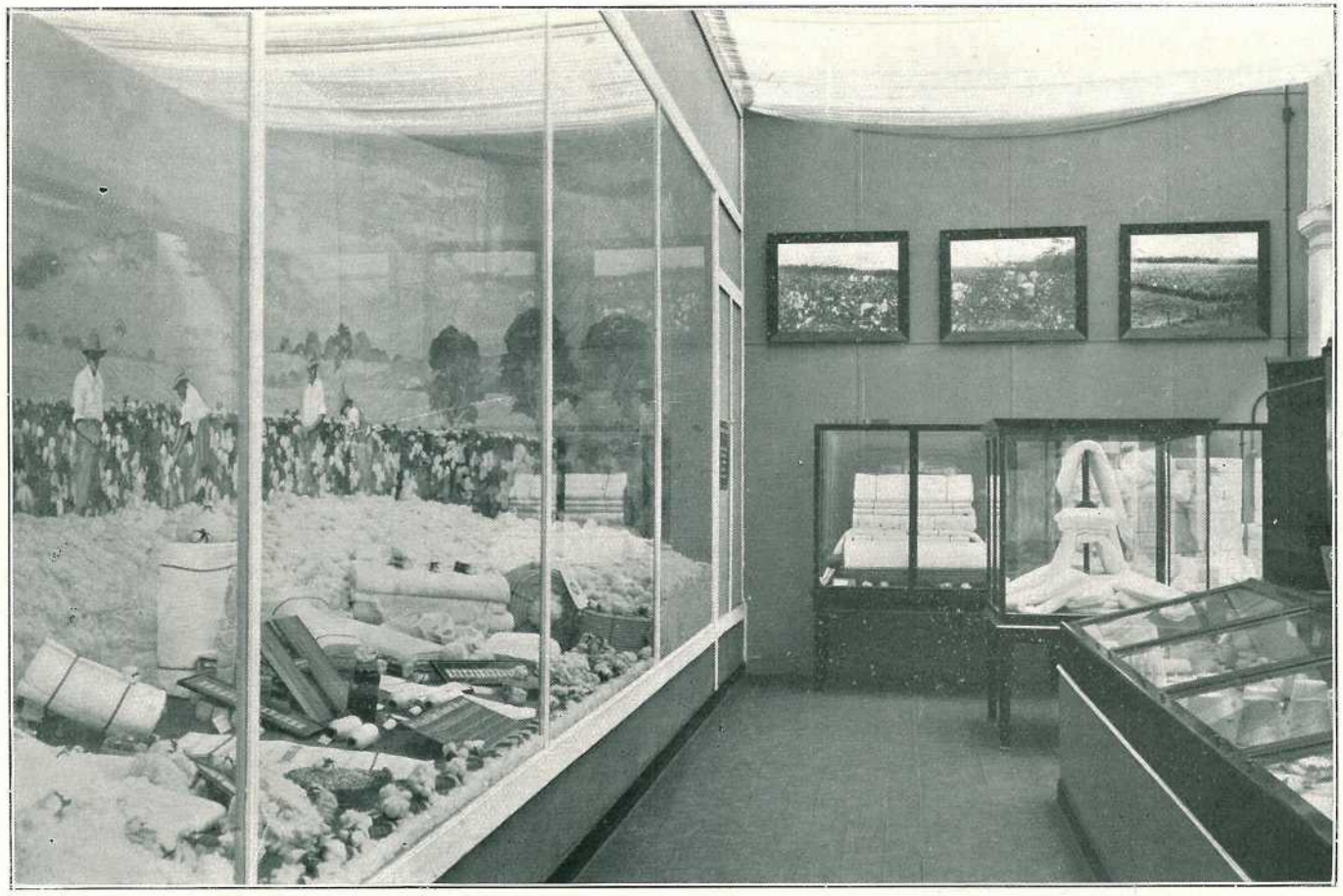


PLATE 62.—DISPLAY OF COTTON (QUEENSLAND).—RAW MATERIAL TO FINISHED CLOTH. AUSTRALIA PAVILION, WEMBLEY, 1924.
Queensland produces 91 per cent. of Australian Cotton.

Photo. by Campbell-Gray.

Comment on Queensland Cotton.

Favourable comment on Queensland cotton was common from people who were able to judge—Lancashire spinners and cotton men from Mexico and America (one had grown cotton in South Africa for fifty years). Queensland Durango was often classed by them as better than any they had seen before. Spinners whom Mr. Mobsby met strongly favoured the annual crop as against ratoon. Mr. Mobsby found also on inquiry of those from Africa and Mexico that they do not favour ratoon cotton-growing. The cotton cloth exhibited made from our Queensland cotton was much admired by the women visitors. The president of the National Federation of Textile Works Managers, from whom Mr. Mobsby received a visit, was particularly impressed with the quality of Queensland cotton.

As the Australian section of the 1925 Exhibition will probably be under only one Commissioner, and as Australia House will control the Pavilion, it is a pity, in Mr. Mobsby's opinion, that each State will not have an officer to give information and follow up the good work of 1924. Without this he is afraid that the interests of individual States, particularly Queensland, will suffer. Queensland exhibitors should, in his opinion, have preference over concessionaires, who have naturally no really permanent interest in Queensland in respect to the sales of our products in the Australian Pavilion. Under such an arrangement the proceeds of sales could be credited to our own exhibitors.

LEAF ROLL OF POTATO.

The symptoms of leaf roll are somewhat varied, according to the stage of infection reached. Two American scientists, Schultz and Folsom, have shown that the disease is spread slowly from plant to plant in the field by aphids—possibly also by other sucking insects. Once a plant has been infected, the contagion is readily carried over from season to season in the tubers, and practically all the tubers from an infected plant convey the disease when used as seed.

In the first year of infection very little sign may be seen on the leaves—possibly a certain amount of curling of a few leaves. Tubers from plants which have been infected give rise in the next year to plants showing marked rolling of the lower leaves, and possibly of some of the upper leaves. In addition, a proportion of the leaves display a form of yellowing, or chlorosis. This is particularly marked along the rolled margins of the leaves. In varieties where pigment is present, the rolled margin may be marked with purple. The manner of rolling is characteristic. The sides of the leaves curl inwards from both sides, so as to form two rolled cylinders parallel with the midrib. If the plant so affected is examined, the seed tuber may be occasionally found intact. In addition, the new tubers will be found to be few in number and greatly reduced in size.

In some cases the stolons, or stalks, which connect them to the plant are shortened. The disease interferes in some way with the manufacture and transfer of the starch from the leaves to the tubers. If tubers from affected plants be again sown, there may be a proportion of marked failures, and in any case a serious depression of yields results.

For control a system of selection of hills must be practised. The best way to secure good potato seed is to raise it on the farm under one's own observation. Farmers who have large areas to plant should maintain a seed plot. To commence this, they should select only tubers from hills which are quite free from leaf roll, and which are not in proximity to affected plants. These seed tubers should then be planted in a seed plot situated some little distance from the main or other potato crops, and in the following season all plants in this plot which show leaf roll should be noted and removed promptly, as soon as they are recognised. The remaining tubers will provide the seed for the main crop in the following year, with the exception of the small number necessary again to maintain the seed plot.

If this system of two-year selection of the seed potatoes was practised, or a known disease-free strain were propagated in the seed plot, and rogued only one year, it is certain that much higher yields would be obtained. The method would not be costly, but would involve attention to that most vital of all potato-growing problems—the selection of the best seed. The present haphazard methods of securing seed from the crop without any knowledge as to whether the tubers come from leaf-roll plants or not will only result in further depression of the yields.

The foregoing has a seasonable significance for growers who may be selecting seed from a late-sown patch.

SHEEP ON THE CENTRAL COAST.

Mr. W. G. Brown, Instructor in Sheep and Wool, reports:—At the request of the L.P.A. presidents, I visited the Bajool and Mount Larcom districts to inspect the land of the farmers and the possibilities of sheep raising in that part of Queensland.

I found that the great bulk of the land was scrub land which, when cleared, was sown with Rhodes grass and wherever I went there are now splendid stands. I lectured at Bajool to about thirty farmers and at Mount Larcom to twenty or more.

There is a strong movement all over the coastal areas up to Cairns in favour of keeping at least fifty sheep, and the wonder to me is that it has never been done before. There have been several small flocks in both districts for some years and they have invariably done well.

The Mount Larcom district is specially suited to sheep. The land is of high quality and the rainfall adequate. There is abundance of good water. Rhodes grass grows to perfection.

Messrs. Fairweather, of Bajool, have been running 250 ewes on 25 acres of Rhodes since the beginning of November last, and although they were poor when put on the place they are now in excellent condition. They are about to lamb and from appearances should give a drop of at least 80 per cent.

There seems to be a keen desire on the part of the farmers of both districts to keep small flocks of sheep as a side line. Three men who have added sheep to their farm stock and whom I met are very satisfied. Mr. Beck, of Mount Larcom, realised 13s. 6d. per head for wool alone. Mr. Aden, of Bajool, realised 13s. per head for wool alone, and so on. My statement that one ewe will return £1 per annum in wool and lamb can thus be shown to be very conservative, considering that fat lambs are scarce and are bringing up to 35s. per head at Enoggera yards. This at from 6 to 9 months old.

I consider Mount Larcom to be eminently suited for sheep, if care be taken against dogs, the greatest drawback to sheep keeping in Queensland. I advise, in the absence of a dog-proof fence, shepherding and yarding at night. A boy fourteen or fifteen years old can look after 700 or 800 sheep, or an old age pensioner could do the same. There is no heavy labour attached to sheep farming excepting at shearing time. The other drawbacks are stomach worms and flies. These, however, may be dealt with in the manner recommended by the Department.

In can only reiterate that sheep will do admirably in both the districts I have just visited.

QUEENSLAND TREES.

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

The accompanying illustration shows the lower part of the stem of *Cryptocarya fovedata*, a tree which is common in the ranges in South-Eastern Queensland. It has been observed to be common in the ranges of the Killarney district, the National Park, Macpherson Range, and Mount Mistake. The leaves of the tree are small and have globular, wart-like swellings on the upper surface where the chief lateral veins join the midrib. The specific name, fovedata, originates from these wart-like swellings or foveoles. The wood resembles that of an allied tree, the Bolly Gum, but is finer in texture and heavier.

Plate 63.—Cryptocarya foveolata.

A tree in the Ranges eastward of Emu Vale in the Killarney District.

CASSAVA—MANIOC OR TAPIOCA.

By N. A. R. POLLOCK, H.D.A., Northern Instructor in Agriculture.

The Bitter Cassava, "Manihot Utilissima," known by its yellowish roots and stem, and Sweet Cassava, "Manihot Aipi," with reddish roots and stem, though classed as distinct species, are held by some authorities to be but variations of one original species.

This possibly is true, as there are many varieties of both, in countries where it is extensively cultivated, that approach so closely in appearance as to make it extremely difficult, if not impossible, to distinguish any difference in the species.

The species is indigenous to Tropical South America, where it has been cultivated for human food from very early ages. From there it has been introduced into most tropical countries and now forms a staple article of diet for many races.

For human consumption it is prepared in many different ways. As a vegetable and as a flour; while we are most conversant with it in its commercial form of tapioca.

The roots of both species contain a poison (hydrocyanic acid), a greater quantity occurring in the bitter variety than in the sweet. This poison occurs mainly in the skin of the roots and is easily dissipated by heat, but, nevertheless, care should always be exercised in preparing the roots for human consumption, and they should be used, especially if not quite mature, shortly after lifting.

While it is necessary to call attention to the poisonous properties, it has been observed that fresh roots in different stages of growth are eaten by pigs and predatory animals without any apparent ill effect.

Propagation.

The plant is a semi-shrubby perennial with slender, erect stems, and grows from 6 to 9 ft. high. It is propagated from cuttings of the stem 8 to 12 in. long, preferably from firm new wood, or wood of under twelve months' growth; the younger the wood the more suitable for propagating sets.

The soil most suited for Cassava is a well-drained, sandy or otherwise friable loam with good humus content, which will admit of the free expansion of the roots and of easy cultivation. It should be deeply worked by ploughing where a depth of soil as in alluvials occurs, or ploughed and subsoiled where the organic matter of the soil does not obtain deeper than the depth of ploughing.

After a thorough preparation of the soil, as for sugar-cane, drills are drawn out similarly from 4 to 6 ft. apart and single sets planted therein at intervals of from 3 to 6 ft,; width of spacing being governed by the variety and conditions under which it is to be grown.

The wider spacing is recommended on the richer soils of the coast where conditions for growth are most favourable, with somewhat closer spacings on the poorer lands, as well as on the soils at higher altitudes.

After planting the sets, which should be inserted in the soil for about two-thirds of their length, either upright or at an angle of 45 degs., the young plants, provided conditions are favourable, should appear above the surface in about a fortnight.

Cultivation.

Cultivation consists in keeping the soil well stirred and free from weeds until the plants are about 2 ft. high. It is an advantage when cultivating to throw a little soil in towards the plants, leaving a depression along the centre between each row of plants similarly as in sugar-cane cultivation; a high hilling of plants is not necessary.

The growth of the tuber is stimulated by checking the growth of the plant upwards by removing some of the terminal buds, thus throwing the strength of the plant downwards.

Where Cassava May be Grown.

The climatic conditions most suitable for the Cassava plant are such as obtain in the Northern coastal districts with heaviest average rainfall. In these districts, with suitable well-drained and rich soils, under humid and warm conditions, very heavy crops should result.

At Cardwell and on the Bloomfield River instances are recorded of from 80 to 90 lb. of roots being obtained from a single plant. The general average under proper conditions can be estimated at quite 20 tons to the acre, but on poorer soils and on drier areas the yield may only be 10 tons.

Plantings can be made at any season of the year, but are considered to give the best returns when planted between spring and autumn. Under favourable conditions the crop should be ready to lift in eight or ten months after planting, but the roots

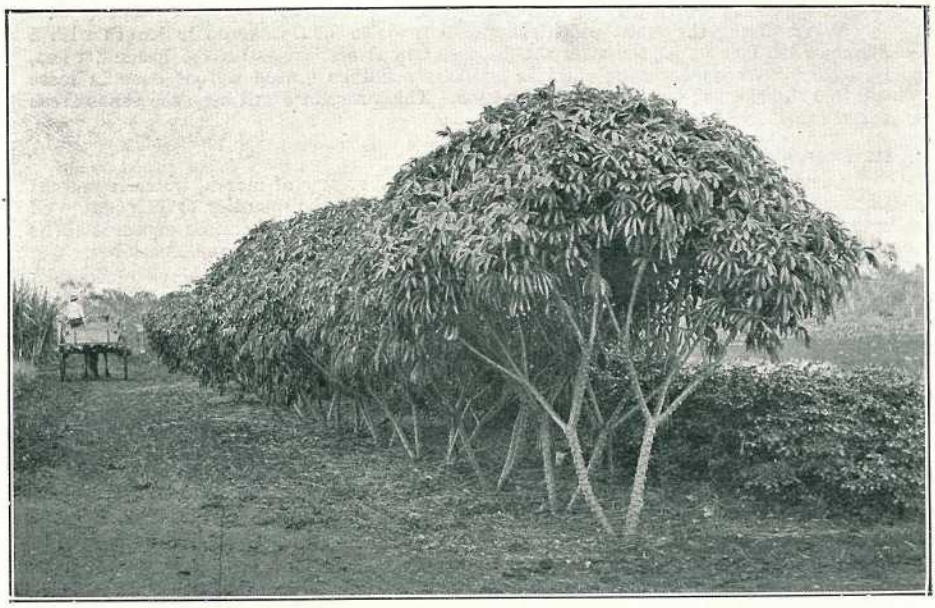


Photo.: G. B. Brooks.]

