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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment.

Agriculture in Queensland—A Quarterly Survey.

THE Minister for Agriculture (Hon. H. F. Walker) has received a report of conditions in the agricultural districts for the quarter ending 30th September, from the Director of Agriculture (Mr. H. C. Quodling). The report which covers a period terminating just prior to the recent rains in Southern Queensland indicated unfavourable conditions generally at the time, but these happily have now been dispelled in the southern section of the State by generous rains. On the Darling Downs the area planted to wheat was slightly in excess of that of last season, but the crop was showing distress as a result of the continued dry weather. Some of the early sown crops, particularly in the northern portion of the Downs, were being fed off by dairy cows or sheep. In the Maranoa district a number of individual crops had failed, but where attention had been given early in the season to the conservation of soil moisture, a light crop of grain will be harvested. Now that the conditions have altered, anticipated yields must greatly exceed the earlier estimate.

Maize and Fodder Crops.

FAIR average yields characterised the maize crop, which is now practically all in the bag. Large acreages have been prepared for planting to maize next season in anticipation of favourable weather, and this is in addition to a considerable area already sown. Early sown potatoes also had reached a stage when rain was urgently necessary to save the crop, and these also benefited by the timely downpour.

An increase had been noted in the areas in dairying districts planted with green fodder crops, which have proved of great value to the dairying industry. Although the dry spell had followed a very severe winter, the condition of the stock and output of dairy products had been maintained by grazing off or hand-feeding these crops. In view of the necessity of feeding off in the green state practically no fodder was conserved, and in most districts there was very little carry-over of silage from the previous season. Good draught horses were very much in demand on the Downs, and active draughts brought fair prices.

In the Northern Division.

IN the Northern Division of the State the three months period, according to a report from the Senior Instructor in Agriculture for that division (Mr. N. A. R. Pollock), proved to be practically rainless except for light falls well below the average for each month in the wet belt, Ingham to Cooktown. The grass and water were plentiful generally, but beginning to go off and much of the dry feed had been burnt in parts. The pasturage generally on the Atherton Tableland was better than usual for the time of the year, and all dairy stock and pigs were in good condition. A lowering of output is expected until the advent of the wet season this month or next. The Tableland maize crop has been harvested and this is expected to show some decrease in yield.

The potato crop has been harvested on the coastal areas and the yield was from fair to good. There has been an increase in the area devoted to this crop, also to winter growing fodders, which have already been fed off or harvested. No silage had been conserved and little or no hay made in the course of the quarter under review.

Bacon pigs and porkers were in brisk demand, both from the factory and from local butchers. Fat cattle after the meatworks season are in poor supply and prices are on the upward curve. Store cattle are in good demand, but few are offering.

Ploughing and other preparation of land is being briskly proceeded with for the sowing of crops when seasonal rains occur.

Notwithstanding that the winter was long and severe the average production of dairy produce was well maintained up till the first week in October, when dry weather generally prevailed and a shortage of fodder crops and fodder was in sight. The position, however, was relieved by beneficial rains of a general nature which greatly improved the outlook for the coming season.

An abundant supply of natural grasses and fodders at the beginning of winter prevented any serious reduction in the condition of stock during the cold weather. Preparations are well forward for the planting of fodder crops. In some districts large areas have been seeded and the favourable turn in the season assures a growth of green fodder and prospects of having a supply available for conservation are good. The output of dairy produce is on the increase in the North generally. The quality of the product shows an improvement which is attributable to more frequent factory deliveries due to increased output of cream, and to the generally cool conditions prevailing.

Dairy Factory Improvements.

REBUILDING and improvements to dairy factories were accelerated, and the completion of two large modern factories at Beaudesert and Toowoomba is approaching. In a number of districts the progress made in establishing the necessary improvements for modern dairy farm equipment has been satisfactory and in keeping with the general expansion of the industry.

There is a sound demand for dairy cattle of good type and quality. The improvement of dairy herds by the use of purebred dairy sires is receiving more attention than formerly.

Rural Schools and Home Project Clubs.

IN the course of a speech in the Legislative Assembly the Minister for Public Instruction (Hon. R. M. King) had this to say on rural educational activities:—

> Reference has been made to the splendid work carried out by the rural schools. In 1928 the enrolment was 3,281, and the average attendance 2,550. Those figures do not include the senior children who come to rural schools from

neighbouring primary schools by road or rail for instruction in certain subjects. Fourteen schools were in operation in 1928, three more were opened in the first half of this year, and it is proposed to establish further schools at Proserpine, Pomona, Sarina, and Atherton. In this connection I would like to make some reference to the splendid work achieved by the Country Women's Association, which from time to time has raised funds as contributions towards the establishment of rural schools in certain localities. For that the association is to be highly commended. Our rural schools are doing excellent work. They are established in centres where they are likely to be of the most use, principally in agricultural districts where the scholars will probably undertake farm work when their school days are done. They are instructed in things which will make them more adaptable to the occupations they will follow, such as saddlery, sheet metal work, and carpentry, whilst, on the other hand, the girls are instructed in domestic science in subjects such as cooking, laundry work, and jam-making. This is very useful instruction indeed, and I think that it will help to make life on the land not only more congenial and happier, but also far more efficient and productive. I think the idea of the rural school is a splendid one, and I am very glad to see it in operation. I can assure the Committee that it will be encouraged to the best of my ability, because I think splendid results will accrue from it.

In connection with rural schools, I think it right to mention the home project clubs, which were mentioned by the hon. member for Fortitude Valley. These are partly educational, partly economic, and were introduced into schools to develop and foster the interest of the children of the rural districts in agricultural, stock, and farm matters. To show hon. members how the idea has caught on and is becoming more popular as time passes, let me quote the following figures:—

Year.	Number of Clubs.	Total Membership.	Number of Schools.
1927	74	546	53
1928	121	897	73

I cannot say what is going to happen this year, but I venture to predict that there will be a total membership of 1,000 in probably 100 schools.

It is very pleasing to note that the pupils of the home project clubs display an extraordinarily keen interest in their work. They are doing their work scientifically; they are doing it on second economic lines; and they seem to vie with one another in securing the very best results. In connection with these clubs, I desire to express my thanks to the different agricultural shows for the encouragement given to these clubs, and particularly to the Royal National Agricultural Association, Brisbane.

Cane and Vegetables.

SOME cane farmers on the Lower Burdekin are giving attention to vegetable-growing and other crops. On Rita Island and round about Jarvisfield, small areas are being cropped for tomatoes, cucumbers, and potatoes with good financial results. In fact some of the growers have already entered the export trade and one recent shipment included well over a thousand cases of tomatoes from those localities. The growers have formed a sub-branch of the Bowen Fruit Export Society. A very fine display at the last Ayr Show of tomatoes, cucumbers, and other vegetables was a striking testimony to the suitability of the district's soil for such products, and was a praiseworthy effort on the part of the growers to arouse the interest of farmers generally in the wisdom of engaging in other lines of agriculture as well as sugar-cane.

Bureau of Sugar Experiment Stations.

CANE PESTS AND DISEASES.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received from Mr. A. N. Burns, Assistant Entomologist at Mackay, the following report for the month ended 12th October, 1929:—

Occurrence of New Guinea or Weevil Borer (*Rhabdocnemis obscurus* Boisd.) at West Plane Creek, Sarina.

During the past month attention was drawn to the occurrence of this pest on two farms which adjoined each other, at West Plane Creek. An inspection of these farms was, therefore, carried out so as to ascertain the extent of the damage and find out if control measures were necessary.

The areas attacked lie on either side of a scrubby creek, bordered on their other sides with scrub-covered hills. Some of the latter had been cleared years ago and planted with cane, and now much volunteer cane is growing amongst the young second growth scrub. Some of these old canes had been introduced from the more northern areas, and it is very likely that the borer found its way to this particular locality with the introduction of these canes years ago. With these volunteer stools growing amongst the grass and scrub, they no doubt form an ideal breeding ground for the weevil borer, and it is obvious that infestation is maintained in this area through these canes.

The infested cane on both of the farms under question was Badila, and the degree of infestation was only moderate, and was confined chiefly to the basal portions of the sticks or to sticks which were lying down and covered with trash and rubbish. It was accordingly decided to make arrangements to have a consignment of Tachinid flies (*Ceromasia sphenophori* Vill.), which are a natural parasite of this borer, liberated in this area. These flies will breed in the cultivated canes as well as in the volunteer cane; this should greatly lessen the infestation in future seasons and act as a check on the spread of the borers.

In the cane areas north of Ingham, the beetle borer comes probably second in importance as a cane pest after the notorious greyback beetle grub, but very fortunately the Mackay district, taken as a whole, is, comparatively speaking, free from any serious outbreaks of this pest. It has been recorded from Silent Grove, Kungurri, Kolijo, Foulden, Rocklea, Finch Hatton, and West Plane Creek. In each instance the attacks appeared to be confined to Badila cane, and in the far north this appears to be its favoured variety. There is no doubt that further records of borer occurrence will be forthcoming from different parts of the district in the future.

In view of this, any growers who observe these borers in their canefields are requested to bring the same under the notice of the Sugar Experiment Station, Mackay, so that if necessary arrangements may be made to have Tachinid flies liberated on their farms, and thus prevent further spread of this pest. When flies are liberated it is necessary for the grower to leave a small block of the borer-infested cane as standover for the flies to breed in during the growing period of the other cane. Less than a quarter acre is sufficient to leave for this purpose, and care should be exercised to see that the "standover block" is not burnt whilst burning trash, &c.

Many growers may be troubled with large moth borers in their canefields, and may therefore not be sure if it is beetle borer or not that is attacking their cane. In order to assist them in correctly determining between these two borers the following brief descriptions of each one should be of assistance. It must here be pointed out that liberations of Tachinid flies are no use at all for controlling moth borers:—

Large Moth Borer (*Phragmatiphila truncata* Walk.).

The larva or caterpillar of this insect attacks either the mature cane sticks or the young shoots; in the former case it is soft varieties such as H.Q. 426 or B. 208 that are usually attacked, and the injury almost always occurs fairly high up in the stick and often in the vicinity of a node. The moth borer caterpillar when fully

grown measures approximately from 1⅝ to 1¾ inches in length; it is of a light pinkish or purplish brown colour, with a brownish yellow head. These caterpillars when removed from their tunnels move fairly rapidly with the usual undulating caterpillar movement. The change into the chrysalis which is dark brown and about ⅝ inch long, may take place in one of the old tunnels, beneath lose leaves or trash, or just below the surface of the soil. When the attack occurs in mature sticks pupation then usually takes place under clinging trash, &c., but when the injury occurs amongst young shoots, the caterpillars enter the soil to pupate. From these pupæ, greyish brown moths with a wing expanse of about 1 inch emerge. Though plentiful enough, these moths are not often noticed on the wing. Some species of stout grasses, also corn and sorghum, are recorded as being also attacked by caterpillars of this insect.