PLATE 64.—BITTER CASSAVA, TWO YEARS' GROWTH.

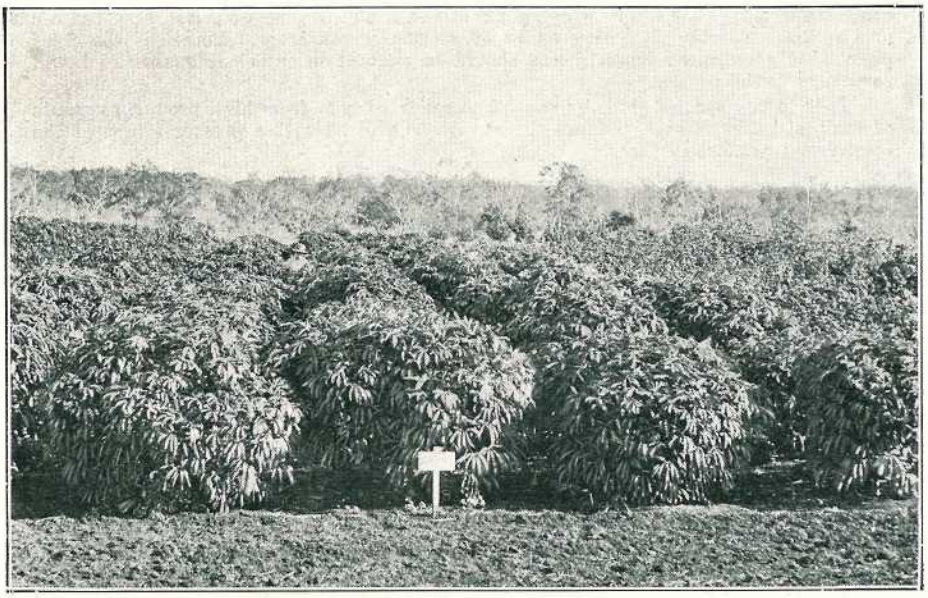


Photo.: G. B. Brooks.]

PLATE 65.—MANIHOT UTILISSIMA, OR BITTER CASSAVA.

will not deteriorate if left for twelve months or even longer. Some varieties even take up to fifteen months to attain full maturity.

When lifting the roots, which sometimes grow to 3 ft. or more in length with a diameter of 5 or 6 in., the stem should first be cut off level with the ground, when, if needed later on for sets, suitable portions could be buried a foot deep in loose soil in a shaded, but not too moist, situation. This procedure will keep the stems fresh for a considerable time.

Its Economic Value.

Cassava is recognised as the cheapest source of supply of starch, which is present in the fresh roots to the extent of up to 34 per cent. The quantity or percentage of starch will, of course, vary during the growth of the roots, but can be expected to be at its maximum during the drier part of the year, between June and December.

In this State a fair quantity of Cassava was grown in the days of kanaka indented labour, but since then, apart from some of the aboriginal mission stations, it has rarely been cultivated as a crop, though recommended by this Department as of value for pig feed in certain localities.

Cassava and Power Alcohol.

In the production of power alcohol Cassava, as a crop to supplement molasses and other components, should be largely grown, especially as it thrives to greatest perfection in the districts which produce the heaviest cane crops. Though the price per ton for the roots cannot be high, owing to its regulation by the price of the resultant alcohol with imported petrol, the total return per acre should allow from this source an appreciable profit on cultivation, while the by-products after the alcohol has been obtained should have some small additional value as a stock food.

What Analyses Show.

The following analyses from Henry's "Feeds and Feeding" show of digestible nutrients in fresh roots:—Crude protein, 0·6 per cent.; carbohydrates, 26·4 per cent.; fat, 0·2 per cent.; nutritive ratio, 1: 44·7.

The same authority gives in analyses of the dried roots:—Crude protein, 1·4 per cent.; carbohydrates, 77·4 per cent.; fat, 0·2 per cent.; nutritive ratio, 1: 55·6.

It is evident from these analyses that Cassava roots alone are very ill balanced for stock food, owing to the preponderance of carbohydrates, and that to feed economically it would be necessary to add quantities of foods rich in protein.

A Gross Feeder.

Cassava is an exhausting crop on soil, and should be grown in rotation with other crops, at the same time keeping the soil in a high degree of fertility by the use of fertilisers and the ploughing under of suitable green crops. Potash is the chief plant food constituent required and should be present in sufficient quantities in all fertilisers used.

It is to be expected that, by careful selection of sets from high producing plants of the best varieties high yielding strains will be evolved with a greater return of the commercial product per acre.

SEEDING OF NUT GRASS.

It has commonly been contended that the Common Nut Grass (*Cyperus rotundus*) does not propagate by seeds, but solely by vegetative means.

It is a common character with plants that propagate freely by vegetative means that viable seed is not produced by them, or at least not produced in abundance; though flowering heads may be freely produced the ovules do not develop into ripe seeds—for example, Buffalo grass, the cultivated bananas, &c.

Nut grass is a widely spread weed over the warmer parts of the world generally. In a recent circular issued by the United States Department of Agriculture it is stated—"Nut grass is popularly supposed to reproduce by means of seed as well as by nuts, but extensive investigation has failed to reveal either seedlings or viable seeds." Other authorities in the United States claim that the weed is spread by seeds as well as by nuts.

Personally, though I have no very definite evidence to offer, I am inclined to think that "Nut grass" is sometimes propagated by seeds and that it is carried from one district to another by stock, manure, &c.

The "seed" has a hard seed-coat that allows it to pass through the digestive tract of animals without its germinating properties being affected.

As there has been so much controversy of late over the matter I hope this year to obtain a number of "seeds," sow them and watch results which will be published later in this Journal.—C. T. WHITE, Government Botanist.

PIG CLUBS FOR SCHOLARS.

SUGGESTED SCHEME FOR QUEENSLAND.

By E. J. SHELTON, Instructor in Pig Raising.

In the United States of America and in Canada, some very practical and profitable Pig Clubs are in operation, and it is suggested that the formation of similar clubs in Queensland should be seriously considered.

In the countries named the boys and girls are engaged in a phase of pig raising which is proving to be of the greatest value to these youthful farmers and to the hog industry of the States. One of the specialists in charge of these clubs, in officially reporting on the subject, remarks that it is safe to say that the industry is being improved and stimulated to a greater degree than ever before by the Boys' and Girls' Pig Clubs which are now to be found in operation in almost every country in Kansas, Iowa, and other hog raising States. There are State Clubs for junior farmers and these are organised by the Division of Extension of the Kansas and State Agricultural Colleges.

Supervision.

In general the work is supervised by the Boys' and Girls' Pig Club Department through a State Club leader, who is employed co-operatively by the United States of America Department of Agriculture and the State Agricultural Colleges. Details of the work are planned and put into operation by an assistant State Leader or specialist in club work, who has direct charge of the live stock club work promoted by the Colleges. Locally the work is carried on by the County Farm Bureau as a definite and important part of its programme of work. In communities where there is to be pig club work, the county agent secures a local leader who helps to enrol the members and organise the club. In counties where the Farm Bureau is not yet organised, other agencies are made use of, such as county superintendents, chambers of commerce, and agricultural instructors. Most of the work, however, is in counties having a farm bureau. The local leader's duty is to encourage the boys and girls and to help in an advisory capacity in feeding, preparing for shows, &c., and in record keeping.

Club Meetings.

The members meet once a month at least to give attention to club business and to discuss their problems, after which a social hour is usually enjoyed. The meetings are thus made most interesting and helpful and are a pleasure and stimulant to the club members. Club tours, picnics, camps, &c., are also part of a well organised club. The club motto is equally applicable to Queensland conditions—viz., "To make the best better." The club pledge likewise—

> "I pledge my head to clearer thinking,
> My hands to larger service,
> My heart to greater loyalty, and
> My health to better living for my
> club, my community, and my country."

Such is the enthusiastic spirit of loyalty and service that is guiding the efforts of these junior farmers.

Rules of Membership.

Boys and girls from 10 to 20 years of age inclusive are eligible to membership in these clubs, which include sow and litter clubs, young sow clubs, and market pig clubs.

The rules of the sow and litter club provide for club members caring for one or more purebred sows from the time they are bred (mated) until the litters are at least four months old, the desirable young sows to be raised for breeding purposes, the other pigs to be fed for market. The rules for the purebred sow club provide for the selection of a young sow at weaning time, and the raising of this sow for breeding purposes. Many of the club members usually breed their sows and continue in the work a second year as sow and litter club members. The rules of the market pig club provide for the selection of a pig at weaning time, and the feeding and preparation of the pig for market purposes for sale at from five to six months of age.

Benefits Derived by Members.

Thus it can be seen that these three important phases of pig raising are taught to these youthful farmers, and the requirements in feeding and care are those recognised by successful pig breeders as being the most profitable. Records of the kinds and amounts of feed used and the cost of same, together with the time spent on the work, are kept by club members, and these have an important place in the calculation of the results of the year's work.

The Extent of the Work.

During 1923 and 1924 Boys' and Girls' Pig Clubs owned or managed, approximately, 1,800 pigs at a profit to themselves of nearly 30,000 dollars, this in Kansas alone with 107 clubs and an enrolment of 980 members. In addition to general care, the club members are taught to fit their animals for the show ring, with the result that large numbers of club pigs have been shown at local, county, and State fairs and generous prizes won many times in competition with adult breeders. Practically all of the pure breeds of pigs are exhibited, the proud exhibitors are always present, and never tire of showing visitors their pigs and making the pig pens more comfortable and attractive. These boys and girls are emphatic in stating that they are in pig club work to stay, because they have found both interest and profit in the work. Not only are pig clubs financially successful, but they are proving to be a most important agency in directing attention toward improved methods of feeding, &c., in the different communities. Club members conduct many valuable demonstrations which are doing a great deal to stimulate the interest of others. Some of the phases demonstrated include value of balancing the ration; importance of pasture and forage crops of pigs; cost of pork production; use of self-feeders; care of the brood sow and her litter; proper selection and judging of animals; disease prevention and control.

One striking example of what is being done along the lines indicated (and this is especially worthy of note here) is the work the boys and girls have been doing to prevent worm infestation in young pigs. The United States of America Department of Agriculture has worked out one efficient system by which worm infestation can be prevented, but farmers have been slow to put it into practice or to realise its value. For this reason pig club members in about twelve counties in various parts of Kansas have been selected to take up this work as a demonstration. The work is carefully supervised and records are being kept. The results obtained by the boys and girls are to be summarised for each community and county, and made public in order to prove the value of this work, and to secure a more wide-spread adoption of same by farmers in future years. Other demonstrations are conducted in a similar manner.

Stock Judging.

This is another important phase of pig club work and considerable skill in the selection of good stock results from the training which the club members receive along these lines. County stock judging tours and contests are held each year, and the winning teams from each county are sent to the State judging contests held at the State Fairs and Live Stock Shows. The winning teams in these contests have the honour of competing further in Interstate and National judging contests. Thus some expert live stock judges are being trained in pig club work. Another phase or result which should be noted is the improvement which the club animals are making upon the quality of swine in Kansas. Stock which is being introduced and raised by these pig club members is being used as a foundation of what, in the near future, will prove to be the finest purebred herds in the State. Not only is this true but much of the stock raised by these boys and girls is being spread throughout the community in which club members live, so that whole communities are thus receiving the advantage of this work, and the pigs within these areas are being brought to a very much higher plane both in quantity and in quality, and since the State is only a collection of communities a start has been made at the logical place for improvement of the pigs in the State.

Other Benefits.

Mention might also be made of the results which the pig club is credited with by stimulating an increased interest in community, county, and State fairs or shows. This phase of the work is exceedingly important. Boys and girls with their pig clubs are making exhibits at these live stock exhibitions of such a quality that they are attracting the favourable and enthusiastic attention of the entire State, especially in counties where such shows take place. When these splendid animals are placed on exhibit by their owners in club work, they form the centre of attraction and are thus viewed by the adult farmers; the latter return home with a new standard for live stock improvement towards which to work during the following year. Therefore,

pig clubs have done their share in directing towards greatly improved live stock exhibits. The show committees throughout the State have recognised this as one splendid result of the work, and they are providing increased prize money and more classes for the exhibits.

Banking institutions are also showing their faith in the State Pig Club work by loaning the members money with which to buy improved stock. This has become a widespread practice, which is proving advantageous to both the banker and the pig club members. Bankers state that such work is helping to bring prosperity to their communities, and a more favourable attitude towards farming and towards banking. Most of such loans are being made at the rate of 6 per cent. per annum.

One of the most encouraging features of the pig club work is the interest shown by breed societies in the local organisations. Many times these associations have taken the responsibility for organising clubs in their community and counties. In a number of cases breeders, by giving special concessions to the members, have made it possible for the boys and girls to start their club work with purebred animals which they could not have bought had the breeders not made the sacrifice in their favour. Many times also special prizes are donated by these breeders, and this does much to boost the work.

Educational Advantages

In all of the pig club work the educational feature is emphasised so that members may realise that their work in the clubs means more than the winning of prizes; they are given an opportunity to operate in community enterprises and programmes of work, and this is teaching them the true meaning of co-operation. Through pig club work boys and girls are coming to look upon the community and its problems, not only from the mere selfish point of view, but with a spirit that makes for general improvement. This is encouraging a spirit of service and citizenship and is teaching principles to the boys and girls that they can profitably apply in the future.

There would appear to be no reason why we, in Queensland, should not adopt similar methods to those outlined. The variety of forms in which pork may be marketed makes the pig an excellent animal for the purpose, and the project described is one which commends itself for serious consideration.

SCOUR IN YOUNG PIGS.

BOILED RICE AS A REMEDY.

Reference has been made in these pages on several occasions to the disease known as "scour" in young pigs (also called white or yellow scour or diarrhoea), one of the most troublesome of all the scourges to which the young pig is subject; it is likewise one of the most difficult to treat unless treatment is commenced early in the attack.

An American breeder, writing recently on this subject, recommends boiled rice and the water in which the rice has been boiled as a cure for the trouble. This is a very useful remedy; in the case of very young pigs a desertspoonful of warm rice water two or three times a day will suffice; it must be given in teaspoonful doses as a drench and the suckers should be kept away from the sow for at least two hours after dosing. Weaners that still have a good appetite should be given both the boiled rice and the rice water, and no other food should be allowed while this is being given.

Scour in young pigs is due in most cases to overfeeding, or to some abnormal condition of the sow's milk. The ailment can, to an extent, be checked by immediately reducing the sow's ration to an absolute minimum and by compelling her and the suckers to take plenty of exercise in the sunshine; they should also be penned in a clean, dry sty after exercise, and the sty in which they were kept should be thoroughly washed out with hot water, to which some coal-tar disinfectant has been added. It is useless treating the suckers unless attention is given to the sow.