Weevil Borer (*Rhabdocnemis obscurus* Boisd.).

The adult beetle borer measures a little over half an inch in length, and is of a dark brown or ochreous colour with a large central black marking on the thorax, and two rounded black patches on the back of the elytra or wing covers. The sides of the body as well as the legs are blackish. The head is produced into a curved snout or proboscis about ⅛ inch in length. This curved rostrum is a typical character in weevil borers.

The female borer makes a small tubular tunnel with its proboscis through the rind of the cane into the internal tissue and deposits an egg therein. The incubation period varies according to the season of the year, from a few days to a couple of weeks or so, and on emergence the young borer grub immediately commences tunnelling and feeding.

The fully-grown borer grub measures about, or a little over, half an inch in length in the natural semi-curved position; it is creamy white in colour with a brown head. It has no legs, and the body is stout and thickest near the anal extremity, to which the body then rapidly tapers. These grubs frequently move for long distances through the cane sticks, and their tunnels are invariably filled with shreds of fibre and grass. Before pupation these grubs assume a decidedly creamy yellow colour, and their bodies become slightly more elongate, they then form a cocoon of fibres and grass interwoven in one of the tunnels, and usually just below the rind of the stick. These cocoons measure approximately 1⅛ to 1¼ inches in length and about ⅜ inches in width. The time spent in the grub or larval stage varies from about five to six weeks to three months or so, being dependent upon the season of the year.

The pupa or chrysalis is enclosed within the fibrous cocoon, the pupa is almost inactive, being able to move its abdomen only slightly. It resembles in shape the adult beetle, with its legs neatly folded in front, and the wing covers are contained in two elongate bud-like processes. The newly turned chrysalis is creamy yellow in colour, it becomes darker as development progresses, until finally just before emergence, it is almost black. The time occupied in this stage is shorter during warm weather than in cold, but the average period may be estimated at about three weeks. The newly hatched beetle is soft, so it remains within the cocoon for a few days to harden up before commencing to bore out of the cane stick.

The New Guinea borer, as its name implies, was introduced from New Guinea, and as before stated, has now become a serious enemy of sugar-cane in northern Queensland. No artificial means of control have yet been devised, and as the damage occurs within the cane sticks themselves, a considerable amount of difficulty presents itself. The Tachinid fly (*Ceromasia sphenophori* Vill.) which is one of the borer's natural insect parasites (Dipterous) in New Guinea, has been successfully introduced into Queensland, and is bred at the Meringa Experiment Station, near Cairns, from which place liberations are made from time to time in borer-infested canefields. Already these useful flies are well established in the South Johnstone, Babinda, and Cairns districts.

The female fly deposits her eggs in the grass, &c., at the entrance to one of the borer tunnels, and the young larvae or maggots on locating a borer grub, enter its body and feed on its internal tissues, ultimately resulting in the death of the borer. Sometimes the parasitised borer is able to form a cocoon, but before it is able to pupate the fly maggots have destroyed it, and they then leave their host's body and pupate themselves. Their pupae are about 3/16 of an inch in length, and dark brown in colour, and cylindrical with round ends. They are called puparia. As many as five or six maggots may breed up inside one borer grub, so it can be seen that these flies breed fairly prolifically. The complete life cycle of the Tachinid fly occupies about six weeks.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following report (18th October, 1929) from the Southern Assistant Entomologist, Mr. R. W. Mungomery:—

FALSE WIREWORM ATTACKING CANE SETS.

Amongst the several insects that attack cane sets when planted in early spring, and which, therefore, contribute towards an inferior strike, may be mentioned the false wireworm, which has been noticed on some farms this year.

The insect in question is about ¾ inch in length, thin and cylindrical, and it is of a shining creamy-white to light-brown colour and bears a superficial resemblance to a small millipede or "thousand-legs," although, of course, this insect has only six legs and would never be confused with the latter on that account. It can be readily distinguished from the true wireworm by the absence of the hard reddish-brown head and tail plate, and also by the fact that its jaws are directed downwards, whereas the jaws of the true wireworm project out in front of the head like a pair of callipers. This insect has the peculiar habit of "playing possum" or shamming death when touched. At first it gives a sudden wriggle and then remains quite motionless on the ground, and, if left alone, it will be seen burrowing back into the soil in a few minutes. It is most frequently met with in wet localities that have carried a fair crop of native grasses previous to being ploughed and planted with cane, and it usually occurs near the surface of the ground where the dry surface soil meets the moister soil underneath. It is thought that, in addition to eating into the cane sets, this insect lives on decomposing vegetable matter which is intermixed with the soil.

The beetles that are responsible for these so-called false wireworms are about three-eights of an inch in length, and of a blackish colour. Soon after their change to the beetle stage from the pupa, their wing cases become covered with the soil in which they have been living, so that they appear reddish-brown in red soils, greyish in the lighter forest soils, and a dirty black in the black clayey soils. The beetles can sometimes be seen scurrying across the ground in the daytime, and in wet weather they forsake the ground and climb trees or fence posts where they congregate in large numbers, particularly under loose bark or in any irregularities of the fence posts which afford them protection.

The wireworms are present in the soil during the winter, and as soon as spring comes, they commence to eat into the young swelling buds of the cane sets, their injury giving one the impression that a hot piece of wire had been pushed into the eye, and from the damage they inflict the eye fails to shoot.

Although generally they may cause some annoyance in wet localities by eating out a set here and there, only in odd cases do they cause extensive damage and make a re-plant necessary. When this happens it is a good plan to defer planting until October, when they are practically all full fed and on the point of changing to the pupal stage.

As a control measure, scuffling during the months of October and November is to be advised, since they pupate near the surface and the scuffler tynes account for several as this implement is being dragged along the cane rows. In addition, burning clumps of dead grass under which the beetles congregate will do much to lessen their numbers.

A MAGAZINE FOR THE FAMILY.

A Moggill farmer, in renewing his subscription for two years, writes (12th October, 1929) appreciatively of the Journal and adds: "It is not only myself who looks forward to the Journal, but my children also. Dad often has to play second fiddle in reading the contents, and when I do get hold of it I have to explain this and that, which shows clearly how even the kiddies take an interest in the Journal."

SCLEROTIUM CROWN ROTS.*

By J. H. SIMMONDS, M.Sc., Plant Pathologist.

The fungus *Sclerotium rolfsii* is a soil-inhabiting plant parasite found widely distributed throughout the world. It shows very little discrimination as regards its selection of a host, and, so long as the conditions are such that abundance of warmth and moisture are provided for, it would appear capable of attacking a wide range of herbaceous plants. A few of the cultivated plants recorded in other countries as being attacked by the parasite are tomato, potato, tobacco, rhubarb, cotton, peanut, maize, citrus, strawberry, bean, carnation, violet, chrysanthemum. Acting as a storage rot, it may attack cucurbits, cabbage, and Irish and sweet potatoes. In Queensland *S. rolfsii* has appeared chiefly in commercial and private flower gardens, attacking delphiniums, carnations, and gerberas. It has also caused loss in some economic plants, including the strawberry, orange, and persimmon.

Symptoms.

The fungus usually attacks its host at the crown just below ground-level. The outer tissues are invaded and a rot set up which may encircle the stem and spread down along the roots. The presence of disease then becomes manifested in a wilting of the upper portion of the plant. If the weather conditions are moist, the mycelial threads of the fungus will grow out together in a longitudinal direction to form white radiating fans which extend up the stem and outwards over the surface of the soil. Often there is associated with the white threads a number of small rounded brown bodies known as sclerotia (Plate 170).

In the case of the strawberry, the white mould growth can be seen amongst the bracts and leaf débris of the crown, and from here the radiating fungal threads extend out along the base of the leaf and fruit stalks, which soon assume a brown rotten condition, with the result that the leaves and fruit wilt off and die.

The orange and persimmon are affected in the seed-bed. At one or several points in the bed the seedlings commence to wilt off, and the trouble continues to spread in an ever-widening circle. On pulling up a wilted plant, the stem is seen to exhibit just below ground-level a dark shrunken area of decay associated with which is the fungus.

The Causal Organism.

Sclerotium rolfsii is one of the few fungi which have never been known to develop a definite reproductive stage. For this reason it is included for convenience with several similar types in the group Mycelia-Sterilia.

The fungus is distributed by means of mycelial threads and sclerotia which are carried about in association with the remains of the host plant or in infested soil. The sclerotia are structures specially adapted to resist desiccation and other adverse conditions of their environment, and so serve to a certain extent the purpose of the spore of other fungi in the perpetuation of the disease.

*Reprinted from "Pests and Diseases of Queensland Fruits and Vegetables" by Robert Veitch, B.Sc., F.E.S., and J. H. Simmonds, M.Sc., published by the Department of Agriculture and Stock, Brisbane, 1929.