It is advisable to carefully regulate the sow's diet in the treatment of scour; she should be given only sweet, clean nourishing foods of the best quality, and the rations should not be too liberal for the first few days after she farrows. As the suckers grow older they naturally require more food, and her supply should gradually be increased so that she can supply more milk.—E. J. Shelton, H.D.A., Instructor in Pig Raising.

DIARRHOEA OR WHITE SCOUR IN YOUNG PIGS.

E. J. SHELTON, H.D.A., Instructor in Pig Raising.

The following maxims have been compiled as golden rules for the breeder who wishes to ward off attacks of the above dread disease in his pigs.

1. Be careful not to overfeed the sow immediately before or after farrowing or during the first ten days she is rearing her litter.

2. Watch that you do not feed sour decomposed or musty foods, and be careful also to keep musty, mouldy bedding out the sow's sty.

3. Avoid changing the sow's food while she is suckling her litter unless it is found to be absolutely necessary, then effect the change gradually.

4. The moment any of the young pigs show the slightest sign of diarrhoea (scouring) reduce the sow's food supply by half and compel her to take liberal exercise, the object being to reduce the quantity of milk she is producing. Some breeders believe that the sow should have one heaped teaspoonful of copperas (sulphate of iron) dissolved in hot water and placed in her feed; this will do no harm and certainly would tend to reduce the supply of milk and tone up her system.

It is well to note that when the sow farrows she has an ample supply of milk (or she should have if she is in normal condition) for her progeny, and they soon reduce her normal supply; but some breeders in their enthusiasm and with a desire to give her a good time both before and after farrowing immediately increase her food supply and keep her trough well filled. Under this treatment the sow likewise becomes enthusiastic (it might be said) and produces heavier supplies of milk, consequently, the little fellows get more than is good for them or is necessary, and as their digestive organs cannot effectively deal with the extra supply, the result is that indigestion is set up and this is generally accompanied by inflammation of the stomach and intestines. The pigs then sicken and a feverish condition follows, the bowels refuse to act properly and grey-coloured, evil smelling, profuse diarrhoea follows. The young pigs do not immediately lose their appetites but their condition gradually grows worse, and they begin to die off. The owner frequently thinks they are dying of starvation and continues to force the sow with food so that she will produce more milk. The sow thus becomes overburdened with milk, and as the suckers gradually drop away from her she cannot get rid of it, inflammation of her udders follows and she also sickens and will probably suffer to such an extent as to lose her supply of milk altogether. This is commonly referred to as milk fever.

It is necessary to remember that the stomach of the young pig is very small and they require small quantities of food only and at frequent intervals. They are, however, easily overdone and treating them is a different matter. To prevent trouble note that the sow should not be fed during the day she farrows, give her a thin gruel only, about eight or ten hours after farrowing, and very gradually increase her food supply after the suckers are born and until they are a week or ten days old. She must have sweet succulent green food, and ample exercise, and when the little fellows are ten days old they may be allowed to explore their surroundings, and gradually become accustomed to following the sow about. If, after all, due care is taken to prevent the appearance of white scour in successive litters, it should occur and not yield readily to treatment, it would be better to seek veterinary aid, for the trouble may be due to infection.

To summarise: Immediately there is any sign of scouring in one or more of the young pigs, reduce the sow's food supply by half; compel her and the suckers to take exercise; give copperas in the food as advised; move the sow and suckers to a clean, dry pen, and feed the sow very lightly for a few days. If the ailment persists, give the sow a second dose of medicine (the copperas should be dissolved in hot water before being added to the food); give the suckers teaspoonful doses of castor oil each on the first day, and again next day if still scouring; sprinkle the floors and yards lightly with air slacked lime and keep them scrupulously clean; add a cupful of lime-water to the sow's food every day, and be careful not only to use sweet clean food, but also to place it in a clean food trough in a clean pen. Later, when the young pigs begin to feed "on their own," give them some lime-water, too; it never does them any harm so long as it is not used too freely. The lime-water is readily prepared by taking a tub or barrel, cleaning it out thoroughly, and soaking in clean water for a day or two. Then half-fill with clean rain water, and put about half a bucketful of air-slacked lime in the barrel, and after stirring water and lime together, allow to settle for several hours. It will be noticed that a thin "scum" floats on the surface, and that the water is as clear as crystal. As long as this scum forms daily, the lime-water is good; and the barrel can be refilled after use. Stir the lime up occasionally, and it will be good for two or three weeks at

least. When the scum fails to appear on the surface, clean the barrel out, and start again with a fresh supply of lime and water. Never use an iron or tin container for this purpose.

Cleanliness is next to godliness in all matters relating to pig management. Common sense methods of feeding and care are also golden rules, and a knowledge of the cause and effects of the common diseases to which stock are subject will be of the greatest value at all times.

HOUSING THE PIG.

By E. J. SHELTON, Instructor in Pig Raising.

The climatic conditions in Queensland in general are such that there is no occasion for the pig farmer to have to incur heavy expenditure in the erection of expensive accommodation houses for his breeding stock or fattening pigs. This does not, however, suggest that accommodation is unnecessary or that the tumbled-down unsanitary so-called pig sties one sees on so many farms are good enough.

It is the objective of this series of articles on "Housing the Pig" to supply information that can be applied by pig breeders in the "lay out" of their pig sties, paddocks, &c.; to supply plans of simple structures, and where possible to illustrate the different types of houses suggested as being suitable for erection on different types of farms.

It will readily be understood that the farmer engaged in fattening pigs on the surplus butter-milk, whey, or skim milk from butter or cheese factories and who has at certain seasons of the year an abnormal supply of this product to handle, must of necessity have more extensive feeding and housing arrangements than, say, the dairy farmer who keeps pigs as a side line or purely as an adjunct to dairying. The suburban pig farmer who utilises the waste food from hotels, cafés, sweepings from flour mills, produce stores, &c., waste vegetables and fruit from the markets, and possibly some meat products, must also in order to conform to municipal or shire regulations and to provide for the requirements of a large number of fattening pigs, have ample and convenient accommodation. The suburban farmer is usually somewhat cramped for space, hence he cannot give his breeding stock the benefit of a pig paddock, one or more acres in extent. He also has to provide a plant for cooking most of his food, and must have a more liberal water supply than would be necessary further afield.

The butcher who runs pigs in conjunction with his boiling down establishment is now having regular visits from the slaughtering inspector, who, under the powers vested in him by the Slaughtering Act or by other authority, demands that the pig sty accommodation be brought up to the standard required by these Acts, which includes the provision of concrete feeding floors, &c., as will be referred to later on in this series of articles.

The man who specialises in stud pigs and whose main source of income is to be derived from the sale of selected boars and sows, will find that he requires a good deal more accommodation, small yards, shelter sheds, &c., than the farmer raising pigs for direct sale to butchers or bacon factories.

The bacon factory itself must provide up-to-date accommodation, even though it only "rests" the bacon pigs prior to slaughter, and provides them principally with cool water to drink, but who make no special provision for feeding pigs.

The farmer who intends raising pigs on the paddock system and whose pigs will live the "open-air" life with all its advantages in our genial climate, will require a special type of accommodation to which extensive reference will be made as we proceed with our study. His principal expenditure will be in the purchase of wire-netting, barbed wire, fencing posts and rails, straining posts, portable shelter sheds, water and food troughs in addition to special accommodation for farrowing sows, &c.

Thus it will be seen that the subject opens up a wide field for study, and one that it is hoped will shortly provide ample material for a complete treatise on housing and accommodation of pigs. The illustrations, Figs. 1 and 2, are of open-fronted shelter sheds as originally designed at the Hawkesbury Agricultural College, Richmond, New South Wales, during the writer's term there as Pig and Bacon Expert. They were designed in collaboration with the then Principal (Mr. H. W. Potts), in whose text-book "Potts on Pigs" these illustrations appear. The plan was prepared by Mr. Adam Brooks, works overseer in the N.S.W. Agricultural Department. These shelter sheds are simple yet convenient and roomy and could be constructed of sawn hardwood palings, or other building material, with corrugated iron roof or other suitable material. The illustration and plan give complete details as to the layout of the building, its length, breadth, height, &c. Fig. 2 shows several Berkshire sows "in occupancy."

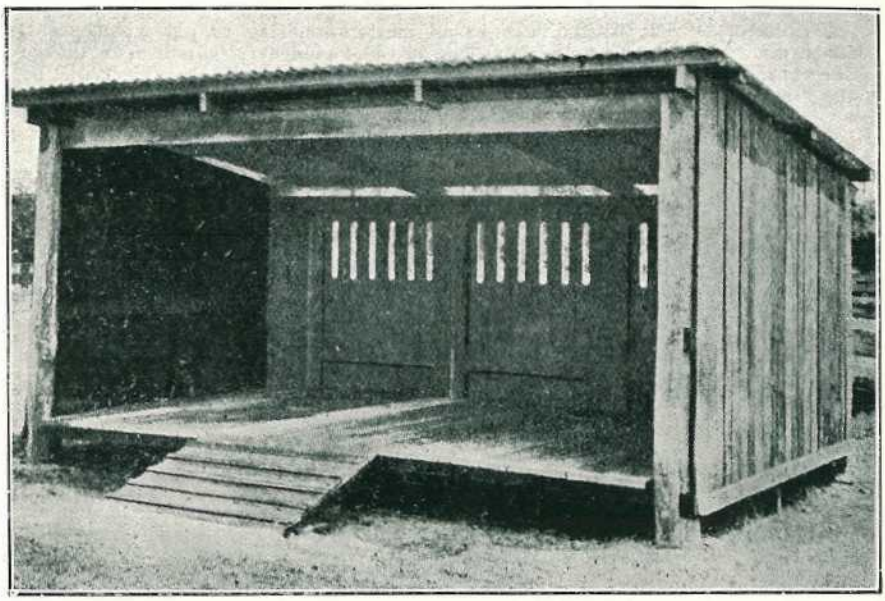


FIG. 1.—OPEN-FRONTED SHELTER SHED (See also Fig. 2).
This type of accommodation adds value to the farm, and is not only convenient, but attractive and useful, yet inexpensive.

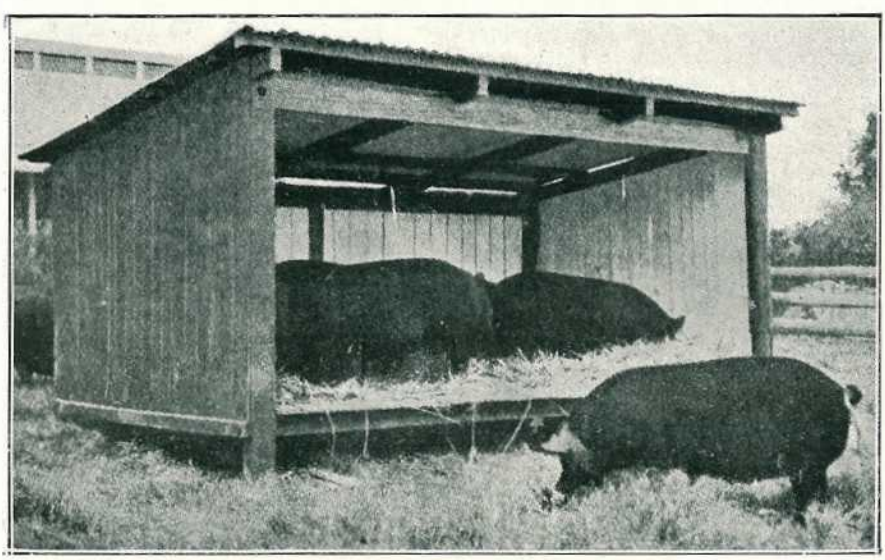


FIG. 2.—OPEN-FRONTED SHELTER SHED AT HAWKEBBURY AGRICULTURAL COLLEGE, N.S.W.
Berkshire Sows enjoying the advantages of a simple yet convenient Shelter Shed such as is recommended for Queensland Farms.

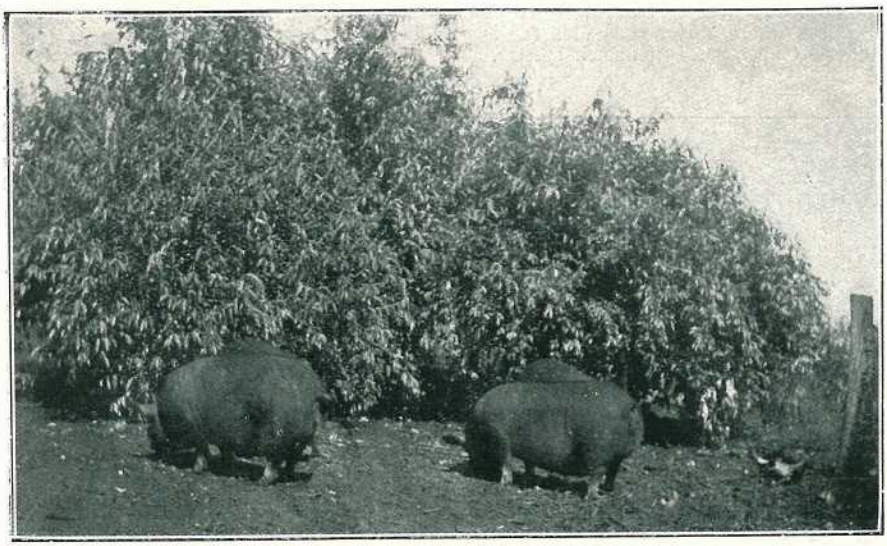


Fig. 3.—Housing the Pig.
Berkshire Sows at the Farm Home for Boys, Westbrook *viâ* Toowoomba. These sows appreciate the shade and protection provided by the Budelia Shrub, a most useful addition to the shade around the Piggery

Fig. 4.
Showing the lay-out and arrangement of Paddocks, Shelter-sheds, &c., on a noted English Stud Farm.

Fig. 3 shows the advantages of ornamental trees in providing ample shade for the pigs. The illustration is of some of the matrons in the Berkshire stud at the Westbrook Farm House for Boys, where Mr. Thos. Jones, as superintendent, has established a high-class stud of the famous old English Berkshire. The shade is provided in this instance by a flowering shrub, commonly known as Budelia.

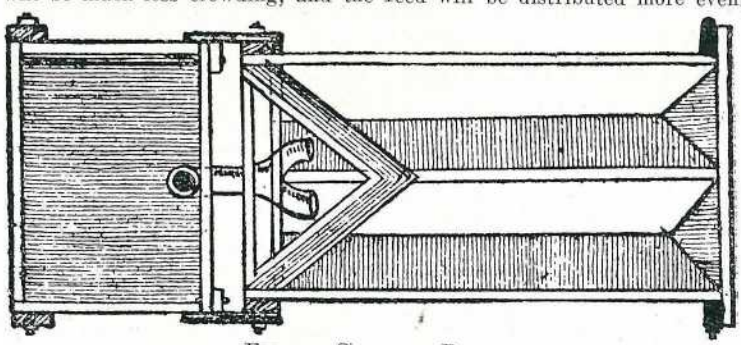
Fig. 4—where Berkshires thrive—shows the farrowing pens at Swinton Grange, England, where Major Clive Behrens is breeding Berkshires on a large scale on the modern "open-pair" paddock system.

(TO BE CONTINUED.)

PLATE 66.—DOWN ON THE FARM.
The piglet appreciates its bottle. A domestic scene on Mr. R. Wight's farm at Mutdapilly

FEEDING SLOP TO PIGS.

Pouring wet hog feed all over one's shoes in trying to satisfy a lot of crowding, squealing pigs need not be a part of every day's work. A trough that will give the animals their swill without the usual mess, and that will save a great deal of feed and temper is shown in the illustration. It can be made from an old trough plus a piece of rainspout and an old barrel or box. If the trough is made double, as shown, there will be much less crowding, and the feed will be distributed more evenly. A



FEEDING SLOPS TO PIGS.

piece of rain-spout with a Y at one end lets the swill down to the trough from the barrel or box in which it has been mixed. Each opening of the tube opens into one of the troughs and the openings are protected with a V-shaped guard made of boards. After the swill has been well mixed the plug is drawn from the bottom of the box, and the swill runs into each of the troughs, which can be made any length.—"Country Gentleman."

QUEENSLAND SHOW DATES FOR 1925.

March 31, April 1—Goondiwindi.
1–2—Dalby P. and A. Association (C. Harvey, Secretary).
11—South Brisbane A., H. and I. Association.
13–14—Herberton M., A. and P. Association (E. C. Wright, Secretary).
15—Pittsworth P., A. and H. Association (B. Binney, Secretary).
16–17—Wondai A., P. and I. Society (G. D. Griffith, Secretary).
18—South Brisbane.
21—Milmerran District A., P., H. and I. Association (J. H. Sopp, Secretary).
21—Milmerran.
21–22—Chinchilla A. and P. Association (J. E. Mackie, Secretary).
22–23—Killarney Agricultural Society (Clifford Alford, Secretary).
28–30—Barcoo Pastoral Society, Blackall (W. P. Tilden, Secretary).
28–30—Toowoomba Royal Agricultural Society of Queensland (G. Noble, Secretary).
May 30, 1—Kingaroy A., P. and I. Society (J S. Michen, Secretary).
5–6—Taroom A. and P. Association (T. O'Malley, Secretary).
6–7—Central Warrego P. and A. Association, Charleville (W. R. Sinnott, Secretary).
6–7—Longreach.
6–7—Maleny A., I., P., and R. Society (G. B. Sutton, Secretary).
6–7—Toogoolawah D., A., and I. Association (Douglas Young, Secretary).
7–8—Nanango.
13–14—Springsure.
13–14—Maranoa P., A., and I. Association, Mitchell (W. J. Rogeneamp, Secretary).
13–14—Fassifern A. and P. Association, Boonah (G. E. Ball, Secretary).
13–14—Murgon P., A., and H. Society (N. Waldock, Secretary).
20–21—Emerald.
20–21—Western P. and A. Association, Roma (F. W. Mills, Secretary).
20–22—Queensland P. and A. Society, Ipswich (H. W. Watson, Secretary).
26–27—Wallumbilla A. and P. Association (M. J. Grace, Secretary).
27–28—Esk P., A., and I. Association (T. C. Pryde, Secretary).
June 2–3—Marburg and District A. and I. Association (G. E. Dance, Secretary).
2–3—Hughenden.
2–4—Maryborough.
3—Brookfield, Pullen Vale, and Moggill Farmers' Association (John Phillips, Secretary).
3–4—Logan and Albert A. and P. Society, Beaudesert (P. F. Dever, Secretary).
3–4—Proserpine.
6—Buderim Mountain A. and I. Society (S. Anderson, Secretary).
6–9—Isis District P., A., and I. Society (G. W. Wrench, Secretary).
11–13—Bundaberg.
15–17—Gin Gin.
17–18—Woombye.
18–19—Gladstone.
19–20—Lowood and Tarampa P. and A. Association (S. Coleman, Secretary).
23–27—Rockhampton Agricultural Society (H. Hill, Secretary).
July 30, 1–2—Mackay.
1–2—Lockyer A. and I. Society, Gatton (Percy Skinner, Secretary).
2–3—Biggenden A. and P. Society (C. J. Stephensen, Secretary).
2–3—Kilcoy.
3–4—Sandgate A., H. and I. Association (W. F. Kenny, Secretary).
7–9—Townsville.
8–9—Laidley.
9–10—Woodford.
11—Wellington Point.

July 15–16—Charters Towers.
16–17—Caboolture.
22–23—Ingham.
24–25—Ayr.
24–25—Rosewood A. and H. Association (R. J. Walsh, Secretary).
24–25—Ithaca A. and I. Association (T. A. Bennion, Secretary).
29–30—Bowen.
31 } Pine Rivers.
Aug 1 }
1 —Mount Gravatt.
5–6 —Humpybong A., H. and I. Society, Redcliffe (C. G. Graves, Secretary).
10–15—Royal National A. and I. Association of Queensland, Brisbane (J. Bain, Secretary).
26–27—Crow's Nest A., H. and I. Society (J. Pike, Secretary).
Sept. 2–3 Esk Bushmen's Carnival.
4–5 —Wynnum.
12—Zillmere.
24–25—A. and P. Society of Southern Queensland, Beenleigh (W. Laughlin Secretary).
26—Rocklea A. and I. Society (C. R. Gwynne, Secretary).
26—Maroochydore Agricultural Society.
Oct. 1 —Kenilworth P., A., H. and I. Society (R. Houston, Secretary).
2–3 —Toombul A., H. and I. Association (A. J. Thompson, Secretary).
9 —Southport A., H. and I. Society (S. H. Earl, Secretary).
10—Enoggera A., H. and I. Association (N. Thomson, Secretary).
16—Nerang.

CONTROL OF COTTON INDUSTRY.

The Minister for Agriculture and Stock (Mr. W. Forgan Smith) received a recent deputation representative of the Cotton Advisory Board and attended by Messrs. H. H. Bentley (Secretary to the Council of Agriculture), G. McDonald, and J. W. Camplin in respect to the question of State decontrol of the ginning and the marketing of cotton, conditional on the Commonwealth Government's favourable consideration of a request for a bounty for an extended period of years.

The deputation pointed out that in making that request it was not unmindful of what the Queensland Government had done in the direction of establishing the cotton industry in this State by guaranteeing the price of 5½d. per lb. for a period of five years. It was, however, of the opinion that the State Government should not be saddled with the nurturing of an industry which was going to be beneficial to the whole of Australia. Recently the Council of Agriculture had completed an agreement with the British Australian Cotton Growing Association having for its object the securing of the option offered to the growers by the Association for the purchase of its physical assets in Queensland as a going concern at any period prior to 1st May, 1928. The question of a bounty from the Federal Government was also contingent upon the following proposals, viz.:—

(1) The present Government policy under the Cotton Industry Act to stand for the current season;

(2) The Act to be repealed before the next cotton season;

(3) A Cotton Pool under the Pools Act to be constituted without State Government guarantee and without State Government control of ginning and marketing;

(4) The B.A.C.A. Agreement with the Government to cease after the end of the present season and instead a fresh agreement to be made with the Pool;

(5) The B.A.C.A. and the growers' representatives to immediately take up the matter of guarantee for the next season with the Commonwealth Government.

The Minister, in reply to the deputation, intimated that before considering the proposals involving a change in the Government's policy in regard to the cotton industry he would have to be satisfied that the cotton-growers favoured the scheme. To that end he suggested that the questions at issue should be fully explained to the growers, and that a vote should be taken of the producers concerned through the Local Producers' Associations. If he were satisfied that a substantial majority of the growers favoured the scheme for State decontrol and the substitution of a Commonwealth bounty, he would be prepared to place the matter before Cabinet. The matter of a bounty was one entirely for the Commonwealth Government.

General Notes.

Bird Sanctuary at Yeerongpilly.

In accordance with the provisions of the Animals and Birds Acts, the Yeerongpilly Golf Links have been declared a sanctuary in which it is unlawful for any person to shoot or kill any animal or bird.

Definition of Primary Producer.

At the request of the Council of Agriculture it has been approved that the term "primary producer" mentioned in the Primary Producers' Organisation Acts, shall include apiarists and farmers' sons, 18 years of age and upwards, working on their fathers' farms, not for wages but for their keep only.

Pure Seeds.

The Premier (Hon. W. N. Gillies) stated recently that, as the success or failure of a crop may be wholly determined by the condition of the seed sown, it is of the utmost importance, particularly after a wet harvest such as that recently experienced, that every farmer should know the purity and germination of the cereals that he intends to sow.

It is desired that, as far as possible, all farmers should know that arrangements have now been made by which samples of barley, oats, rye, and wheat will be examined at the Seed Laboratory, Brisbane, free of charge.

Leaflets giving full particulars of the testing of samples of seed, also forms for enclosure with samples, may be obtained from the Department of Agriculture and Stock, Brisbane, or from officers of the department in the various country districts.

Primary Products Pools Act—Additional Regulations.

An addition has been made to the Primary Products Pools Act Regulations, which addition provides that, where the name of a candidate not duly nominated for membership on any Pool Board appears on a ballot-paper, the figure placed against his name shall be disregarded for the purpose of determining the order of preference.

Regulation 11 of the Primary Products Pool Act has been altered to read that the nomination of every candidate for election as a member of any Board shall be signed by at least three persons (or such greater number of persons as may be decided by the Minister) instead of eleven, as was the case previously. Of course, the persons to sign the nomination must be growers of the commodity for which the Board is being constituted.

Pineapple Production.

A writer in the "Demerara Chronicle" discusses pineapple production in the Antilles, Hawaii, Haiti, and South Africa in a recent issue of that journal. Reviewing lessons of the past, he says, that without looking on the black side, we may usefully consider the causes of two instances of failure in regard to pineapple production in order to obtain information likely to be of value in making a programme of development in any new country. The first instance is that of Florida. Although that State has revived its pineapple industry, the industry suffered almost complete extinction a few years ago. The causes of failure appear to have been two: exhaustion of soil humus, and the disease known as wilt or red wilt, associated with a parasite known as the root nematode or worm. It would appear that soil depletion weakened pineapples in Florida to such an extent that they became unable to resist the nematode which appears to be widely distributed. The important point is that, given proper cultivation and adequate manuring, varieties of pineapple can be successfully grown in spite of the nematode; and further, areas which are badly infested by this worm can be freed by growing for two or three years crops like Natal grass and certain varieties of cow peas, on the roots of which the nematodes are unable to live.

Peanut Board.

Notice of intention to create a new Peanut Board has been issued. All peanuts harvested from areas of one-half acre and upwards during the period 1st July, 1924, to 30th June, 1927, will come under the supervision of the proposed Board which will consist of four members, one to represent the Council of Agriculture and three to represent the growers.

The Board to deal with the crop until the 31st August, 1925, will consist of the members appointed to deal with last season's crop, viz.:—

C. F. Adermann (Chairman),
W. Muir,
R. M. Wise, and
W. O'Mara (Representative of Council of Agriculture).

The members appointed after the 31st August, 1925, will hold office for one year from the date of their appointments. Persons eligible to vote will be persons who have had growing peanuts on areas of one-half acre and upwards at any time during a period of twelve months prior to any referendum or election held between the first day of July, 1924, and the thirtieth day of January, 1925.

Any petition for a poll to decide whether the Board shall be created must be signed by at least fifty growers as above, and must reach the Minister for Agriculture and Stock before the 28th March, 1925. To ensure their names being on the roll of persons eligible to vote, growers as beforementioned are invited to send their names and addresses at once to the Under Secretary, Department of Agriculture and Stock, Brisbane.

The Hamilton Cold Stores.

The Minister for Agriculture (Hon. W. Forgan Smith), in the course of a recent Press interview, stated that his attention had been drawn to a statement which had appeared in the Metropolitan Press relative to the position in connection with cold storage accommodation for butter in Brisbane.

It was stated that all cold storage space in the metropolitan area was packed up with butter awaiting shipment; and an attempt was made to cast the blame upon the State Government.

At the outset the Minister stated that it had been claimed that the exportation of all commodities from Australia was a matter that come under the control of the Commonwealth Government, however the State Government had made an endeavour to assist in the development of primary industry by having under course of construction a cold storage premises at the Hamilton.

This store, when completed, will supersede the existing State Government Cold Stores at Roma Street, which have been conducted for many years past under the control of the Railway Commissioner. The Cold Stores at Roma Street have served a very useful purpose in the development of the dairying industry in Queensland.

The production of butter and cheese has developed to such an extent that the Cold Stores at Roma Street are incapable of providing sufficient cold storage space for the quantity of butter and cheese now manufactured.

There are also cold storage premises outside those owned by the State Government, which are conducted by private enterprise, and in the past these firms canvassed for the business of cold storage of dairy products. They are still in the field, but, contrary to statements which have appeared in the Press, chronicling the disaster to primary industries that has been occasioned by the unsympathetic administration of the affairs of the man on the land by the Labour Government, we find that the cold storage space now available is insufficient to cope with the volume of dairy produce that is coming forward for exportation overseas.

The congestion in cold storage accommodation has been rendered somewhat more acute by the fact that the sailing dates of one or more vessels, which were expected to carry butter, have been deferred.

To relieve the position the Minister arranged to accept, temporarily, butter at the Hamilton Cold Stores.

The production of butter and cheese is at present almost at a standstill, and the complement of dairy produce coming forward for export is slightly less than it was some little time ago.

One firm that had undertaken to cold store 1,000 boxes of butter per day found that they were unable to do so when the butter was actually submitted to them for storage, and naturally this butter is now included amongst the supplies for which accommodation is being sought at the Hamilton.

Atherton Tableland Maize Board.

The following nominations have been received by the Department of Agriculture and Stock to fill the vacancies on the Atherton Tableland Maize Board, caused by the retirement of Messrs. McDonald and Armstrong, owing to the expiration of their term of office on the 31st March next:—

H. J. Armstrong, junr., Atherton.

D. H. Wallace, Atherton.

J. J. McDonald, Tolga.

Drummond Macpherson, Tolga.

John Gargan, Kairi.

George Ferguson, Kulara.

The ballot-papers are returnable to the Department not later than the 31st March, 1925.

Fodder Conservation.

Following on the Conference that was held on the 21st January last, between the Minister for Agriculture and representatives of the various Associated Banks, on the subject of Fodder Conservation, the Premier (Hon. W. N. Gillies) stated recently that at the conclusion of that Conference, the representatives of the banks present, promised that the matter would be considered by their Association at its next meeting.

Mr. Gillies has received a letter from the Secretary of the Associated Banks to the effect that while the matter has been placed on the agenda paper, no meeting of the Association has been held since the Conference. A further letter has been received by Mr. Gillies from the Chairman of the Associated Banks, which advises that the question of extending help to farmers for fodder conservation had been fully discussed by the Association. The Chairman added that while his members are unanimously of opinion that each application for financial assistance for the purpose of fodder conservation must be dealt with on its individual merits, he was requested to advise that the trading banks are very sympathetic to the movement and thoroughly believe in its value to the community.

Milk and Cream Testing Examination.