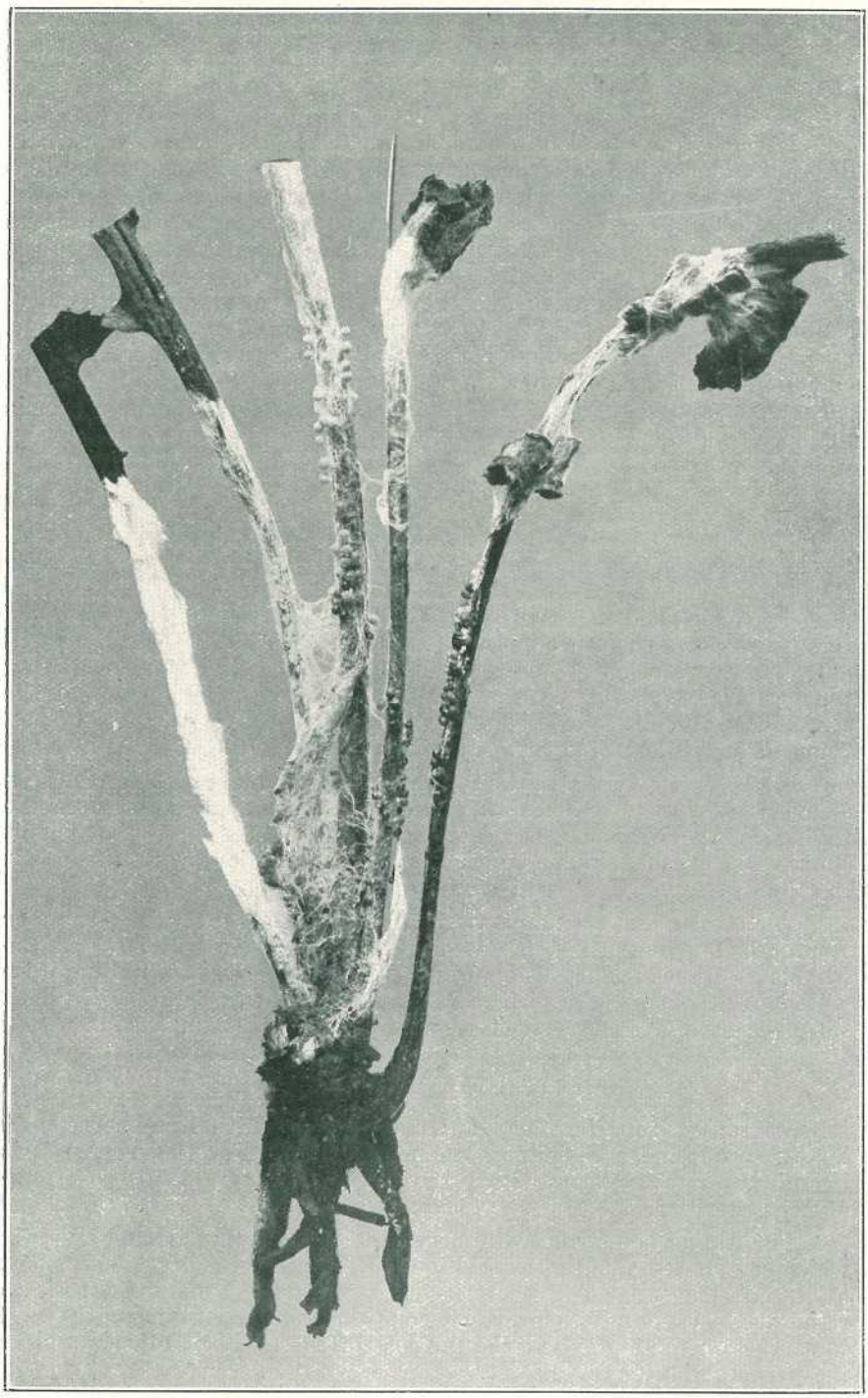

PLATE 170.—GERBERA ATTACKED BY *Sclerotium rolfsii*.

In the formation of these sclerotia the fungal threads become aggregated at certain points, and branch and rebranch to give many short segments or hyphæ, which become interwoven to form a loose white cottony ball of somewhat less than $\frac{1}{16}$ inch in diameter. By further branching, interweaving, and fusion of the hyphæ a firmer structure is produced. This becomes differentiated into an outer firm, resistant layer or cortex in which the individual threads have become so fused together as to form a cellular structure somewhat resembling the parenchymatous tissue of higher plants. The interior or medulla consists of thinner walled hyphæ arranged in a somewhat looser manner. As the sclerotium matures its colour changes from white to light or dark brown, and finally takes the form of a firm rounded body of about $\frac{1}{10}$ inch or less in diameter, somewhat resembling in appearance a small round radish-seed.

Control.

The soil-frequenting habits of this fungus make its effective control a somewhat difficult problem.

1. Pull out and burn any diseased plants.

2. Do whatever may be possible, by means of thinning out and pruning, to allow access of sun and air to the plants, as it is moist conditions that are specially conducive to the growth of this fungus. Good drainage and wide spacing of the plants will help in this direction.

3. To eliminate the fungus from the soil after it has become infected is a difficult matter. Taubenhaus in America has shown that the mycelium and sclerotia are apparently killed when buried more than 5 inches deep, and hence deep ploughing or digging-in of affected soil may be beneficial. Drenching the ground with lime sulphur solution may be useful in checking the disease in the seed-bed, while the same mixture sprayed well into the crown of strawberry plants may prove of use when this plant is attacked.

WHEN MAKING BORDEAUX MIXTURE.

If Bordeaux mixture is to give satisfactory results in the control of the many fungus diseases of fruit trees and vegetable crops for which it is used, it is important not only that it should be properly prepared, but that the ingredients be pure.

Samples of bluestone sometimes come on to the market which contain a quantity of sulphate of iron, and it is as well that the grower should know the difference. Bluestone proper should be in the form of dark-blue crystals, while the adulterated mixture is a lighter blue; indeed, the characteristic colour of sulphate of iron is a light green. The bluestone may be tested by dissolving a few crystals in water and adding a little ammonia. A pale blue precipitate is formed which dissolves to an intense blue colour, and the solution remains perfectly clear and free from sediment if allowed to stand for a while. If a reddish sediment settles, it is due to the presence of iron.

It is important that the lime used should be freshly burnt. To test whether it is so, a few lumps should be placed in a heap and sprinkled with water, when it will gradually fall to pieces, becoming very hot in the process, giving off a quantity of steam, and crumbling to a fine, white powder. Some lime may not crumble readily with cold water, but may do so with hot water. If it does not get hot enough to give off steam even with hot water, then the lime is unsuitable.

THE BANANA INDUSTRY.

NEW MEASURE FOR ITS PROTECTION.

Better provision for the protection of the Banana Industry is the object of a measure introduced in the Legislative Assembly last month by the Minister of Agriculture and Stock (Hon. Harry F. Walker). Under it greater command of their industry is given to growers, while certain responsibilities are imposed upon its representatives. Subjoined is Mr. Walker's second-reading speech, somewhat abridged, on the Bill, and which is taken from "Hansard."—ED.

SPEECH BY THE MINISTER.

THE SECRETARY FOR AGRICULTURE (Hon. H. F. Walker, *Cooroora*): It gives me pleasure to move the second reading of this Banana Industry Protection Bill, because it is really the first Bill I have had the pleasure of moving in connection with an industry which particularly affects the growers in my own district.

Historical Sketch.

In reading up the subject, I went back a few years to try to find out when bananas were first grown in Queensland, so as to get some idea as to their growth since. I came on a cutting from a newspaper which was written by a gentleman, whose name I will give directly, giving some idea of what the industry was forty-six years ago. He wrote thus—

> "The extent to which the banana is cultivated, and the number of human beings who are more or less dependent upon it for food in warm countries, is wonderful, equalling and perhaps exceeding that of any other known plant. It is one of the most useful plants in the world, and seems to have migrated with man wherever it would grow. It is for an immense portion of mankind what wheat and other cereals are for the inhabitants of Europe and Western Asia. It is one of the greatest blessings bestowed on mankind in hot climates."

That was written forty-six years ago by the late L. A. Bernays, the at-one-time clerk of this House, and father of our present respected clerk, in his work "Cultural Industries for Queensland," in which he gives some idea of the extent to which he had gone into the problem of the cultivation of a plant which has been growing successfully in Queensland ever since. Hon. members will see that it was grown in a great number of countries in the world prior to its introduction to any commercial extent into Queensland. At one time it was principally grown in the West Indies, the Canary Islands, Fiji, and other islands contiguous to Australia. We all know that only a few years ago most of the bananas consumed in Australia came from Fiji and other islands not far distant from our coasts, where it was grown under tropical conditions. In 1860, so far as the records show, no land was under bananas in Queensland. The growth of the industry since then is reflected in the following figures:—

Year.	Acres.	Production.	Value.
		Dozens.	£
1870	339	..	..
1880	410	706,560	..
1890	3,890	22,002,092	..
		Bunches.	
1900	6,215	2,231,108	..
1910	5,198	1,121,075	154,148
1920	8,981	1,198,121	349,452
1928	19,750	3,265,161	960,000

Hon. members will see from that table how the industry has grown, and the figures are more particularly interesting at the present moment on account of the efforts which have recently been made for the introduction of Fiji bananas to a greater extent than at present. It will be noted that the yield is in terms of dozens from the commencement of the records until 1899, whilst from 1900 to 1928 the return is expressed in bunches. It is only in later years that the annual value is given, and that fact alone gives hon. members some idea of the altered conditions in the industry, apart altogether from indicating its value to-day. Although the banana is a tropical plant, it has been largely grown on the southern coastal areas of Queensland from the Tweed River north. Its value has been recognised by all who take an interest in agricultural industries, including members who occupy seats on this side of the House, who appreciate its value on account of the cheap methods of cultivation which are suitable in the industry, the cheap way in which land can be broken up in comparison with other forms of farm life, and the fact that extensive and expensive machinery is unnecessary. It is well known to all hon. members that the industry has been pretty well established on the coastal areas of Queensland, where the mountainous country is particularly suitable for banana-growing. It has, however, suffered from disease. First of all, there was the weevil-borer. Later on "bunchy top" attacked the industry, appearing first on the New South Wales side of the border near the Richmond River. It rapidly spread to Queensland, and it was only men with some capital who were then able to engage in it successfully.

The Value of the Industry in Land Settlement.

To-day we see them successfully growing bananas, particularly under adverse conditions, with this dreaded menace rapidly overtaking them. One is really struck with these beautiful settlements, particularly in Queensland. New South Wales has had a painful experience with this dreaded disease, which almost wiped out the industry there, but it is pleasing to note that recently there has been a revival in that area. When one witnesses the settlement right along the north coast of Queensland as far north as Cairns, but particularly in the Gympie and Caboolture districts, up the Mary Valley, the Brisbane Valley, the South Coast, and along the tributaries of our principal rivers, one can realise what an advantage the industry has been to the Government, because the industry not only absorbed an enormous number of men who were in search of work, but it enabled men with small capital—men with no capital and many of our returned soldiers—to establish homes on small banana orchards. Roughly, an area of 5 acres is sufficient not only to provide employment, but in many cases to give a sufficient return to the grower. One can quite realise what a splendid adjunct this industry is from the point of view of land settlement, and from the point of view of absorbing labour. The small amount of capital required was a great advantage to the Government in that the Agricultural Bank could make the necessary funds available, and the settlers could immediately launch out in this industry, rquiring only a good strong arm, and probably a decent wife to help him. Banana culture does not demand the very best land. It is necessary only to have land suitable for the growth of the plant, so long as the soil contains suitable constituents. When I say it does not require the best land, I mean that it is not necessary to have the low rich alluvial flats required for other agricultural pursuits. All that is necessary is land situated on mountain sides, sufficiently high to be above the frost line, but not so high as to be subject to the cold winds prevalent in all countries. Bananas can be grown on the steepest and rockiest land. One marvels at the ingenious methods adopted by orchardists on the North Coast line, and to witness the clever means of conveying the fruit from one mountain side to another by aerial lines. The fruit is also conveyed by means of tramways and in other ways. Nearly all the fruit gravitates in one direction, which leads to a wonderful reduction in the labour required to work the holding. The fact that bananas can be grown on mountain sides presents the natural corollary that the land can be secured at a cheap rate, which is of great assistance to the beginner. It is a regular eye-opener to any person travelling on the North Coast line to see the place studded with banana plantations; and one is filled with pride at the sight of those Queenslanders, who have gone out with the object of supplying Australia with an absolutely necessary article of diet, particularly from the point of view of health. The Bill has been introduced to encourage that good work, and with a view to increasing production, having in view the absorption of unemployed labour which to-day is to be found in idleness in our streets. All that is required is a small amount of capital, and that can be secured from the Agricultural Bank. I strongly urge members of Parliament and members of agricultural organisations and co-operative bodies to do what I urged the miners of Gympie to do when I first became a member of Parliament. I urged upon them to get out into the country; but, comparatively few followed that advice. If they had done that, they would have been far better off growing bananas or dairying in the Gympie district than roaming all over Queensland and Australia

searching for work. I tender that same advice to-day. It is our bounden duty to demonstrate the possibilities of this industry to the man who is looking for a home. It is not necessary to have an expensive house. There are some hon. members in this Chamber who have taken up the attitude in connection with the Department of Public Lands that the enormous areas embracing State forests and timber reserves, particularly on the Brisbane River, the Mary River, and in our coastal districts—land that cannot be alienated except by Act of Parliament—should be made available for closer settlement.