Patullo, John David, H.T., State School, Wellcamp; Stenzil, Geo. Edward, "Taronga," Beatrice street, Ascot; Carter, Oswald Stanley, Wowan, *viâ* Rockhampton; Stubbin, Vincent Ernest, State School, Middle Creek, Brooklands, *viâ* Nanango; Biggs, Aubrey Wilfred, Cressbrook, Toogoolawah; Anderson, John Joseph Edward, Atherton Butter Factory, Malanda; Davidson, John Roy, Toogoolawah Condensery; Rattray, Frances Mary, Injune, *viâ* Roma; Cunningham, Bruce, H.T., State School, Haden; Hutton, James B., Kingsthorpe; Daly, James Conleth, Cooby Creek Cheese Factory, Meringandan; Morgan, James Llewellyn, Goombungee; Ogilvie, Lloyd Welesley, Butter Factory, Allora; Coppin, Wm. Jas. Jeffery, care of M. J. Dobson, Ross road, Malanda; Kemp, James, Butter Factory, Kingaroy; Little, Alfred Frederick, Biddeston Cheese Factory, *viâ* Oakey; James, Norman, Post Office, Colinton; Batzloff, Wm. John, Biddeston Cheese Factory, *viâ* Oakey; Rodgers, Albert Edward, Box 5, Murgon; Marks, Wm. Victor, Atherton Butter Factory, Malanda; Mullins, Chas. Thomas, Pittsworth; Gleeson, Edwin Ambrose, Crow's Nest; Judd, Walter James, Crow's Nest; Growcock, James, Wide Bay Dairy Company, Gympie; McRobert, Chas. Wm., Mundubbera; Boland, Raymond Patrick, Lewis street, Roma; Brown, N. V., Ashford's Hill, Gympie; Hamilton, R., Cheese Factory, Southbrook; Fox, Wm. Joseph, Hodgson Vale Cheese Factory, *viâ* Toowoomba; Mulqueeney, Herbert John, Sunnyvale, *viâ* Bell; Leary, James Ambrose, care of Butter Factory, Booval; McPhee, Henry Norman R., Sunnyvale, *viâ* Bell; Barnes, John Francis, Melbourne Hotel, Bundaberg; French, Wm. David, Sunnyvale, *viâ* Bell; Mann, Victor Crouch, Yarranlea; Souwer, Hermanus Johannes, Mundubbera; Chamberlin, V., Kingsthorpe; Littlemore, John Alfred, Gladstone; McGrath, P., Cedar Pocket, Gympie; Colthorpe, Henry James, Gladstone; Bennett, N. C., Cooroy; Hedley, John Rutter, Cothill road, Booval; McPhee, Angus Alexander, Sunnyvale, *viâ* Bell; Ford, John Wm., Butter Factory, Clifton; Redman, Lionel, Butter Factory, Allora; Wyllie, Geo. Garvin, G.P.O., Bundaberg; Conroy, Kevin John, Bundaberg Dairy Company; Walker, John L. W., Wide Bay Dairy Company, Gympie; Gamble, James E., Southbrook Co-operative Dairy Company; Lambley, Chas. Joseph, Victoria Hill, *viâ* Clifton.

The Pest Destroyers Act of 1923.

Buyers of Insecticides, Fungicides, Vermin Destroyers, Weed Killers, &c., would do well to note that every dealer must, before delivery to the buyer, affix to or upon every package a label conforming in all respects with the specimen label forwarded to the Department of Agriculture. The label must state—

1. The distinctive name of the pest destroyer.

2. The net weight contained in the package or, in the case of liquids, the true volume content expressed in Imperial gallons or fractional parts thereof.

3. The names of the active constituents, and when so required by the prescribed standards, the percentage of such active constituents and (or) the impurities contained therein.

4. All directions for use of the pest destroyer.

5. The name and address of the Queensland wholesale dealer.

On the purchase of any pest destroyer of a greater value than five shillings, the buyer should, on or before delivery of such pest destroyer, receive from the dealer an invoice setting forth:—

1. The name and address of the dealer.

2. The net weight or Imperial measure and name of the pest destroyer.

3. A warranty in the following words:—Notwithstanding any agreement to the contrary, this invoice shall be deemed to be and shall have effect as a warranty by me, the seller, that the constituents of the pest destroyer sold, and the percentage in which each constituent is contained therein and the percentage of each constituent contained in that part thereof which is soluble in cold water, accurately corresponds with the constituents and percentages respectively stated in the statutory declaration furnished to the Under Secretary, Department of Agriculture and Stock, Brisbane, as prescribed with respect to the pest destroyer of the same name by "*The Pest Destroyers Act of* 1923."

The Act provides that no purchaser is bound to accept delivery of any pest destroyer unless it is labelled and invoiced in accordance with the above; further, the buyer is not bound to take delivery of any package of pest destroyer which upon weighing does not correspond with the weight as set out on the label and invoice.

Central District Prospects.

The Director of Agriculture (Mr. H. C. Quodling), on his return recently from the Central District, stated the country generally is looking exceptionally well. January rains appeared to have been well up to the average, excepting on a section of country immediately to the north and west of Rockhampton, where the registration for the month was under 2 inches, as against several inches elsewhere.

Touching the question of Departmental activities, Mr. Quodling stated that the Experiment and Crop Demonstration work carried out for several years past on individual farms under the supervision of the Central District Agricultural Instructor, Mr. G. B. Brooks, was showing encouraging results. Much had been done to improve existing varieties of sweet potatoes. New kinds had been introduced from other States and countries; varieties had been raised by cross-fertilisation, and subsequently brought into cultivation; and existing types were now classified under a scientifically designed nomenclature.

The demand for cuttings from tested strain had been maintained with the result that growers will soon have larger supplies available for culinary purposes and for stock feeding.

The practice of carrying out trials with winter and summer growing fodder crops on individual farms is creating interest among dairymen, who invariably find it imperative at times to provide food for milch cows. Obviously, the system of providing for a continuity of fodder to make up for the lack of succulence in pastures during the winter and spring seasons calls for more universal adoption. Success has also attended efforts to conserve surplus supplies of fodder as ensilage. The present season's arrangements in respect to stack ensilage embrace demonstrations in several localities, extending from Rosedale to Marlborough, and inclusive also of the Dawson Valley.

In the Boyne Valley last year winter fodder trials furnished good returns, and clearly showed that a continuity of green fodders combined with legumes was readily obtainable, thereby ensuring practically a farm-grown balanced ration for dairy cows during a period of the year when natural grasses were innutritious.

Several crops found suitable for pig feeding purposes have also shown the value of systematised production of home-grown supplies. Experiments conducted with English potatoes and onions on individual farms indicated that both offered a good medium of profit to producers who have suitable soils available for raising food crops, for which an everyday demand exists.

Several varieties of grain sorghums are under test in different localities. An effort is being made to popularise this class of grain which has shown itself to be more dependable in dry seasons than maize, and capable also of being used on farms as a substitute for this latter crop for stock and poultry feeding purposes.

In the near future, production in the Central District must soon show a pronounced increase. In the Callide Valley alone there are some hundreds of new settlers hard at work in the development of their selections. In this locality some excellent agricultural land exists. Now that the settlers are commencing to establish themselves, it is the intention of the Department to extend its system of crop demonstration to the district.

Butter Board.

Following on the favourable result of the recent referendum held in connection with the proposed Butter Board, the Board has now been constituted to deal with butter produced at factories for a period of three years as from the 21st February, 1925. The Board will consist of five representatives of growers and one to represent the Council of Agriculture. Representatives of growers will be elected by butter factories at present operating in the State, and nominations are now being called for election for one year. The factories have been divided into five divisions, and each division will elect one representative.

The Board will be empowered to make levies on companies as are necessary to meet the payment of allowances and expenses to members of the Board as the Minister for Agriculture may think fit. No company shall deliver butter to the Board before the date to be published by the Minister in the "Government Gazette." Until such date, on Saturday in each week, every company shall deliver to the Board, in respect of each of its factories, a return showing the quantity of butter manufactured during the past preceding seven days, and the names and addresses of the persons to whom such butter was delivered or consigned. Agents for the sale of butter will furnish similar returns. The Board will also be empowered to make monetary arrangements necessary to effect equalisation of returns to companies. The Minister may appoint any person or persons to inspect and take copies of books, papers, vouchers, &c., of any company or agent, for the purpose of ascertaining or verifying any particulars mentioned in returns of companies.

Persons eligible to vote on any referendum or election in connection with the said Board shall be companies manufacturing butter in the State of Queensland.

Staff Changes and Appointments.

As a result of Friday Island, in the Torres Straits, being recently declared a sanctuary for animals and birds, Mr. S. Wilson, Police Magistrate, Thursday Island, and Mr. H. N. Hockings, also of Thursday Island, have been appointed officers under and for the purposes of the Animals and Birds Act.

Mr. F. G. Holdaway, formerly Assistant to Entomologists, has been appointed Assistant Entomologist, Cotton Section, Department of Agriculture and Stock.

An Order in Council has been approved removing all members of Local Sugar Cane Prices Boards appointed during 1924, excepting the members of the Babinda, Bingera, Farleigh, Invicta, Macknade, Maryborough, Moreton, Mount Bauple, Mourilyan, Plane Creek, and South Johnstone, which latter members had their term of office extended to the 28th February.

Mr. Geo. Boyle has been appointed a member of the Cotton Advisory Board constituted last week. Mr. Boyle will take the place on the Board of Mr. J. McRobert.

As Mr. J. T. Jenkins, who held the position of Acting Inspector of Slaughterhouses at Winton has left Queensland, his appointment as above has been cancelled.

Constable J. Goodfellow, of Roma, has been appointed an Acting Inspector of Stock.

Messrs. M. Custance, W. Dixon, and E. T. Lewin, all of Brisbane, and Mr. D. Culhane, of Cambooya, have been appointed Inspectors of Stock; Mr. J. A. O'Neill, of Glastonbury, *viâ* Gympie, has been appointed an Inspector of Dairies.

The appointment of Mr. S. L. Brimblecombe as Honorary Inspector under the Diseases in Plants Acts has been cancelled.

The Officer in Charge of Police at Chinchilla has been appointed an Acting Inspector of Stock, and Constable J. M. McKeever, of Dayboro, has been appointed an Inspector of Slaughterhouses.

The term of office of the members of the Council of Agriculture has been extended to the 31st December, 1925.

The resignation of Mr. A. R. Atherton of Mackay as an Officer under and for the purpose of the Animals and Birds Acts has been accepted.

Mr. J. M. McLaren, of Cunnamulla, has been appointed Government Representative on the Paroo Dingo Board.

Constables J. P. Phelan and P. Shepherd, of Eulo and Yaamba, respectively, have been appointed Inspectors of Slaughterhouses.

The appointments of Mr. A. H. T. Bedford, Warwick, as Inspector, Advances to Settlers Branch, State Advances Corporation, and as Inspector, Agricultural Bank, have been confirmed.

Mr. W. Bennett, of Talwood Station, Talwood, has been appointed an Acting Inspector of Stock.

Mr. A. B. Smyrell, District Inspector of Stock and Brands, and Mr. P. J. Short, Inspector of Stock and Slaughterhouses, have been retired from the Public Service as from the 30th June, 1925.

For the purposes of the Primary Producers' Organisation Act, a Cotton Advisory Board has been formed to consist of the following members:—L. R. Macgregor, G. E. McDonald, R. J. Webster, J. McRobert, R. L. Boyd, A. H. Carrington, G. W. McLean, J. W. Camplin, D. C. Pryce, J. Scanlan, and E. V. Little.

Constable E. W. Conway, of Tangorin, has been appointed an Inspector of Slaughterhouses.

Mr. J. Cavill, of Southport, has been appointed an Officer under and for the purposes of the Animals and Birds Act.

The following gentlemen, members of the committee of the Brisbane Golf Club, have been appointed officers under and for the purposes of the Animals and Birds Acts:—

E. H. Macartney, J. H. Cannan, W. B. Savage, T. B. Hunter, H. J. Craig, S. T. Little, D. A. McNab, A. D. Pearce, E. H. Waring, and R. A. Wearne.

Mr. J. McDonald, caretaker of the Yeerongpilly Links, has also been appointed an officer as above.

Mr. C. R. Toop, B.V.Sc., of Maitland, S.A., has been appointed a part-time Veterinary Officer for the Northern District. Mr. Toop's headquarters will be at Atherton.

Mr. S. C. O. Jessop, of the Land Office, Mitchell, has been appointed an Inspector of Stock.

The resignation of Mr. T. T. Southerden, of Stanthorpe, as a Temporary Inspector under the Diseases in Plants Act has been accepted.

Bald Hills Sanctuary.

The Bald Hills district has been declared a sanctuary for the protection of native animals and birds.

Fruit Fly Precautions at Stanthorpe.

Last year a Regulation was issued under the Diseases in Plants Act restricting the importation of certain fruits into the Stanthorpe district. This Regulation provides that no person shall introduce any of the following fruits from any district within which the Queensland Fruit Fly, the Spotted Fruit Fly, or the Mediterranean Fruit Fly existed into Stanthorpe and district unless such fruit had been in cold storage for a period of not less than twenty-one days at a temperature of not more than 35 degrees Fahr.:—

Apples, apricots, barberry, Brazilian cherry, cherry, citrons, custard apple, fig, gooseberry (Cape), granadilla, grape, guava, kai apple, kumquat, lemon, lime, loquat, mandarin, mango, mulberry, nectarine, orange, papaw passion fruit, peach, pear, persimmon, plum, and quince.

The period during which this Regulation shall operate has been extended from the 1st April, 1925, to the 31st March, 1926.

Poultry Diseases Declared.

The following poultry diseases have been declared to be diseases under and for the purposes of "*The Diseases in Poultry Act of* 1923":—

Avian diphtheria (canker or diphtheritic roup); bacillary white diarrhœa; chicken pox (Epithelioma contagiosum); contagious catarrh (non-diphtheritic roup); favus (Zophophyton Callinæ); fowl or chicken cholera (Septicemia hæmorrhagica); fowl enteritis; gapes (Syngamus trachealis); poultry lice (of all kinds); poultry tick (Argas persicus or other species of Argas met with in Australia); scabies (Sarcoptes lævis); stickfast flea (Echidusphaga Gallinacea); tuberculosis; tumour; vent gleet (Cloacitis).

World's Butter Championship.

The Premier (Hon. W. N. Gillies) has received particulars of the World's Butter Championship Competition to be held in connection with the Auckland (New Zealand) Winter Exhibition, 23rd to 31st July, 1925.

This competition is open to all countries and is for a box of butter, 56 lb., salted, suitable for export, to be packed in an oblong box, inside measurements—length 15¾ in., depth 11⅛ in., width 10⅛ in., to be made of ½-in. timber. Exhibits from Australia, Fiji, and New Zealand are to be lodged with the Auckland Farmers' Freezing Company, Auckland, two months prior to the date of the Exhibition. Other overseas countries' exhibits one month prior to date of Exhibition. The packages are to be branded Class No. 1, and addressed to the Secretary, Auckland Winter Exhibition, Auckland, New Zealand. Oversea butter is to be enclosed in an outer case. The first prize is £50, the second £30, and the third £20. Gold medals and certificates in each instance. The entry fee is 20s., and the judging will be undertaken by a committee consisting of about twelve official graders of the New Zealand Government Dairy Service. The Secretary of the Exhibition is Mr. A. D. Stanley, P.O. Box 86, Auckland, New Zealand.

For Bees in Spring—Two Good Pollen-bearing Trees.

The development of colonies of bees in spring depends mainly upon the supply of pollen with which to feed the larvæ. A lack of this food invariably results in slowly developing colonies and sometimes in malnutrition of the larvæ, and consequently a weak stock of adult bees. Pollen shortage at the season mentioned can, however, be overcome to some extent by planting trees that yield this important element of bee-food in abundance. All practical apiarists recognise the foolishness of planting trees from which to gather a surplus of honey, but this does not apply in the same degree to food for the sustenance of colonies. Good pollen-yielding trees may be planted profitably where they will be accessible to bees, though it is not suggested that when such trees have been planted no pollen shortages will occur.

In the neighbourhood of Hawkesbury Agricultural College, Richmond, the pollen supply in August and September is not usually very plentiful. This has led to the close observation of bees' activities on certain trees near the apiary, with the result that two trees have been noted as being particularly valuable pollen-producers. The first, *Juniper virginiana*, is probably the better known. It blooms in August and yields pollen very profusely. When bees alight on the flowers the fanning of their wings is sufficient to dislodge the pollen grains, so extremely fine and light are they, and they rise in the air almost in the form of smoke. When this condition obtains bees do not work upon the tree so freely, probably because of the difficulty in collecting; they appear to work this tree best in the early morning before the dew has evaporated.

The other tree referred to is a handsome Mediterranean tree, *Celtus australis*. It is deciduous, has a spreading habit, attains a height of about 30 ft., and blooms for about two weeks late in August before its leaves appear. The manner in which the bees work upon this tree is truly remarkable, writes the apiarist at the institution referred to. The pollen is a dirty brown in colour, and is gathered by bees in large quantities.

Both these trees make ideal windbreaks, and would prove valuable sources of pollen in localities lacking in pollen-bearing flora in the spring.

One of the unsolved problems of commercial apiarists at the present time is the periodical pollen famine. The foregoing is not recommended as a solution, but the planting of good pollen-bearing trees is certainly a step in the right direction, however insignificant it may appear.

Lucerne—Rate and Method of Sowing.

The rate at which lucerne should be sown varies widely with the method and the district. In the regular lucerne districts of the State from 12 lb. to 15 lb., and even 20 lb., per acre is applied. For dry districts 10 lb. to 12 lb. will be found ample if evenly applied.

It is not wise to run the risk of a thin crop through a little parsimony in seeding. It is all-important, with a permanent crop such as lucerne, that a good stand should be obtained at the outset. Re-seeding cannot be done without again breaking up the land, and this means that a year or more is lost. If re-seeding is not done, the yields are permanently affected through the poor stand. Attempts are sometimes made to remedy unsatisfactory stands by sowing further seeds, but they are seldom successful. The soil is not in a receptive condition, and what plants do grow have to contend with established vigorous plants.

At the same time it is a mistake to endeavour to remedy defects in preparation, or in the state of the soil, by heavier seeding. Favourable conditions are required to promote germination and to help the young plant, and seeding should only be done after they have been obtained. If the ground should happen to be dry at seeding time, heavier seeding will not secure a proper stand.

Farmers generally prefer to broadcast the seed where the area is small, but sowing through the grass-seed attachment of the wheat drill is a useful method when the area is large.

A method of sowing that is well suited for wheat districts is to mix thoroughly 70 lb. of superphosphate with 10 lb. to 12 lb. of lucerne seed, put the mixture into the manure-box of an ordinary seed drill, and set the drill to sow about 80 lb. of manure per acre. The discs or hoes of the drill should not be set into the soil too deeply. Some drills, especially when new, cannot be set to a shallower depth than 1½ to 2 in.; in such a case a good plan to follow is not to set the lever of the drill into the first notch, but to let it dangle. The cogs of the drill will be in gear, but the hoes will not go down as deeply as if the lever had been set into the first notch. In this way the seed will be sown about ¾ in. deep. Special care must be taken not to fill the manure-box right up. Not more than sufficient seed and manure for 1 acre—*i.e.*, about 80 lb.—should be put into the drill at one time. In order that the seed may be thoroughly covered, it is advisable either to improvise a brush harrow at the back of the drill, or to harrow with light harrows after the sowing.

A fine, level, rolled surface is required for sowing. The seed must be covered not more than 2 in. deep nor less than half an inch, and to secure this, fineness is essential. An even distribution of the seed is required, and, although some men are sufficiently expert to obtain it by hand-sowing, that method is not recommended to the inexperienced. Many good machines are available which do the work satisfactorily.

If a farmer is compelled to resort to hand-broadcasting, half the seed should be sown in one direction across the paddock, and the other half at right angles across the first cast, so that strips missed the first time will receive some seed. Select a calm day or early morning, as it is hard to distribute the seed evenly on a choppy, windy day.

The seed should be covered with a light harrow, though a brush harrow is often used. Adjustable lever harrows are very effective for this work, as the depth can easily be regulated. The seed should not be covered deeply, and precautions must be taken to prevent a crust forming on the surface.

Lucerne sown in autumn should receive no cultivation until the following spring at earliest. The young plants are tender, and will not stand rough handling. On friable, loose soil especially the effect of cultivation would be to pull many of the plants out, and consequently the harrowing must be light, and should not be attempted until the roots have a firm hold; but after the second cut, particularly on ground that sets hard, the harrow can be used.

Farmers have so far given but little attention to the subject of varieties of lucerne, the local strains having such an advantage in acclimatisation as to make the discovery of a better a difficult matter. The Department of Agriculture of New South Wales has recently tested a number of lucernes from other lands, however, seed being obtained from time to time as the published reports appear to suggest their possible utility here. It is still extremely doubtful if any can be recommended in preference to the local strains—Tamworth, Hunter River, and Mudgee—that have been deservedly popular for so long.

The Theory of Dairy Feeding.

The dairy cow has often been likened to a machine. She is much more than that, of course, yet to think for a moment of milk production as a manufacturing process in which the cow is the machine, her ration the raw material, and her milk the finished product, will emphasise the need of proper care for the animal and intelligence in selecting her feed.

The animal body, points out an American departmental hand-book, may be likened to a steam engine. The engine must have three things to keep it going—first, it must have repair material, and if any part of the engine or boiler gives out, it must be repaired at once; second, it must have water, so that the energy of the fuel may be transferred to the engine; third, it must have fuel, to yield energy to do work.

In the same way, the body must have three things—first, it must have repair materials, for the body is continually wearing out. For this material a certain amount of protein must be supplied in the food. In contrast with the engine, when the body is given more repair material (protein) than is needed, the residue may be used for building new parts or producing energy. Second, the body must have a sufficient amount of water to aid in forming bones and new tissue, in the circulation of food material, and in the withdrawal of waste material. The water is supplied directly and in the succulent part of the food. Third, the body requires energy to do its inside construction work, to perform labour, to make milk, and so on. This energy is derived mainly from the carbohydrates and fat, and partly from the protein in the food.

To carry the analogy a little further: The engine and the boiler do not turn all the energy derived from fuel into power, but a good deal of the heat is lost in the air. In the same way energy is lost in the vital processes of the body and in keeping up the body heat. Then the engine loses part of the heat in ashes, because the fuel is not completely consumed. This corresponds to the part of the food the body fails to digest.

Preparing Poultry Show Exhibits.

The poor condition in which many of the utility birds are shown is a subject of comment at all shows where utility classes are provided, and never more so than at the two big metropolitan shows (writes the Poultry Expert of the New South Wales Department of Agriculture). This applies to all breeds, more or less, but particularly to White Leghorns, either because they have not been washed or because they have been badly washed. In many cases bad washing is worse than no washing at all—the result of lack of experience and want of knowledge on the part of the owner.

To wash a bird plenty of warm water and towels and three large bath tubs should be provided, and a coop that is lined with clean crash or some such material. This coop should be placed either in the sun or before a stove, so that the bird can be put into it to dry. If it is in the sun, care should be taken to protect the white lobes, or they will be scalded, and the result will be blisters that later on will leave red spots in the lobe and cause the skin to become creased and wrinkled.

In the actual washing of the bird it is necessary to have three waters, the first being the soap water. To make this, about a quarter of a pound of good soap (white Castile is best) should be cut into slices and dissolved in about half a gallon of hot water. Pour into this about 5 gallons of luke-warm water, and into the lot plunge the bird—over the head to start with, and then holding the head out of the water while the lather is rubbed well into the feathers. And now comes an important point: the bird must be thoroughly soaked, and sufficient time given in soaking to loosen the dirt. Usually about ten minutes is required, but the dirtier the bird the greater the length of time necessary in this bath.

Next put the bird through a rinsing water, which will remove the soap—there must be plenty of water to do this thoroughly—and then into the third bath, to remove the last possible trace of soap. Failure to remove all the soap means a quite inefficient washing. Most poultry exhibitors use the laundry blue-bag in this last water, but it must be employed sparingly, and the water must not be made darker than a light sky-blue. Finally, stroke all the water possible out of the feathers, and dry off with clean towels. The bird should then be put into the drying coop, and every care taken to avoid dirt or dust.

The operator should be seated on a low stool or chair while at work, with a pad of sacks covered with a clean towel over his knees. Washing should be done one or two days before the day of showing to allow of the bird 'preening'' his feathers to web them out. It is fatal to good results to wash a bird twice inside one week. Therefore it is necessary to make sure of the first operation. Amateurs should practise on a bird not intended to be shown in order to get used to the work.

The Pig's Tail.

The curl in the pig's tail is said to be a sure indicator of the state of his health. Some breeders assert that a straight-tailed pig is discontented and a feed waster. In health, the tail is curled and carried in a characteristic way, whereas in a sickly animal the tail is often carried loosely and hangs in a limp fashion. One will often notice, however, that in aged pigs the tail is not always curled. Sometimes it hangs free and is switched about in the same way as the tail of a horse or cow. Even in these cases the way in which the tail is moved indicates whether the animal is in good heart or is sickly and disinclined to move about.

Vermin in Poultry Houses.

The best method of clearing poultry houses of vermin and keeping them free is to spray them with kerosene emulsion as frequently as may be necessary.

To make the emulsion, take 8 oz. of soft soap and dissolve it in 1 gallon of boiling water; take the mixture off the fire and add slowly 1 gallon of kerosene, stirring all the time. This mixture should be agitated briskly until the oil and the soapy water are thoroughly emulsified. These 2 gallons are then designated "stock." Add to this 10 gallons of soft water. Hard water will not do; nor should lime or any caustic substance come in contact with it, or the result will be that the oil will separate from the soapy water and the emulsion will be spoiled.

If it be desired to make the spray also a disinfectant, add 1 tablespoonful of miscible carbolic acid to each gallon of emulsion. The whole should be kept well stirred, especially when adding water.

A spray pump and hose, similar to those used by orchardists, should be used to force the emulsion into all cracks and crevices about the poultry houses. A small force-pump suitable for this work is obtainable, which can be stood in a kerosene tin and held down by means of a footrest that is provided. The whole, with a short length of hoze and nozzle complete, is obtainable at about 22s. 6d. in Sydney.

In cases where the infestation is bad one spraying is not sufficient—two or three may be necessary at intervals of a day or two between each.

Should the vermin be confined to the roosts, these might be washed over with a brush in place of spraying.

Tonics for Poultry.

What is known as Douglas mixture is recognised as among the best tonics for general use in the poultry yard. The method of making and using it is as follows:—

Take 4 oz. of sulphate of iron and 4 oz. of Epsom salts, dissolve in 1 gallon of boiling water, let it cool, then add ½ oz. of what is sold by the chemist as dilute sulphuric acid; bottle and put away. One teaspoonful of this mixture might be added to each pint of drinking water; this might be used three or four times per week for three or four weeks at a time.

Great care is necessary when handling sulphuric acid. It should only be poured slowly into the mixture, and only earthenware vessels should be used when preparing the stock mixture. No special drinking pots are necessary, for the small amount that is used in the water will not damage iron vessels to any appreciable extent. The case is different with tin-ware, such as kerosene tins, for they are readily destroyed by the use of Douglas mixture owing to the occurrence of what are known as pin-holes in the tin.

Syrup of iron is also a useful tonic. The quantity to use is a teaspoonful to a quart of drinking water, given in the same way and under the same conditions as Douglas mixture.

Over-Production of Sugar.

At its last meeting in Brisbane the Central Sugar Cane Prices Board had before it several applications for assignments of new land. In view of the serious position created by over-production of sugar in the State—200,000 tons—the Board considered the matter very carefully and came to the conclusion that it will not make any further assignments of new land for the present. The price realised for exported sugar will so affect the price which can be paid by the Sugar Board for raw sugar that a most serious position for those already in the industry will arise. The general position of the sugar industry has reached a serious stage owing to the over-production of the 1924 season and the larger prospective over-production of the 1925 and future seasons. This question of over-production must be seriously faced and some way found to overcome the difficulty that has arisen. In the meantime the Board considers it advisable to keep production within bounds so far as it can. It, therefore, does not intend to allow the area under sugar-cane to be increased by assignments of any new lands.

STANDARD POULTRY.

In reply to an inquiry for the Show Standard of the White Leghorn, the Poultry Instructor, Mr. Rumball, supplies the following information, and recognising that the producing powers of stock governs their true value recommends an earnest study of the Utility Standard characteristics of the cock.

Characteristics of the Cock.

Head and Neck.—Skull fine; beak stout, the point standing well clear of comb but not too long. Comb, fine in texture, large but not overgrown, perfectly straight and erect, deeply and evenly serrated, the spikes broadening at the base; extending well beyond the back of the head and following, without touching, the line of the hackle, free from thumb marks and side sprigs.

Face.—Fine in texture and free from wrinkles. Wattles long, thin and fine in texture. Lobes well developed and rather pendant, smooth and free from folds. Neck moderate length and full in hackle.

Body.—Wedge shaped, wide at shoulders, and narrowing to the root of the tail. Breast round and prominent, breastbone straight. Back slightly rounded and sloping to tail. Wings large but tightly carried. Tail moderately full, carried at an angle of 40 deg. to 45 deg. Legs long, the shanks free from feathers. Feet well spread and toes long and straight. Carriage upright. Size medium, 6 lb. to 8 lb.

General Characteristics of the Hen.

With the exception that the comb falls gracefully over to either side of the face, and the tail carried closely, and not at such a high angle as the cock, the general characteristics of the hen are similar to those of the male bird, allowing for the natural sexual difference; weight 5 lb. to 7 lb.

Beak, toes, nails, and legs yellow. Eye red; comb and wattles bright red. Face bright red without traces of white. Lobes white or cream, the former for preference. Plumage, pure white.

UTILITY STANDARD.

Type, colour (plumage and lobes), legs and feet (colour), condition, health, furnishing brightness and cleanliness of feathers and legs, in accordance with accepted standard of the breed.

Laying Characteristics (any breed).