Banana-Growing and Forestry.

We can, with advantage to the grower and the State as well, advocate the growing of bananas in conjunction with the growth of pine trees. Here we have a system which helps the man with a little capital to go upon the land and make a good living. I do not think that pine trees can be grown in any other way under existing conditions in Queensland except in the form I have indicated; but I am afraid that the Speaker will not allow me to enlarge upon that system. Anybody who knows anything about banana-growing knows that it is an industry in which a man can easily become established. As soon as the man falls the scrub and burns the fall off in three or four months, he digs his holes and plants his banana-suckers. The banana plantation is then all ready for him. Fourteen months afterwards the trees will have sufficiently developed to enable him to commence to make money from them. The time has come when we should point out the advantages of banana-growing, knowing full well that we are now only supplying half the Australian requirements. We should launch out in the direction I have indicated with a view not only to supplying this market, but with a view to relieving the congestion on the labour market. It would be one of the most effective methods of dealing with unemployment that I know of, and more particularly in view of the advantages that the markets offer to the people of this State to develop the industry.

The Call of Country Life.

I need not dilate any further on that side of the question; but I would like to emphasise the small amount of capital that is required to engage in banana culture. Beyond preparing the ground for the planting of suckers the banana-grower has only to purchase cases. No machinery is required, and there is a ready market for his products in the Southern States. Although the market fluctuates, nevertheless the prices compare very well with the prices obtainable for other primary products, while the remuneration the grower gets for his labour compares favourably with that of his neighbours engaged in other forms of primary production. The main thing is that the banana-grower is a contented man. I have no hesitation in saying that, when a man has lived in the bush and knows the privileges of bush life as I do, there is no occupation which can be compared with it for comfort and the pleasure derived. As I pointed out a while ago, a rough estimate of the value of the banana industry to Queensland is £1,000,000 per annum. It may be more, because no record can be kept of the fruit that is eaten in Queensland. That gives hon. members an idea of the importance of the industry. There is still more wealth to be produced from it. I would emphasise the fact that, since strict grading was enforced about twelve months ago, the benefit accruing to the fruit placed in the Southern markets has been enormous. Unless we are prepared to be up and doing and to take advantage of the opportunities now offering, we shall probably lose a trade which we can ill afford to lose. We shall have outside competition to meet, for, despite the high tariff, bananas are being imported from centres outside Australia, where, because of the cheap-labour conditions, they can be produced for a few pence per bunch. We want to go right ahead with the banana industry, because it is of vast importance to the State, and this Bill has been brought down with that end in view.

Extension of the Industry.

I have spoken about the waste lands in this State; and I wish to emphasise that we can extend this industry further North. By waste lands I mean lands that are unsuitable for dairying and agricultural pursuits. It was one of my pleasures last year, when travelling through the North, to see that vast valley of beautiful land in the Tully district. It was truly remarkable to see that land, and I make bold to say that, so far as banana land is concerned, we shall not exhaust our resources in that direction for many years to come. Knowing that fact, there is nothing to stop the industry from going right ahead. What is wanted to-day is a step forward in order to catch the market we have down South, and in this manner obviate any attempt on the part of agitators to import bananas from outside Australia, which are grown under inferior conditions to those under which the industry is carried on in Queensland. . . .

The duty of 1s. 6d. per cental introduced in 1911 had some beneficial influence. The increased tariff of 1920 to 2s. 6d. per cental, and in 1921 to 8s. 4d. per cental, which placed the industry on a level with the protection given to other green fruits, was the means of stabilising the industry and placing it on a reasonably satisfactory footing.

Proposed Board of Advice.

The first real difficulty met with by banana-growers in Queensland was the occurrence of the borer-weevil. I do not want to enter into a dissertation on the borer-weevil and "bunchy top," any more than I have already done in connection with the last Bill. The reason I mention them is to connect these particular menaces up with the board proposed to be appointed under this Bill. As a matter of fact, although the Bill is not law, we are practically working along the lines laid down here, rather than lose the season. In order that control measures might be started on right lines, the Government in 1920 appointed Mr. Froggatt, an entomologist, to investigate thoroughly the borer-weevil, and for the last eight or nine years his time has been exclusively spent on this pest. The department certainly did its best, with no apparent result to the present time. Going further, we must remember that "bunchy top" has played a big part in the destruction of our orchards. It is a crying shame to see the beautiful orchards that at times have been destroyed by this disease. We have to give assistance in the form referred to by the Bill, in order that the ravages of this pest may be restricted.

Probably hon. members know the seriousness of the leaf-spot pest in bananas; but they will realise it more when I tell them that it is 50 per cent. worse than the "bunchy top" disease.

The object of the present Bill is to create an organisation which will be specially charged with the business of improving and developing the most important section of the fruit industry of Queensland. The board will consist of four members, two of whom are to be appointed by the Minister and two by the growers. The Governor in Council will appoint the chairman, who will be a Government representative. The duties of the board will be to advise the Minister on banana problems, including the policy of the banana experiment stations; advising the Minister on scientific problems, such as "bunchy top," leaf-spot, and other diseases; aiding in the dissemination of information regarding bananas; and such other duties as may be entrusted to it. I have always found it advisable to take the public into my confidence. I have done so in the butter factory with which I am associated, because I find that it makes for the best results.

The board will administer the Diseases in Plants Act so far as bananas are concerned, and in that respect it will deal with abandoned or neglected plantations, with banana quarantine matters, with the issue of permits, with plant bananas, and with trafficking in banana suckers. In connection with the issue of permits, we have had a considerable amount of trouble in getting information expeditiously. That matter, however, has been tightened up to a great extent by the Under Secretary and other departmental officers. The main point is that we want to have a check on the work of the inspectors, and in this connection the board which is now functioning will do good work.

Banana Experiment Stations.

There is also the policy regarding experiment stations. The board will make investigation, and then make certain recommendations to the Minister. The Minister has full power as to whether he will accept recommendations or not. It is for the experts to consider those recommendations, and the Minister will be advised by them. . . . . The duties of the board will also include the visiting of banana-growing districts from time to time. If any trouble arises, say, in the South Coast district, we shall send the members of the board there immediately. As a matter of fact, members of the board went out to Samford yesterday, where they did effective work. They reported three or four banana plantations as being infected. We are endeavouring to find the owners, and if we cannot do so we shall have to clean them up ourselves. The board will also aid in the distribution of information regarding bananas.

This brings me to the question raised by the hon. member for Barcoo (Mr. Bulcock), who said that we should get in touch with those who have gardens in which they grow a few banana trees, with a view to giving them information. That is a very excellent suggestion, and one that will be followed. The board will also furnish reports on matters submitted by the Minister, and perform such duties as may be required.

Administration.

Loading bananas to-day at the railway stations is rather expensive when you consider the work done by the loaders. They work half a day, say, twice a week, or at most two days a week, and for the remainder of the time there is nothing for them to do. We propose to appoint them as inspectors and also to do other work, and that will minimise the cost of loading, which is fairly heavy at the present time. The board will also administer the Diseases in Plants Act, which deals with abandoned and neglected banana orchards, quarantine, the issue of permits to plant, and trafficking in the sale of suckers. That is the most important duty, and one which the department should control. At the present time suckers may be sent anywhere without any supervision. After they leave the orchard it is hard to locate them. Only to-day the Under Secretary reported to me a case where a truck of banana suckers was sent from the North, only to find when they reached Southern Queensland that there was something wrong. That shows conclusively that men will traffic in these banana suckers, and it is hard to control them. The inspector in each district will keep in touch with the movements on all farms in his district. He will also advise the Minister in regard to abandoned or neglected banana orchards, and he should know whether an orchardist is keeping his farm clean or not.

The Inspectors' Board has sweeping powers, but I will not deal further with that subject, because I referred fully to it in connection with the Diseases in Plants Bill. Our object is to try to get these men to do dual work. The work is of an interesting character, which the inspectors should readily take up. In my opinion, our inspectors, no matter whether they belong to the Department of Agriculture or to the Department of Public Lands, should have a knowledge of the activities of the various State departments.

The Governor in Council may endow the fund to the extent of £1 for £1. A similar arrangement is now being carried out, and is working effectively. The question of a levy will arise later on; but the amount will be subject to the recommendation of the banana-growers. It is proposed to follow on the lines of a similar system which has been in vogue before.

Compensation.

The question of compensation is also dealt with under this Bill. I do not agree with what the hon. member for Barcoo said regarding quarantine areas; but he was on sound ground when he spoke of the compensation to growers, if we destroy not only unhealthy plants but also healthy plants. That is the policy of the department to-day. Any loss in respect to diseased plants must be borne by the individual concerned; otherwise there would be no incentive to his cleaning up his home.

A White Man's Industry.

In Queensland, banana-growing is a white man's industry. At the present time the industry supports approximately 16,000 white Australians—I include men who are growing bananas, and their wives and families and others indirectly concerned with the work. It is one of our principal industries to-day. It also provides work in connection with boxes, and for carters, railway workers, and distributors. One has only to watch the fruit trains going from Brisbane and loading at the various stations, to see the vast amount of work provided in that way. These fruit trains have been in operation for some years, and the industry could not possibly do without them. Bananas are carried to New South Wales and Victoria very quickly, taking into consideration the transhipments involved.

This Bill is purely complementary to the Bill which has just passed its second reading, and I have now much pleasure in moving—

"That the Bill be now read a second time."

THE JOURNAL AT SCHOOL.

A country school teacher writes (10th October, 1929):—"I wish to renew my subscription for the Journal. . . . It has proved very interesting, and has assisted me largely in my nature study work."

THE WHEAT INDUSTRY IN QUEENSLAND.

A COMPREHENSIVE REVIEW.

Since assuming office I have been engaged in examination of the principal primary industries with a view to ascertaining the directions in which development is practicable. I am convinced that the greatest relief of the depression from which the country is suffering will lie in the fuller utilisation of our natural resources. A dissemination throughout the community of increased wealth taken from the soil would stimulate trade and increase the avenues of employment.—*Hon. Harry F. Walker, Minister of Agriculture and Stock.*

THE present position and condition of the wheat industry in Queensland were reviewed by the Minister of Agriculture and Stock (Hon. Harry F. Walker) in the course of a recent statement to the Press, of which the following is the full text:—

Queensland's Bread Needs.

Upon investigating the position of the wheat industry I find that the consumption of wheat in Queensland in the matter of the bread requirements of the people may be taken at approximately 5,000,000 bushels, exclusive of requirements for seed, poultry feed, and such like. Over a period of eleven years we have produced on the average barely half of these requirements. A doubling of the wheat production of the State would mean an increase in the income of the State of close upon £750,000 per annum.

Dependence upon Southern States.

Some weeks ago alarming reports were received respecting the prospects of the wheat crop in New South Wales. Some reports went so far as to forecast that there was little likelihood of there being any surplus from New South Wales for export next season. Happily, rains in some districts have to some extent improved the outlook in that State. The situation during the dry period, however, served to focus attention upon the position in which Queensland would be placed in the event of a New South Wales wheat failure. If we do not have enough wheat for our own needs we would be dependent upon Victoria and South Australia for wheat for local consumption. From the standpoint of importation of flour, it is possible that Southern manufacturers might then take advantage of the situation by combining to treat Queensland as an artificial market and demanding artificial prices.

In any event the experience of history dictates that a State should produce its own bread supply. The fact that we have not been doing so in Queensland has impelled the Government to look into the position in an endeavour to correct this very unsatisfactory state of affairs. Probably Queensland will never be a great wheat-producing State as are some of the Southern States. But it is believed that existing wheat lands on the Downs and in the Maranoa, already served by railways, roads, &c., are capable of producing sufficient wheat for the needs of the State if reasonable encouragement were offered wheatgrowers.

The Objective.

I have therefore adopted the objective of assuring the production by Queensland growers and the milling by Queensland mills of this State's bread needs. **Realising that such an objective cannot be achieved without the co-operation of those concerned in the primary and secondary industries, I convened a conference between the Wheat Board, as representing the growers, together with the millers, representing the secondary industry, in the hope of finding it possible to take definite steps in the direction of achieving the objective.** The conference sat at intervals throughout the month of September. Frequent adjournments were necessary.

Past Misunderstandings.

It appears that over a considerable period of years misunderstandings have existed as between the Wheat Board and the millers. It was not my purpose or desire in asking the respective interests to meet me to investigate all the details and causes of any such misunderstandings which have existed in the past. Rather the object was to see what could be done to create goodwill in the future, as in the absence of that goodwill I felt that the object of encouraging wheatgrowers to increase wheat production would be difficult of achievement.

It also appears that the lack of harmony which has obtained in the past as between the Wheat Board and the millers has resulted in—

(1) The Wheat Board having to retain considerable stocks of wheat of one season well into the next year.
(2) First payments by the Wheat Board to the growers being less than they might otherwise have been and final payments being considerably delayed pending realisation.
(3) Costs being sustained by growers through accumulating charges by double handling of wheat at country stations.
(4) Sustaining by the growers of additional interest and storage charges.
(5) Loss attendant upon the deterioration of the quality of the wheat.
(6) On occasion wheat being exported by the Wheat Board while Southern States wheat has been brought in by the millers.
(7) The market formerly enjoyed by the Queensland millers for Queensland flour being invaded by Southern millers.

Probably not all of these results have accrued in any one season, but some have operated every season.

Importance of Markets.

In any event before considering the advocacy of the increase of wheat production in Queensland, it was felt expedient to confer with the interests concerned in the marketing of the product so as to verify the opinions held to the effect that a satisfactory local market exists for increased quantities. In the embarking upon projects for increased production there has, in the past, been an inadequate regard for the markets available. It was desired in this instance to assure the market.

Consideration by Conference.

The conference between the Wheat Board and the millers duly assembled under my presidency on the 4th and 5th instant. It was considered—

Firstly—Whether it would be sound and practical to aim at the objective of a doubling of the wheat production; and

Secondly—Whether it was not possible to bring about a mutual understanding as between the Wheat Board and the millers.

As regards the first-mentioned consideration—namely, that of the practicability of increasing the State's wheat production—I am pleased to say that all interests concerned, both including the Wheat Board and the millers, as well as the technical officers of the Department appear to be united in the opinion that the objective is reasonably practicable and attainable.

GENERAL PRINCIPLES.

With a view to facilitating discussion I submitted to conference an outline of certain general principles. For instance, I pointed out that, in the past, wheat has been received by the State Wheat Board and put into sheds or dumps at country stations and has later been taken out when required by mills, as a consequence of which double handling costs were involved, and sometimes also avoidable damage. It was further suggested that an organised transport arrangement be carried into effect involving the nominating of a special transport officer by the Commissioner for Railways during the wheat receiving season to co-operate to the fullest extent with the Wheat Board in marshalling and fully utilising rolling-stock with a view to reducing country storage and if possible to eliminate "dumping" and damage therefrom. It was also suggested that millers should undertake to store wheat at mills on behalf of the Board to the fullest extent, the millers to be responsible for the agreed intake weight of wheat, and all wheat as received at mills to be checked by a representative of the Board. As regards price, a suggestion was made that an understanding should be arrived at providing for a minimum grist by each mill

at a price to be fixed according to a formula based upon an agreed upon margin of so much per bushel above New South Wales country station values. I suggested that settlement might take place on the Wednesday of a given week in respect of the gristing up to Saturday of the preceding week, and that millers' gristing accounts would be subject to audit by the Auditor-General. It was intimated by me that, in the event of an understanding being reached between the parties to operate for a term of years with a view to affording the necessary assurance and encouragement to the growers, the Government would assist in the making of arrangements for a more attractive first advance to growers than has hitherto been the case, as well as to facilitate a quicker final distribution, the intention being to wind up one season's crop before a new season's crop comes in.

It was pointed out that the advantages which would accrue under such an arrangement if carried into effect seemed to be—

(*a*) That stabilisation as a result of a working arrangement between the Wheat Board and the millers would be an encouragement to growers on the Darling Downs to go in more largely for wheat.

(*b*) Wheatgrowers would be assured of full parity values for their product.

(*c*) The stabilisation attaching to the arrangement for a term of years would encourage millers to improve their plants, to provide more storage, &c., and generally to increase efficiency and reduce costs.

(*d*) The Wheat Board would be encouraged to reduce costs by saving of storage, handling, &c.

(*e*) The very heavy losses sustained through prolonged storage of wheat at country stations would be very largely obviated if not eliminated.

(*f*) Continuity of policy would be assured which would react favourably upon the growers.

(*g*) Millers would have adequate supplies of wheat at command of a better quality than that which was available generally in the South, and the continuous working which would be possible would tend to reduce millers' overhead expenses.

(*h*) Generally the increase of wealth through augmented wheat production and by increased consumption of Queensland-made flour would assist in relieving unemployment and add to the general prosperity.

The foregoing is a summary of the general circumstances which seemed to justify close consideration by the Government of the questions involved, and the determination to solve them, and the evolving of ideas to that end.

AGREEMENT REACHED.

I am pleased to be able to announce that a complete agreement has been reached between the parties covering a period of three years commencing with the coming season's crop. It was my concern throughout that any understanding should be fair to the grower in ensuring him of the full reward of his labours, just to the consumer, and not harsh upon the secondary industry. The price of bread in Queensland has for some time compared favourably with that ruling in the other States. I was anxious to make sure that this should not be departed from, and am pleased to say that the parity of bread prices will not be affected. So far as concerns the grower, it is generally known that Queensland has a natural geographical advantage. This has been secured for the producer.

The following are the main points in the arrangement, namely:—

1. Queensland millers undertake to endeavour to increase the consumption within the State of flour made from Queensland wheat up to 4,000,000 bushels within the three-year period.

2. Pending the millers building up the trade referred to and for the first year, millers agree to purchase a total of 3,500,000 bushels of wheat (subject to the wheat being available) for gristing purposes. In addition to this there is a substantial trade for poultry feed, seed, and other purposes which should enable the absorption of a 4,000,000-bushel crop immediately, should we be fortunate enough to secure such a harvest from the crop now in the ground, while as a result of the co-operation of the Wheat Board and the millers it is hoped during the period of the agreement to approach the 5,000,000-bushel local market objective.

3. Feed wheat will be the subject of a separate arrangement.

4. To maintain to the growers the existing geographical advantage, millers agree to purchase wheat under a formula calculated to assure a gross realisation at Queensland country stations of approximately 8d. per bushel above New South Wales country station parity, or 1d. per bushel above Wallangarra or Sydney.

5. With a view to economising in the cost of operations, the Wheat Board has entered into an arrangement with the millers to act as acquiring agents at country stations or mills, as the case may be, for direct wheat, doing all the receiving, handling, storing, loading in, loading out, including the bearing of the responsibility for losses in weight and deterioration at a flat rate contract allowance on all wheat of 1¼d. per bushel. For the protection of the wheatgrowers all wheat will, however, be classified and weighed by Wheat Board's representative. The classification will be on the same basis as that which has obtained during the last two years, excepting with such modifications as may be mutually agreed upon.

6. The Board will bear costs of administration, interest on sheds, interest on bank overdraft, &c., but it is expected that, as a result of the arrangement which has been concluded between the parties, a very considerable economy in handling costs will be effected.

7. Millers have agreed to make available for the storage and protection of the wheat their entire mill storage capacity, estimated to be sufficient to safely house approximately 1,500,000 bushels. The Wheat Board has storage for approximately 2,100,000 bushels. The mills have a gristing capacity during the three months receiving season of anything up to 1,000,000 bushels unless there is undue uneconomic location. It appears, therefore, that sufficient storage exists to effectively protect and care for a 4,000,000-bushel crop. With a view to further ensuring adequate protection the existing Wheat Board's sheds will be mouse-proofed. Moneys for this purpose will be made available to the Wheat Board under the guarantee of the Government. In consideration of the millers making available their storage accommodation free of charge, the Wheat Board's sheds in the country are to be available free of charge to the millers. Acting as agents for the board and included in the flat rate charge of 1¼d per bushel, millers will temporarily dump wheat in rush periods and bear responsibility therefor. The millers also agree to take delivery of wheat promptly from farmers and as fast as they can deliver it, subject to avoidance of congestion.