Conformation.—(*a*) Length, depth, and width proportionate to the type of the breed; (*b*) length, as taken from the base of the neck to the base of the tail; (*c*) depth to be determined by the vertical space between the back and the breastbone and between the end of the breastbone and the pelvic bones; (*d*) width, as measured across the saddle and immediately behind the wings, and as indicated by the distance apart of the legs.

Freedom from Coarseness.—(*a*) Shanks strong as differentiated from either extreme coarseness or fineness of bone; (*b*) pelvic bones strong at base, long, fine, and straight; (*c*) tissue pelvic bones to be as free as possible from gristly covering.

Head.—Finely modelled skull, deep over eyes, full and rounded at back.

Eyes.—Full, bright, and expressive.

Face.—Bright and lean, free from feathering, and not sunken.

Comb and Wattles.—Neat, fine in texture, and medium in size, avoiding beefiness.

Neck.—Fine, and fairly long.

Skin and Abdomen.—Texture of skin to be of the thinnest and finest quality and pliable; abdomen to be elastic, avoiding sagging in, or fulness indicating excess of fat.

Plumage.—Feather soft and silky. Close but not hard as in game. Fluff moderate.

Weights.—Light breeds, ½ lb. to 1 lb. above minimum, and heavy breeds 1 to 1½ lb. above to score maximum points; if in excess to be cut correspondingly.

Leghorns, Minorcas, Andalusian, Spanish, Campines, Buttercup, Anconas: Cockerel, 5 lb.; pullet, 4 lb. Orpingtons, Plymouth Rocks, Rhode Island Reds, Sussex: Cockerel, 7 lb.; pullet, 5 lb. Langshans and Wyandottes; Cockerel, 6 lb.; pullet, 4½ lb.

Answers to Correspondents.

'Wild Lucerne" *(Stylosanthes mucronata).*

A botanic specimen forwarded by a correspondent has been identified by the Government Botanist, Mr. C. T. White, F.L.S., as *Stylosanthes mucronata*, commonly known is Queensland as "Wild Lucerne," a native of the West Indies and Tropical America, naturalised in North Queensland and Tropical Asia. The plant is an annual and was at first looked upon as a pest, but soon proved itself to be a most valuable fodder. It is palatable to stock, and chemical analysis has shown it to have about the same nutritive value as lucerne.

Glycine tabacina.

C.R.A. (Blackbutt)—

The Government Botanist, Mr. C. T. White, F.L.S., has identified your specimen and advises:—The plant is *Glycine tabacina*, a small blue or purple flowered legume allied to the Trefoils. I have not heard a common name applied to it, but it is abundant in Queensland pastures, and is generally looked upon as a useful addition to the pasture and in no way harmful to stock. I do not know your correspondent's property, but if the cattle have access to scrub edges or scrub undergrowth it is in these places that very often cattle pick up poisonous plants. Any further specimens of suspected weeds your correspondent may care to send I will gladly report on.

Sudan Grass and Jap. Millet.

C.R.A. (Blackbutt)—

The Director of Agriculture (Mr. H. C. Quodling) advises:—Sudan grass appears to be quite safe to graze cattle on once it comes out into head; prior to that time, however, there is an element of risk. Seeded second growth is not safe pasturage. In fact, if this second growth receives a check and shoots again quickly it is generally regarded as particularly dangerous to stock.

Symptoms of poisoning with sorghums and Sudan grass (Sudan grass is actually a sorghum) are as follows:—The animals stop eating suddenly and throw up their heads as if something had alarmed them. The eyelids begin twitching and the beast trembles all over; this latter symptom commences at the head and works back to all the limbs. The animal soon drops, and while the spasms are on appears to be completely paralysed in all the limbs, and bellows with pain.

Some have up to three spasms before dying, and appear quite easy between spasms. They attempt to rise, but seem to be only able to prop themselves up temporarily on their forefeet. In one case the animal when first seized with the pain reared right over on her back and died.

As a matter of fact, poisoning is very rapid in its action, many animals dying within ten minutes or a quarters of an hour after feeding on the crop. It would be hard to express an opinion respecting your bull. Cattle turned in on to green fodder very often become blown (Hoven), particularly if they are not used to it. In all circumstances it is advisable to accustom the cattle gradually to a change of diet.

The Chief Inspector of Stock considers that, in the event of animals showing signs of poisoning (sorghum) one of the best remedies is an ample supply of molasses. Up to 4 quarts can be poured gently down their throats, or given by means of a bottle.

Jap. Millet.—Jap. Millet is not usually considered to be poisonous to stock; however, don't run any risks with the crop if you have valuable animals, better to try two or three on the crop and watch the effect of the change of feed.

This Department has not had any cases of poisoning reported to it through stock feeding on Japanese Millet in its young stages.

Sows Going Dry after Farrowing.

A correspondent writes:—"There are a lot of complaints in this district of sows going dry as soon as they pig. Some of them dry off altogether, some partially, and some make milk and seem all right in a few days. What is the cause, and remedy?"

The Instructor in Pig Raising, Mr. E. J. Shelton, H.D.A., advises:—There can be but one or two reasons for sows going dry within a day or two of farrowing. First of all, it is evident that the sows are either too fat or too poorly nourished. Sows that are too fat and lethargic (lazy) and that invariably suffer from constipation frequently suffer from an insufficient milk supply for their piglings, particularly if the sows are overfed at farrowing time; indeed, they frequently develop milk fever and either lose their milk altogether or are sickly for a week or more, during which time their pigs die unless taken care of and specially bottle fed, &c. Sows that are in very low condition and that are poorly nourished also occasionally exhibit similar symptoms, though it is the fat sow that suffers the most.

Without an inspection of the affected animals it seems that the feeding is at fault, for it is unnatural for a sow to have an insufficient supply of milk for her pigs, and sows in a normal condition and that are properly fed will rarely suffer, and if they do it is usually due to accidental causes and not the conditions referred to above.

Unfortunately, in these days when show pigs are exhibited in excessively fat condition, it frequently happens that these sows (and also sometimes their progeny) will prove very poor milkers, and some strains of Berkshires particularly seem to have a very poor milk supply, this fault apparently also having hereditary tendencies.

There is no specific disease affecting the udder or teats or the milk supply of the sow which would cause the symptoms you refer to, nor would it be caused by any other specific disease to which the pig is subject, except in cases where the animal was in an anæmic condition and was suffering from disorders of the blood.

Careful attention to the feeding of the sows, keeping them in normal breeding condition only, seeing that their bowels are normal, and that they are not overfed (this is most important) at farrowing time will overcome the difficulty.

Milk Fever in Pigs.

J.E.C.J. (Mt. Larcom)—

The Instructor in Pig Raising, Mr. E. J. Shelton, advises:—Milk fever or inflammation of the udder is an affection common to breeding sows, especially those that are fat when the farrowing period arrives. To avoid troubles of this description, as well as bowel troubles generally, it is recommended that each sow due to farrow be given a good dose of castor oil (ol Ricini ital), say 3 or 4 oz. (one tablespoonful equals about 1 fluid oz.), about three days before due date. This oil should first be mixed in about 1 quart of dry bran or pollard and meal, then, when thoroughly incorporated, thin the mash down with warm water or milk to the consistency of thick cream and give as the first feed of the day, and whilst the sow is hungry. Follow in about two hours' time with the usual allowance of (warmed) skim milk, to which has been added about half a teaspoonful of salt (ordinary table salt); about two hours afterwards compel the sow to take exercise to relieve the bowels and bladder. Feed on a very light diet of nourishing slop and give abundant supplies of green food and a liberal supply of clean drinking water.

Milk fever follows after farrowing and is frequently due to the sow developing a high temperature, being constipated and overfed. It is more frequent during extremely hot or very cold weather than during normal weather, for the reason that if the sow is at all sickly she becomes drowsy and will not take exercise. Sometimes in very nervous excitable sows the trouble is caused through the suckers biting the teats and thus causing the sow to withhold her milk supply. This results in an accumulating of milk in the udders and inflammation.

Sometimes the sow will develop cowpock on her teats. This causes them to be very swollen, tender, and painful. In these cases it is advisable to nip off the points of the very sharp black tusks with which the suckers are provided, and which they use freely in fighting for a place at the teat.

A good ointment to use in these cases is made up of borax and glycerine, which should be applied after the udders have been washed with warm water.

Another very useful healing ointment is made up as follows:—Iodoform, 1 oz.; oil of eucalyptus, 14 oz.; olive oil, 20 oz. Dissolve the iodoform in the oil of eucalyptus, then add the olive oil.

If the sow is unable to urinate freely she should be given teaspoonful doses of sweet spirits of nitre in a small quantity of drinking water and be compelled to take exercise regularly.

Careful attention to the comfort of the sow and a liberal supply of green food will usually effect a cure, but it is usually necessary in severe cases to bottle feed the young pigs for a few days until the sow recovers her milk, and until they learn to drink from a small trough themselves.

BUTTER IN THE HAMILTON COLD STORES.

The Minister for Agriculture (Mr. W. Forgan Smith) was asked recently whether butter was being stored at the Government Cold Stores, Hamilton. The Minister replied that in accordance with the promise he had given to the deputation which had waited upon him, he had arranged to open a section of the Cold Stores, at Hamilton, in order to provide satisfactory cold storage accommodation for dairy produce, which was coming forward in quantities in excess of the capacity of the stores customarily available.

In the third week in March the cold chambers at the Hamilton contained something more than 20,000 boxes of butter, which had been cooled down to a low temperature preparatory to shipment overseas. The Stores were opened solely for the reason of assisting manufacturers and exporters of dairy produce, and they will be closed immediately it is found that there is sufficient cold storage accommodation elsewhere to cope with the dairy produce coming to hand, and not opened again until the installation of the machinery and general equipment of the Stores is completed.

Some complaint had been raised concerning the length of time occupied in the construction and equipment of the Cold Stores, but against this it is to be recognised that the construction of a Cold Stores and wharf of the dimensions of those at the Hamilton is not by any means a minor undertaking, particularly, too, as the construction was carried through at a period when conditions were abnormal in many respects. Additionally it must be remembered that the building throughout is of reinforced concrete, and each section of concrete requires time to set after it is laid down.

Shortage of material at one stage and scarcity of plasters at another period are among the factors contributing towards length of time taken in the completion of the structure. However, the Works Department is generally abreast or ahead of the contractors for the installation of the machinery. The interests of primary producers have been adequately safeguarded throughout the period of construction, and arrangements were made by the Minister at an early stage to complete several cold chambers so that space would be available for the storage of dairy produce in case of emergency. These rooms were in readiness two years ago to receive dairy produce. Unfortunately, they were not needed until quite recently, because of the indifferent seasons that had been experienced.

The Stores will be a valuable asset to this State. The rupture in shipping facilities which occurred during the war emphasised the pressing need for up-to-date cold stores, and I feel confident primary producers will realise the advantage the Stores under Government control will be to them. They will be an important factor in the further development of primary industries in Queensland.

The gross cubic content of the Stores is approximately 1,750,000 feet, and in equipment generally compares favourably with any other cold storage lay-out in the Southern Hemisphere, and has the distinct advantage of wharfage accommodation, thereby enabling frozen produce to be loaded direct from the cold chambers into the ship's hold.

Farm and Garden Notes for May.

Field.—May is usually a busy month with the farmer—more particularly the wheatgrower, with whom the final preparation of his land prior to sowing is the one important operation. Late maturing varieties should be in the ground by the middle of the month at the latest.

Cleveland, intended primarily for feeding off, should be sown not later than the end of April.

The necessity of pickling all wheat intended for sowing purposes is again emphasised; and for general purposes, combined with economy in cost of material, the bluestone and lime solution holds its own. To those who desire an easier but somewhat more costly method of treatment, carbonate of copper at the rate of 1 oz. to the bushel and used in a dry form is suggested.

Malting, Cape, and skinless barley may be sown; also Algerian and Sunrise oats and canary seed.

Potatoes, which in many districts are still somewhat backward, should have by this time received their final cultivation and hilling-up.

The sowing of prairie grass on scrub areas may be continued, but should be finished this month. This is an excellent winter grass, and does well in many parts of Southern Queensland.

Although a little late in the season *Phalaris bulbosa*, a perennial, and *Phalaris minor*, an annual type of canary grass, should be sown in the more temperate of the Southern districts of the State. In these areas increased attention should be given to the introduction of a hardy clover, like the White Dutch, to artificial pastures. Clovers usually thrive best when sown in April, but seed may still be sown early in May, provided weather conditions are propitious.

Root crops, sowings of which were made during April, should now receive special attention in the matter of thinning out and keeping the soil surface well tilled to prevent undue evaporation of moisture.

Every effort should be made to secure sufficient supplies of fodder for stock during the winter, conserved either in the form of silage or hay.

Cotton crops are now fast approaching the final stages of harvesting. Growers are advised that cotton in the Central District should be consigned to the Australian Cotton-growing Association, Rockhampton, and Gladstone for Durango; whilst those in the Southern areas should consign their cotton to the Association at Whinstanes, Brisbane. All bags should be legibly branded with the owner's initials. In this matter the consignor is usually most careless, causing much delay and trouble in identifying parcels, which are frequently received minus the address labels.

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

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

Orchard Notes for May.

THE COASTAL DISTRICTS.

In these notes for the past two months the attention of citrus-growers has been called to the extreme importance of their taking every possible care in gathering, handling, packing, and marketing, as the heavy losses that frequently occur in Southern shipments can only be prevented by so treating the fruit that it is not bruised or otherwise injured. It has been pointed out that no citrus fruit in which the skin is perfect and free from injury of any kind can become specked or blue-mouldy, as the fungus causing the trouble cannot obtain an entry into any fruit in which the skin is intact. Growers are, therefore, again warned of the risk they run by sending blemished fruit South, and are urged to exercise the greatest care in the handling of their fruit. No sounder advice has been given in these notes than that dealing with the gathering, handling, grading, packing, and marketing, not only of citrus, but of all other classes of fruit.

It is equally important to know how to dispose of fruit to the best advantage as it is to know how to grow it. To say the least, it is very bad business to go to the expense of planting and caring for an orchard until it becomes productive and then neglect to take the necessary care in the marketing of the resultant crop. Main crop lemons should be cut and cured now, instead of being allowed to remain on the tree to develop thick skins and coarseness. As soon as the fruit shows the first signs of colour or is large enough to cure down to about from 2¼ to 2½ in. in diameter, it should be picked, care being taken to handle it very gently, as the secret of successfully curing and keeping this fruit is to see that the skin is not injured in the slightest, as even very slight injuries induce decay or specking. All citrus fruits must be sweated for at least seven days before being sent to the Southern States, as this permits of the majority of specky or fly-infested fruits being rejected. Citrus trees may be planted during this month, provided the land has been properly prepared and is in a fit state to receive them; if not, it is better to delay the planting till the land is right.

In planting, always see that the ground immediately below the base of the tree is well broken up, so that the main roots can penetrate deeply into the soil and not run on the surface. If this is done and the trees are planted so that the roots are given a downward tendency, and all roots tending to grow on or near the surface are removed, the tree will have a much better hold of the soil and, owing to the absence of purely surface roots, the land can be kept well and deeply cultivated, and be thus able to retain an adequate supply of moisture in dry periods. Do not forget to prune well back when planting, or to cut away all broken roots.

All orchards, pineapple and banana plantations should be kept clean and free from all weed growth, and the soil should be well worked so as to retain moisture.

Custard apples will be coming forward in quantity, and the greatest care should be taken to see that they are properly graded and packed for the Southern markets, only one layer of one sized fruit being packed in the special cases provided for this fruit—cases which permit of the packing of fruit ranging from 4 to 6 in. in diameter in a single layer.

Slowly acting manures—such as meatworks manures—may be applied to orchards and vineyards during the month; and lime can be applied where necessary. Land intended for planting with pineapples or bananas during the coming spring can be got ready now, as, in the case of pineapples, it is a good plan to allow the land to lie fallow and sweeten for some time before planting; and, in the case of bananas, scrub fallen now gets a good chance of drying thoroughly before it is fired in spring, a good burn being thus secured.

GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Clean up all orchards and vineyards, destroy all weeds and rubbish likely to harbour fruit pests of any kind, and keep the surface of the soil well stirred, so as to give birds and predaceous insects every chance to destroy any fruit fly pupæ which may be harbouring in the soil. If this is done, many pests that would otherwise find shelter and thus be able to live through the winter will be exposed to both natural enemies and cold.

Further, it is a good plan to clean up the land before pruning takes place as, if delayed till the pruning has been finished, the land is apt to dry out in a droughty season.

Pruning can be started on such varieties as have shed their leaves towards the end of the month, as it is a good plan to get this work through as early in the season as possible, instead of putting it off until spring. Early-pruned trees develop their buds better than those pruned late in the season. These remarks refer to trees—not *vines*, as the later vines are pruned in the season the better in the Granite Belt District, as late-pruned vines stand a better chance to escape injury by late spring frosts.

All worthless, badly diseased, or worn out trees that are no longer profitable, and which are not worth working over, should be taken out now and burnt, as they are only a menace and a harbour for pests.

Land intended for planting should be got ready as soon as possible, as, if ploughed up roughly and allowed to remain exposed to the winter frosts, it will become sweetened and the trees planted in it will come away much better than if set out in raw land. In any case the land must be properly prepared, for once the trees are planted it is a difficult matter to get the whole of the land as well worked as is possible prior to planting.

Slowly acting manures—such as ground island phosphates or basic phosphates—may be applied to orchards and vineyards. They are not easily washed out of the soil, and will become slowly available and thus ready for the use of the trees or vines during their spring growth. Lime may also be applied where necesary.

This is a good time to attend to any drains—surface, cut-off, or underground. The two former should be cleaned out, and in the case of the latter all outlets should be examined to see that they are quite clear and that there is a good getaway for the drainage water. New drains may also be put in where required.

In the warmer parts citrus fruits will be ready for marketing, and lemons ready for cutting and curing. The same advice that has been given with respect to coast-grown fruit applies equally to that grown inland; and growers will find that careful handling of the fruit will pay them well. Lemons grown inland are, as a rule, of superior quality to those grown on the coast, but are apt to become too large if left too long on the trees, so it is advisable to cut and cure them as soon as they are ready. If this is done and they are properly handled, they may be kept for months, and will be equal to any that are imported.

If the weather is very dry, citrus trees may require an irrigation, but, unless the trees are showing signs of distress, it is better to depend on the cultivation of the soil to retain the necessary moisture, as the application of water now is apt to cause the fruit to become soft and puffy, so that it will not keep or carry well.

Land intended for new orchards should be got ready at once, as it is advisable to plant fairly early in the season in order that the trees may become established before the weather again becomes hot and dry. If the ground is dry at the time of planting, set the trees in the usual manner and cover the roots with a little soil; then give them a good soaking; and when the water has soaked into the soil, fill the hole with dry soil. This is much better than surface watering.

ARROWROOT POOL.

The following nominations have been received for membership on the Arrowroot Board for the year ending 9th March, 1926:—

A. Clark, Pimpama; C. D. Gordon, Redland Bay; A. McG. Henderson, Redland Bay; J. Lahrs, Pimpama Island; B. G. Peachey, Norwell; R. Stewart, Ormeau.

Mr. C. D. Gordon subsequently withdrew his nomination, and in consequence thereof no election will be necessary.

WHITE SETTLEMENT IN THE AUSTRALIAN TROPICS.

By the HON. E. G. THEODORE.*

Can white people live, work, and thrive in tropical Australia? This question causes grave concern to a good many persons here and abroad who have little knowledge of the nature of the problem, or of the experience already gained in Queensland.

I was present at a West End club in London last year, when a discussion arose on this very problem. An Anglo-Indian asserted that no country in the torrid zone had in any period of history ever been effectively settled by a white race. I dissented from this sweeping assertion, and quoted Queensland, where 250,000 white people are at present settled north of the tropic of capricorn. Yet the Anglo-Indian's assertion as a generalisation is accurate enough, though its implications are false. What is actually meant by such assertions is that no white race ever fully occupied a country in tropical regions and made a permanent abode there, and that, therefore, no tropical country is suitable climatically as a permanent home for people of that race.

On that contention it will be sufficient to say that so far as history teaches, the Nordic races in their early wanderings and migrations to tropic countries, always found those countries more or less densely occupied by black, brown, or yellow people, and although able to conquer and assume a political ascendency in a great many instances, were never able to establish a permanent home for the propagation of a pure white stock in a tropic land.

But the problem of a tropical Australia is different to that of any other country invaded by whites. In the first place the whites found Australia practically unoccupied. The handful of aborigines were wholly hunters and fishers, and had no compact settlements, nor dense communities, in any part of the continent. White occupation was achieved by settlement, and not by conquest. The whites busied themselves with pastoral, agricultural, and mining pursuits—means of livelihood totally unknown to the primitive native inhabitants. The aborigines proved useless as a labour factor in the white man's industries, and the numbers of the former diminished with tragic rapidity with the advance of white settlement. The reproductive rate of the aborigine—apparently never very high—diminished to vanishing point at every place of contact with white civilisation. Hence the problem of economic competition with a frugal native population, which is the chief factor in the riddle of the failure of white settlement in all other tropical countries where the experiment was tried, was non-existent in tropical Australia.

White labour, which is at present working a great variety of industries in North Queensland, would quickly be replaced by Asiatics if the immigration barriers were removed, and this displacement of the whites would be effected not because the Asiatic is superior to the white as a worker, and a dweller in a tropical country, but because his standard of living is lower, his wants are simpler, and the cost of his labour on a corresponding lower scale.

For the same reason the white worker could not compete with the Asiatic in Japan—which is not in the torrid zone, but approximately in the same latitudes as Southern France and Spain. Nor could the white compete industrially in Europe or North America with the Asiatic, if a few million of them got a foothold in those countries.

Another vital point which must not be overlooked is that Northern Australia, though lying within the torrid zone, is not entirely a land of miasmic swamps, impenetrable steaming jungle, the haunts of alligators and breeding ground of malaria, which the mind is apt to conceive as the invariable conditions in the tropics. More than 90 per cent. of the area of tropical Australia is open forest country, and elevated tablelands and plateaus. The abnormal rainfall and excessive humidity in low-lying regions which constitute the climatological features of many equatorial countries is almost absent from Northern Australia, being present only along a narrow strip of the eastern coast of North Queensland.

White settlement in North Queensland has been proceeding steadily since 1870, and received a great impetus on the discovery of gold at Charters Towers in 1872, and on the Palmer in 1873. At the present time the white inhabitants of tropical Queensland number 250,000. There are about 4,000 coloured aliens. Apart from negligible labour of these latter all manual and other work necessitated by the industries in the North is performed solely by white workers. Mining, canecutting, railway navvying, wharf lumping, timber getting, and sheep shearing involve the

* In "Stead's Review" for March (abridged).

most arduous toil men are called upon to perform in any country; yet these are carried on at all seasons of the year in tropical Queensland by white workers. The mill and field work in the sugar industry was at one time carried on by South Sea Islanders; since 1905 these have been replaced by white workers, whose work is acknowledged to be 100 per cent. more efficient than that of the kanakas.

Suggestions of race deterioration which one sometimes hears are without a tittle of justification. The Australasian Medical Congress at its sittings in Brisbane in 1920 considered this subject, and as a result of the investigation of all available material, passed the following resolution:—

"After consideration of sources of information, embodying the results of long and varied professional experience and observation in the Australian tropics, congress is unable to find anything pointing to the existence of inherent or insuperable obstacles in the way of permanent occupation of tropical Australia by a healthy, indigenous white race."

If North Queensland were an unhealthy country for white people the effects would be reflected in the vital statistics of the State. The death rate there compares most favourably with that of other States and Territories.

The proportion of deaths of infants under one year of age is also significant.

A still more striking result is obtained by comparing the death rate in Queensland with that of the leading European and other countries. The Queensland rate is lowest of all.

Dr. R. W. Cilento, Director of the Australian Institute of Tropical Medicine, in a brochure dealing with climatic conditions in North Queensland as they affect the health and virility of the people, remarks that "the death rate, when worked out on as complete a basis as possible with regard to the hospitals of the North, showed that tropical Queensland had a smaller death rate in nearly every instance than the Southern and Central districts. The exceptions consisted (1) in tuberculosis (of which a large proportion doubtless seeks the warmer climate of the North from Southern Australia), and (2) in senile decay, and old age, which can hardly be a charge *against* the climate.

The answer to the query at the beginning of this article is an emphatic affirmative. White people not only can, but do, work, thrive, and multiply in the tropics of Queensland. The land, the climate, and the conditions are in every sense suitable to the permanent settlement and propagation of a healthy, virile white race.

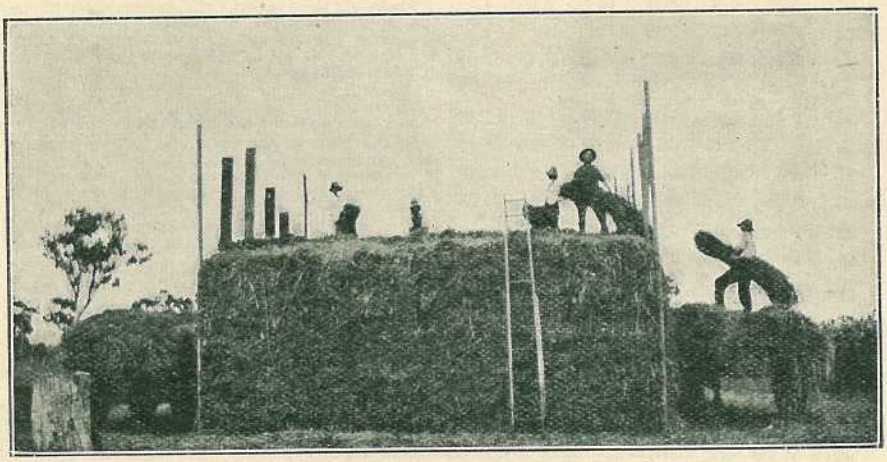


Plate 67.—Ensilage Making at the Farm Home for Boys, Westbrook, near Toowoomba.

Boys at work building a stack. While less economical than pit or tub silos, the stack is a valuable drought or winter-feed standby

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

1925.	MARCH.		APRIL.		MOONRISE. MAR.	APR.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					a.m.	p.m.
1	5 44	6·24	6·1	5·50	11·18	12·33
					p.m.	
2	5·45	6 23	6·2	5·49	12·11	1·23
3	5·46	6 22	6·2	5·48	1·2	2·8
4	5·46	6·21	6·3	5·47	1·54	2·51
5	5·47	6·20	6·3	5·46	2·43	3·30
6	5·48	6·19	6·4	5·45	3·29	4·9
7	5·48	6·18	6·4	5·44	4·14	4·47
8	5·49	6 17	6·5	5·43	4·55	5·22
9	5 49	6·16	6·5	5·42	5·34	6·0
10	5·50	6·15	6 6	5·41	6·12	6·41
11	5·50	6·14	6·6	5·39	6·51	7·25
12	5·51	6·13	6·7	5·38	7·27	8·12
13	5·52	6·11	6·7	5·37	8·5	9·3
14	5 52	6 10	6 8	5·36	8·45	9 58
15	5 53	6·9	6·8	5·35	9·29	10 58
16	5·53	6 8	6·9	5·34	10 17	11·59
17	5·54	6 7	6·10	5·33	11·7	...
					a.m.	a.m.
18	5·54	6 6	6·10	5·33	...	1·1
					a.m.	
19	5·55	6·5	6 11	5·32	12 3	2·3
20	5·55	6·4	6·11	5·31	1·2	3·4
21	5·56	6 3	6·12	5·30	2 6	4·3
22	5·56	6·1	6·12	5·29	3 8	5 0
23	5·57	6·0	6·13	5·28	4·13	5 58
24	5·57	5·59	6·13	5·26	5·13	6·55
25	5·58	5·58	6·14	5·25	6·15	7·48
26	5·58	5·57	6·14	5·25	7·13	8·43
27	5·59	5·56	6·15	5 24	8·9	9 36
28	5·59	5 55	6·16	5·23	9·5	10·28
29	6 0	5·54	6·16	5 22	9 59	11·18
30	6·0	5·52	6·17	5·21	10·47	p.m.
						12·4
31	6·1	5·51	...	...	11·42	...

Phases of the Moon, Occulations, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania.

2 Mar.	☾	First Quarter	10 7	a.m.
11 ,,	○	Full Moon	12 21	a.m.
18 ,,	☽	Last Quarter	3 21	a.m.
25 ,,	●	New Moon	12 3	a.m.

Apogee on the 4th March, at 11 36 p.m.
Perigee, on the 20th March, at 10 54 a.m.

The sun will pass to the Northern side of the equator on March 21st when the Equinox will occur, thus dividing the twenty-four hours equally between day and night.

THE PLANETS.

Mercury will be in superior conjunction with the sun on the 5th at 11 0 p.m.: that is, it will be on the farthest side of its orbit beyond the sun, when it will be quite unobservable.

Saturn will be in conjunction with the moon a little after midnight on the 14th, when both will be high up in the sky towards the N.W. Saturn will then be at a distance of about five diameters of the moon from it towards the South. Mercury will be at its greatest elongation east of the sun soon after midnight on the 30th.

1 April	☾	First Quarter	6 8	p.m.
9 ,,	○	Full Moon	1 33	p.m.
16 ,,	☽	Last Quarter	9 40	a.m.
23 ,,	●	New Moon	12 28	p.m.

Apogee, 1st April at 7 48 p.m. and on the
29th ,, at 3 0 p.m.
Perigee, 14th ,, at 8 12 a.m.

THE PLANETS.

Venus will be in superior conjunction with the sun, that is on the far side of its orbit beyond the sun, and nearly in a line with it on the 23rd at 9 a.m. It will therefore be lost to sight during the greater part of this month.

Mars will be getting lower down towards the west when the sun sets and will become invisible by eight o'clock soon after the early part of the month.

Jupiter will not rise until near midnight on the 1st, but about 10·50 p.m. on the 15th. It will be in conjunction with the moon on the 16th at 3·27 a.m. and should form an interesting spectacle in the northern sky.

Saturn will be in conjunction with the moon at 5·15 a.m. on the 11th, Saturn being at a distance of about five times the diameter of the moon from it when both are low down towards the west.

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

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

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