8. The board will receive payment for wheat from the millers weekly on Tuesday of each week for the gristings up to Saturday of the previous week.

9. The millers' accounts in the transactions will be subject to audit by the Auditor-General.

10. With respect to any surpluses of wheat which may be produced over and above the local consumption demands, it has been arranged that the local millers will have the first refusal of such surpluses at a price to be mutually agreed upon. This is with a view to building up the local milling industry without prejudicing local wheatgrowers.

11. Millers will deposit cash or bonds based on their gristing capacity as a guarantee that they will carry out the terms of the agreement, the total amount thereof being £30,000.

12. With a view to promoting mutual understanding between the parties, a monthly conference will take place between the Wheat Board and the millers alternately at Brisbane and Toowoomba during the wheat receiving months of November to February.

13. Provision has also been made in the agreement for a system of arbitration to enable the prompt settlement of any differences.

14. It has been agreed that any abnormality in Queensland and New South Wales will justify a reconsideration of the price formula, and a tribunal is set up in that connection.

15. There is also an annual right of review of certain provisions.

The agreement between the parties was duly completed and signed, and those concerned appear to be satisfied with the results.

Million Pound Credit.

It will be remembered that the Premier (Hon. A. E. Moore) announced in his policy speech that the national credit would be placed behind industries which were prepared to adopt self-help methods to bring about development without unduly leaning upon the Government. Since the primary and secondary sections of the wheat industry have so united in a common objective, the Government feels justified

in extending assistance along the lines promised by the Premier in his policy speech. The Government has therefore arranged with the Commonwealth Bank for a credit of £1,000,000 sterling per annum for the Wheat Board. The Government will also guarantee a first advance of 4s. per bushel *net to the grower* at country stations on all wheat of approved quality for the next three years up to 4,000,000 bushels. The moneys will be available to enable the growers to receive payment promptly, and if the board so wishes credit will be available so that growers who deliver wheat up to the 31st December will receive payment in the middle of January. Deliveries during January can be paid for in the middle of February, and February deliveries in the middle of March, in a similar manner to butter-factory pays. It has also been arranged that the millers will take over at the 15th September in each year any wheat remaining in stock, and will pay for same promptly so as to enable final distribution to be made to growers in the middle of September of each year. The arrangement means that not only will the grower be assured of a substantial first advance promptly after delivery, but also of an early squaring up of the pool, with an assurance to him of the full value of the wheat based on world parity plus Queensland's natural geographical advantage.

MODERN METHODS OF FARMING PRACTICE.

It is hoped that the arrangement may encourage farmers in districts suitable to wheatgrowing to plan the preparation of extended acreages during the coming summer. I hope they will prepare the land well and in such a way as to conserve the summer rainfall so as to provide a good seed-bed for an extended sowing under favourable conditions in next year's planting season.

Not only have the Departmental activities demonstrated the practicability of regular production of wheat crops in Queensland, but many individual growers have been meeting with consistent success over a term of years by the adoption of modern methods of soil-moisture conservation. In order to further assist in this important matter I have arranged to extend the activities of the Roma State Farm, and will endeavour to arrange for a series of conferences of delegates from Local Producers' Associations to be held there at suitable times when the results of experiments may be brought definitely under notice. This will be in addition to the field days recently arranged. The system of conducting experimental plots on individual farms will be continued and extended where practicable. Every encouragement will be given to the more widespread adoption by farmers of dry-farming methods. The existing departmental arrangements regarding the propagation of varieties of wheat suitable for Queensland will be energetically continued.

More Land under Wheat

I have arranged with my colleague, the Minister for Lands (Hon. W. A. Deacon), who is intimately familiar with the wheatgrowing industry, to initiate a survey of the lands available for closer settlement for wheatgrowing. I feel that there are many farmers' sons on the Darling Downs to-day, who, instead of coming to the cities to compete on the labour market, if given encouragement, would take up wheatgrowing, to their own benefit as well as to the great advantage of the State.

MINISTER'S APPEAL.

I also call the attention of the public of Queensland to the fact that Queensland millers can assist the wheatgrowers in the finding of an extended local market for their product only if Queensland people will ask for and give preference to bread made from Queensland flour. It has been demonstrated that Queensland flour is stronger and generally superior to many Southern flours. In asking for preference for the Queensland article, I am not, therefore, asking for preference for an inferior article but for one which (according to experts) is superior. I also appeal to the Queensland merchants and bakers. I ask them to be loyal to the State in which they earn their livlihood, and accordingly in placing their orders to give preference to those Queensland mills which are giving preference to Queensland wheat.

It now remains to hope for the favourable rains which are now so necessary to ensure a bounteous season so that those wheatgrowers who at present have substantial areas under crop may be rewarded to the full extent which their labours deserve, and that they may be encouraged to continue the valuable work which they are doing.

CLIMATOLOGICAL TABLE—SEPTEMBER, 1929.

SUPPLIED BY THE COMMONWEALTH OF AUSTRALIA, METEOROLOGICAL BUREAU, BRISBANE.

Districts and Stations.	Atmospheric Pressure. Mean at 9 a.m.	Shade Temperature.						Rainfall.	
		Means.		Extremes.				Total.	Wet Days.
		Max.	Min.	Max.	Date.	Min.	Date.		
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cooktown	30·04	82	71	84	20, 29	57	12	26	5
Herberton	..	75	52	84	21	30	12	28	4
Rockhampton	30·13	80	56	89	19	43	11	3	1
Brisbane	30·16	74	54	86	18	48	3	48	8
Darling Downs.									
Dalby	30·15	77	47	88	21, 22	31	3	8	3
Stanthorpe	..	67	39	82	21	27	3	82	7
Toowoomba	..	69	46	81	21	32	3	36	4
Mid-interior.									
Georgetown	30·02	89	58	96	8,22,23	45	13	0	..
Longreach	30·08	83	54	93	21,25,26	39	11	0	..
Mitchell	30·14	77	45	88	20, 26	29	3	4	1
Western.									
Burketown	30·03	85	60	95	22	48	5	0	..
Boulia	30·09	84	55	97	20	40	3	0	..
Thargomindah	30·13	77	52	94	20	39	4	93	3

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF SEPTEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING 1929, AND 1928, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Sept.	No. of Years' Records.	Sept., 1929.	Sept., 1928.		Sept.	No. of Years' Records.	Sept., 1929.	Sept., 1928.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	0·68	28	0·19	0	Nambour	2·63	33	0·33	0·42
Cairns	1·71	47	0·96	0·10	Nanango	1·84	47	0·17	0·09
Cardwell	1·57	57	0·51	0	Rockhampton ..	1·36	42	0·03	0
Cooktown	0·60	53	0·26	0·16	Woodford	2·25	42	0·20	0·60
Herberton	0·50	42	0·28	0					
Ingham	1·55	37	0·39	0					
Innisfail	3·64	48	1·81	0·02					
Mossman	1·54	16	0·76	0·11	*Darling Downs.*				
Townsville	0·85	58	0·17	0					
					Dalby	1·72	59	0·08	0·15
Central Coast.					Emu Vale	1·79	33	0·28	0
					Jimbour	1·54	41	0·15	0·02
Ayr	1·51	42	0·20	0	Miles	1·40	44	0·11	0·03
Bowen	0·86	58	0	0	Stanthorpe	2·33	56	0·82	0·36
Charters Towers ..	0·78	47	0·10	0	Toowoomba ..	2·18	57	0·36	0·26
Mackay	1·64	58	0·24	0	Warwick	1·83	64	0·34	0·02
Proserpine	2·26	26	0·18	0					
St. Lawrence	1·29	58	0	0	*Maranoa.*				
					Roma	1·49	55	0·01	0
South Coast.									
					State Farms, &c.				
Biggenden	1·59	30	0	0·29					
Bundaberg	1·68	46	0·18	0·15	Bungeworgorai ..	1·09	15	0·02	0
Brisbane	2·01	78	0·48	0·78	Gatton College ..	1·60	30	0·20	0·14
Caboolture	1·91	42	0·36	0·20	Gindie	1·07	30	0	0
Childers	1·86	34	0·11	0·57	Hermitage	1·54	23	0·24	0
Crohamhurst ..	2·70	36	0·35	0·25	Kairi	0·67	15	0·45	0
Esk	2·20	42	0·45	0·82	Mackay Sugar Experiment Station ..	1·58	32	0·02	0
Gayndah	1·58	58	0·08	0·19	Warren	0·89	14	..	..
Gympie	2·14	59	0·12	0·24					
Kilkivan	1·75	50	0	1·21					
Maryborough ..	1·96	57	0·36	0·41					

GEORGE G. BOND, Divisional Meteorologist

PARALYSIS OF THE HINDQUARTERS IN PIGS.

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

The disease described by Mr. Shelton in the following notes is often called erroneously Staggers or Rickets, while other terms used to indicate a similar condition are Down in the Back, Kidney Worms, or Paralysis.

The ailment is largely a "deficiency" disease, one almost entirely due to an insufficient supply of mineral matters (bone-making materials) in the food and to lack of green food. It is obviously a subject that must be handled more along the lines of prevention than actual treatment; one coming within the ambit of the instructor more than the inspector, and one that must be remedied more by an all-round improvement in the system of breeding, feeding, and handling than by the administration of medicine. Mr. Shelton's observations on the subject are therefore of unusual interest. These notes appeared originally in the Journal for November, 1927, and in response to numerous requests for information on the subject they are now reprinted with the approval of Major A. H. Cory, M.R.C.V.S., Chief Inspector of Stock.—Ed.

Numerous inquiries reach the Department annually as to the cause and treatment of this all too common and very peculiar disease, if such it might be called. The subject has been dealt with previously in this Journal as well as in pamphlet form, but as both leaflet and pamphlet are now out of print, and as the trouble is of such an important nature, it warrants revision and repetition—this especially as further evidence of a very helpful nature has lately been received through official channels and from correspondence overseas.

A great deal has been written regarding "Paralysis of the Hindquarters in Pigs" and much research work has been carried out, principally with a view to ascertaining the exact nature of the conditions under which the disease occurs, and in studying the subject it is of interest to know just what other authorities are doing, and to determine whether or not their findings are applicable to our conditions in Queensland.

The disease is very largely one due to a deficiency of mineral matters in the food and to malnutrition, hence the writer's objective is to suggest how by improved methods of feeding and caring for pigs these abnormal conditions can be overcome. The Veterinary Officers of this Department should be consulted on all matters relating to medicinal treatment; their advice is also always available in case of any outbreak of disease no matter whether it be of a minor or of a more serious nature.

Paralysis of the hindquarters in pigs is, unfortunately, a trouble not confined to young pigs only, nor is it localised in Queensland. It appears to be a source of considerable trouble wherever pigs are kept the world over, though where the conditions under which pigs are kept are favourable to early maturity and to the healthy and rapid growth of all breeding stock, the disease has been kept in check and has caused but little trouble.

In referring to the occurrence of paralysis in pigs in this State and elsewhere, the Chief Inspector of Stock, Major A. H. Cory, M.R.C.V.S., states that—

"The subject of paralysis in pigs has been given considerable attention for many years past.

"A small leaflet was issued some years ago to farmers dealing with what was then considered three principal causes of the complaint, but in recent years it has been ascertained that the paralysis, in many cases, is due to the lack of a vitamine known as Fat Soluble A, which is essential to the growth of animals, a deficiency leading to rickets.

"This vitamine is found in certain herbage, milk, cream, butter, eggs (yolk), beef fat, and cod liver oil. Latterly cod liver oil has been recommended to make up for the vitamine referred to, with, as far as can be ascertained, marked benefit.

"There is little to report regarding the incidence of the disease, as it occurs in any part of Queensland where pigs are improperly fed and not given the necessary attention. The same conditions exist all over the civilised world. It is mostly young growing pigs which are affected, and generally those in good condition.

"Apart from the paralysis, the pigs usually feed well and appear normal, the pathological changes taking place being apparently microscopical."

Professor L. A. Maynard, of the New York State College of Agriculture, Department of Animal Husbandry, has written on the following lines as a result of his experience:—

"This problem has been under investigation here for several years. On the basis of our studies, we believe the trouble is the result of improper mineral nutrition which prohibits a normal development of bone. This is due to a lack of calcium in most of our rations. We have shown that where paralysis occurs, the long bones are very deficient in calcium and phosphorus, and marked histological changes have occurred. These changes have been observed on a diet low in calcium. However, a lack of calcium is not the only factor involved, because the question of assimilation also comes in.

"Certain feeds are rich in the factor aiding mineral assimilation, and certain others are not. A ration which contains a certain amount of chopped alfalfa (green lucerne or lucerne chaff) is very useful for preventing paralysis, because it supplies the needed calcium and phosphorus and the factor aiding assimilation as well. We have shown, however, that there is a very beneficial effect from the adding of ground limestone and bone meal to rations which are now causing the trouble."

In a communication from Professor R. Adams-Dutcher, Head of the Department of Chemical Agriculture at the State College and Experiment Station, Pennsylvania, U.S.A., the following remarks appear:—

"I have the feeling from the knowledge that I have been able to obtain by reading, and in experimenting, that the diet is a very important factor in preventing paralysis in pigs, and probably calcium and phosphorus accompanied by proper vitamine-carrying foods are the most important dietary factors. Any number of animals have been relieved of the paralytic symptoms by feeding bone meals or other mineral mixtures carrying calcium and phosphorus; mixtures which carry calcium carbonate have also been effective. Veterinarians in New York have had fairly good success with wood ashes, but it is my recommendation that lime or bone meal be made available in those districts where hog paralysis is causing trouble. If lucerne or some other leafy green stuff or hay is available, this would also improve the situation, helping the animals to utilise this mineral matter to the best degree of efficiency."

The following extracts have been taken at random from mineographs supplied by Professor John M. Evvard, as a result of extensive experiment along the lines of feeding mineral mixtures, both simple and complex, to pigs not only with the idea of preventing paralysis, but of stimulating growth and enhancing the returns.

Comment.

(1) The feeding of minerals in whatever form allowed was quite advantageous in that the average daily gains were substantially increased, the length of the feeding period economically shortened, the feed required per 100 lb. gain considerably reduced, and the profits per pig enhanced.

(2) In feeding experiments the appetites of pigs for minerals is shown to be of considerable reliability, inasmuch as they clearly excelled check groups receiving no minerals.

(3) Although there appears to be some advantage gained from the feeding of a mineral mixture carrying more than the single emphasised ingredients, such as common salt, calcium carbonate, bone ingredients, and potassium iodide, yet just how far one can afford to go in the adding of other ingredients in practice is a matter for individual estimation and determination. Our experience has certainly indicated that some of the main ingredients necessary in the mineral mixtures are those that carry sodium and chlorine (common salt), calcium (lime, limestone, and bone materials), phosphorus (bone materials, rock, and other phosphates), and iodine (potassium or sodium iodide). The further addition of suitable combinations of such ingredients as common sulphur, a little charcoal, some Glauber's salts, as well as some other ingredients in small percentages or quantities has, on the whole, shown some benefits in our experimental work.

(4) It appears as if the farmer in his feeding of sulphur, charcoal, and other often-questioned materials has not gone entirely wrong, and like his well-founded belief in yellow corn (as against white corn), we should be sure of our grounds before declaring them or any of them non-beneficial.

(5) Our other work with minerals has shown the dollar and cents practicability of adding a good mixture of mineral ingredients to many ordinary pig rations.

(6) Our general recommendation is to provide a suitable mineral mixture for all classes and grades of pigs—the growing pigs, the breeding sow, the suckling pigs, the boars and all—and it is our suggestion that the mineral mixture be self-fed in an easily accessible place, well protected, and under shelter if possible.

(7) A good mineral mixture may be made up for practical everyday feeding as follows:—

Common salt, 20 per cent.; finely ground raw bone meal, or steamed bone meal, or spent bone black, or rock phosphate, or acid phosphate, 40 per cent.; finely ground high calcium limestone, or wood ashes, or finely ground oyster shell, or lime thoroughly air slacked, 40 per cent. Total, 100 per cent.

If sulphur is desired, add approximately 10 lb. to the 100 lb. To every 100 lb. of the above minerals, add from ½ to 1 oz. of potassium iodide, mixing all ingredients thoroughly.

The following remarks upon this disease form the conclusions arrived at by Dr. J. W. Connaway, a prominent American veterinarian, who has been associated with many of the experiments relating to this particular trouble:—

Paralysis of the hindquarters in pigs may result from one of several causes, and the treatment will vary to some extent, according to the cause of the paralysis. The causes are—(1) Injuries; (2) impaction of the lower bowels; (3) kidney worms; (4) heavy suckling; and (5) lumbago or rheumatism. Each of these causes and the preventive and curative measures are discussed in order as follows:—

Paralysis from Injuries.

If the pig has been running in the same yard with horses, mules, or cattle, it may have been kicked, pawed, horned, or trodden upon, and sustained an injury to the spine, legs, or muscles of the back or hips.

Treatment.—Make a thorough examination of these parts. Sometimes an injury is deep-seated and can be detected only by firm pressure and other manipulations of the paralysed parts which produce evidence of pain, fractures of bones, or rupture of tendons and muscular tissues; or the pressure of deep-seated abscesses. If the paralysis is due to an injury, the best treatment is absolute rest. Put the patient under shelter in a comfortable pen, where it can be bedded and kept quiet. Feed a light laxative diet and keep the pen and bedding clean. After a time, a stimulating liniment rubbed over the injured parts may hasten recovery. A mixture of equal parts of turpentine, ammonia, and cotton-seed oil makes a very good liniment. An abscess should be opened and be given proper antiseptic treatment.

Paralysis from Impaction of the Bowels.

Paralysis of the hindquarters may result from an impaction of the lower bowels with hard masses of dung, causing excessive pressure upon the nerves and blood vessels in the pelvis or hip region. If the paralysed pig seems to be badly constipated, use rectal injections of warm water to soften and remove the hard lumps of dung. Add a couple of tablespoonsful of Glauber's salts to slops (food) and feed twice daily until the bowels are loose. Impaction is most frequently due to improper feeding, and to lack of tone of the bowels. A properly balanced ration with an adequate supply of water will prevent impaction of the bowels. In cold weather, pigs frequently do not have a proper supply of water. If the water is icy cold, pigs do not drink a sufficient quantity and are liable to become constipated. Some provision should be made for warming the water to take off the chill. A warm slop once a day will be helpful in keeping the bowels of the brood sow in good condition.

The following tonic will also be found useful:—Equal parts of pulverised copperas, Glauber's salts, Sal. soda, common salt, and a double portion of powdered charcoal, which should be thoroughly mixed and put in a covered trough (self-feeder), where all the pigs can have free access to it.

Paralysis from Kidney Worms.

The so-called kidney (or lard) worms "Stephanurus dentatus" (also called "Sclerostoma pinguicola") may cause paralysis of the hindquarters if these worms are present in large numbers in the sublumbar or loin region. These worms, in

the embryo stage, migrate into the fatty tissues around the kidneys, and sometimes into the kidneys and other organs, as the liver and pancreas. They produce inflammation, and at times abscesses, in the tissues where they lodge. As they are found in largest numbers in the kidney fat and loin region where the nerves are given off from the spinal cord to the hindquarters, the functions of the nerves of this region are more likely to be affected by these parasites and their toxic products.

Treatment.—A brisk rubbing or massage of the loin muscles, with an application of the liniment already mentioned to stimulate the nerves and increase the blood circulation of the affected region will be helpful. Turpentine should also be given internally; this will destroy many embryo worms in the intestines. As turpentine is very diffusible, it is believed to be useful in destroying these parasites in the tissues around the kidneys. To a 200-lb. pig give a tablespoonful of turpentine in half a pint of oil (cotton-seed or raw linseed); or warm milk may be substituted for oil. Shake well before using. Use a small necked bottle, drenching horn, drenching bit, or old leather shoe with a small hole cut out in the point, and give the drench slowly, or smaller doses may be added to the slop (food). The following worm remedy is also useful:—Santonin 6 grains, calomel 4 grains; this quantity to a bacon pig 100 lb. live weight or twice the amount to a pig weighing 200 lb. or more live weight.

In every case, the bowels should be completely emptied before the medicine is given. The Santonin (or Areca Nut may be used in similar quantities) and calomel should be mixed thoroughly with a small quantity of dry meal or shorts (pollard), which may then be moistened and fed alone, or the meal and medicine may be stirred into the feed or slop. Repeat the treatment in a few days.

As a preventive, use freshly slacked lime liberally over the pig yards to destroy worm embryos on the ground over which the pigs feed. Give the pig yards a thorough lining and clean up several times in the year.

Paralysis from Heavy Suckling.

Brood sows that do not have a proper ration, or that are not able to utilise it effectively, sometimes go down in the hindquarters from suckling a big litter of rapidly-growing pigs. The rapid growth of the pigs requires considerable protein for muscle building and considerable bone-making material. All this must be supplied through the milk of the mother, and if the sow is not given the correct ration, her own muscles and bone tissues are depleted to supply proper elements for the growth of her pigs and the weakened condition mentioned results. This can usually be prevented by giving a food rich in protein and bone-making materials along with a corn ration. Protein supplements, such as "tankage" (meat or blood and bone meal), and linseed meal, should be provided. Protein may also be supplied by leguminous crops—clover, alfalfa (lucerne), cowpeas, and soy beans. Brood sows that have access to a feeding rack that is kept full of "pea green" lucerne or other legumes will have no trouble in supplying their pigs with both muscle and bone-forming materials, and will not be in much danger during their lactation period of going down in the hindquarters from too heavy a drain on their tissues. A little crushed wheat or corn and bran made into a slop with buttermilk is an excellent prescription, especially for sows that are low in condition from suckling large litters of pigs. Heat the milk nearly to boiling point for a few minutes before adding the grain constituent; this will prevent any possibility of transmitting tuberculosis or other diseases to the brood sows through cow's milk.

Paralysis from Lumbago or Rheumatism.

A board off the pig pen may permit a cold draught to blow on the back of the pig at night. This chilling of the loins may produce lumbago, or temporary paralysis of the muscles of the hindquarters and inability to walk. Comfortable sleeping quarters prevent these troubles (as well as pneumonia, &c.). It is a mistaken notion that the thick layer of fat with which pigs are provided is sufficient protection against winter storms. On the contrary, pigs often suffer severely from cold and wet if not properly sheltered and properly bedded. If the pigs are affected with lumbago and rheumatism, clean out the bowels by means of a brisk purge (two to four tablespoonfuls of Glauber's or Epsom salts administered in a pint of warm water). Cut down the protein constituent of the ration; feed thin, warm slops to which baking soda is added in tablespoonful doses. Apply hot packs to the loin and paralysed limbs, massage the muscles and apply a stimulating liniment with brisk rubbing. Bed warmly and cover the body of the patient with a thick horse rug if the weather is cold.

A Peculiar Ear Disease Possibly Mistaken for Paralysis.

Reference has also been made on several occasions in these columns to investigations that have recently been carried out by H. R. Seddon, D.V.Sc., and H. R. Carne, B.V.Sc. of the Veterinary Research Station, Glenfield, New South Wales (as reported in the "Agricultural Gazette" of New South Wales), these investigations having as their objective the determination of the cause and effect of a peculiar disease technically known as suppurative otitis affecting the ear of the pig, the principal symptoms of which are the abnormal carriage of the head and the interference with equilibrium and sense of direction. This disease—which, unfortunately, also is all too common in Queensland and is frequently mistaken for paralysis or as indicating the development of paralysis of the hindquarters—has been described by these veterinarians as follows:—

A condition has been noticed fairly commonly amongst young pigs in which the most prominent symptom is a peculiar alteration in the carriage of the head, which is accompanied frequently by unsteadiness of gait. The disease is seen usually in young pigs from a few weeks up to three or four months old. The reason for the relative infrequency of occurrence in older pigs is possibly that young pigs are more prone to catarrh (which appears to be the forerunner of the condition) and that affected animals suffer such loss of condition that they die or are killed as "runts" or "bad doers."

Symptoms.

The most characteristic symptoms are the abnormal method of carriage of the head and the interference with equilibrium and sense of direction. The head is twisted or rotated to one side or the other so that one ear (the affected one) is depressed, such depression becoming more marked as the condition advances. It is noticed that the animal, when walking about, tends to circle in one direction, this being towards the side to which the head is depressed. For example, if the left ear is affected, the head will be rotated to the left with depression of the left ear and "circling" will occur in the same direction. At times this tendency to circle is not apparent, but it is noticed that when moving, the animal does so with an awkward gait, whilst the head is moved from side to side in an unbalanced manner. Affected animals may also exhibit considerable difficulty in going straight up to the feeding trough, having to make several attempts before gauging the right direction, sometimes walking to one side of the trough and sometimes to the other. It has frequently been noticed that the condition is accompanied by discharge from the nostrils and eyes.

In advanced cases there are very apparent disorders of equilibrium, the gait becoming unsteady and somewhat inco-ordinated, and the animals may fall into the feed trough and be unable to get out again.

Affected pigs are usually found to be "poor doers" showing a scurfy condition of the skin, lack of lustre of the hair, and poor condition. The appetite is capricious. In some cases examination of the affected ear reveals a considerable amount of yellowish brown or brown sticky discharge adhering to the inner surface of the ear.

Cause and Lesions.

Examination of several pigs showing such symptoms has revealed the presence of a suppurative condition affecting the middle ear, and this may be the only demonstrable pathological change found on post-mortem examination.

The hearing apparatus, it may be mentioned, consists essentially of three parts:—

(1) The external ear, which is that portion visible externally. Its function is to collect sound waves and transmit them by means of a passage to—

(2) The middle ear: This is separated from the external ear by the tympanic membrane or "ear-drum." The function of the middle ear is to magnify the sound waves collected by the external ear and transmit them to—

(3) The internal ear: This consists of an intricate structure by which the sound impressions are transmitted to the sensory areas of the brain. The internal ear, however, performs another very important function—namely, the maintenance of equilibrium, it being by means of part of this structure that an animal keeps its balance. Disease of these deeper structures of the ear, therefore, frequently leads to an unsteady gait, twisting of the head to one side, or even to inability to stand at all.

Both the middle and internal ears are situated within the petrous-temporal bone of the skull and it is within this bone that the lesions responsible for the condition are found. The petrous-temporal bones are placed immediately behind the articulations of the lower jaws and the skull, but a careful dissection by sawing open the skull along the longitudinal mid-line and removal of the brain is necessary to expose them properly.

In several cases so examined, it has been found that a thick, cheesy material is present in the cavities of the bulbous portion (*bulla ossea*) of the middle ear on that side to which the head has been depressed during life. Normally, these cavities in the bone have a honeycombed appearance, consisting as they do of small, empty spaces separated by thin plates of bone.

The accumulated pus in the middle ear tends to burst through the ear drum and discharge externally, giving rise to the sticky discharge which may, in advanced cases, be seen on examination of the passage in the external ear.

Examination of the pus shows the presence of bacteria, such as are commonly met with in other suppurative conditions in the pig. It is probable that in these cases they gain entrance to the deeper structures of the ear by way of a narrower passage (called the Eustachian tube) which leads from the back of the throat to the middle ear, and from the comparative frequence of nasal catarrh in young pigs, it is probable that this ear disease is an extension of this inflammatory process affecting the lining membrane of the nasal passages.

Prevention and Treatment.

Once the condition is established, it is unlikely that any treatment will be of use. Syringing of the outer ear will remove the obvious discharge, but will not penetrate into the deeper structures from which the pus arises. While the discharge cannot be definitely prevented, all possible means, such as proper attention to cleanliness and housing, should be undertaken in order that chills may be avoided. Diet should also be attended to, as it is found that this also plays a not unimportant part in the causation of those diseases, such as catarrh (snuffles) and pneumonia with which the condition is frequently associated.

More Efficient Feeding Necessary.

As will be noted from the remarks of the authorities referred to above, both in regard to the condition, paralysis of the hindquarters, and to that more recently described by Doctors Seddons and Carne, it is apparent that any form of treatment must be preceded by a general clean-up of all the piggery buildings, yards, paddocks, &c., careful attention to breeding, and to the selection of reliable, healthy strains of pigs with which to stock up farm piggeries, to a more efficient system of feeding pigs, and to the use of mineral matters in the food given to pigs of all ages. It will be noted that special emphasis has been given throughout to the consistent use of liberal supplies of green food, lucerne, rape and barley, corn, pumpkins and melons, sweet potatoes and other root crops, grasses, and to any other green foods available on the farm.

Mineral Mixtures.

The preparation and use of mineral mixtures is especially worth attention, for they will be found of great value in all seasons whether the supply of green food is available or not. In this connection the following recipes are suggested as being suited for use on all pig farms; the ingredients are reasonable in price, and are not difficult to obtain, and it should not be difficult for any farmer to arrange for a supply of these very necessary additions to the pigs' diet.

Mix together—Charcoal, 20 lb.; hardwood ashes, 20 lb.; coarse salt, 8 lb.; air-slaked lime, 4 lb.; flour of sulphur, 4 lb.; powdered copperas (sulphate of iron), 2 lb.

Prepare as follows:—First mix the lime, salt, and sulphur thoroughly, then add the charcoal and ashes. Dissolve the copperas in two pints of hot water and sprinkle over the whole mass, mixing thoroughly.

Keep some of this mixture before the pigs at all times in a strong box securely fastened in a weather-proof corner of the sty. Provide ample clean cold water at all times.

Lime water should be added to the morning feed, using half a pint to each two gallons of food. It will also pay to add a few ounces of sterilised bone meal to the food of the growing pig. This meal can be ordered specially for this purpose from any of the leading dealers in artificial fertilisers or from firms like Messrs. Thos. Borthwick and Sons (Australasia) Ltd., Wharf street, Brisbane, who also manufacture meat meal—a protein supplement of much value, and Bonolik, a mineral mixture. It may seem that these condiments are expensive and unnecessary, but in actual practice they will give a handsome return on the outlay, though it might be difficult to demonstrate this in actual pounds, shillings, and pence.

The provision of these mineral mixtures will satisfy the pig's desire for mineral substances and will prove of added value as a tonic and appetiser. Salt licks, Vita licks, &c., also are now available on the market, and are becoming increasingly popular each year.

Minerals are just as important in the growth and development of the pigs as are proteins, carbohydrates, fats, vitamines, ash, water, and other nutrients, and more attention should be given to their provision, because, as a rule, insufficient quantities are present in the ration.

All pig rations, of course, contain some minerals, but there are practically no pig rations, unless specially prepared, that contain an adequate quantity to meet the requirements of the pig's body. Pigs need minerals for the building up of bone, for making muscle, for cell division, and for carrying on of innumerable physiological functions.

Without minerals, growth and development will be restricted, and the pigs will be less profitable. Many pigs suffer because they receive inadequate quantities of minerals, but no pigs suffer because too large quantities are given to them. Consequently, we should see that our growing pigs have access at all times to a good mineral ration balancer.

Corn Cob Charcoal.

A good use for the corn cobs (cores) that have always been allowed to accumulate on most farms and around piggeries is to make charcoal of them. The cores in themselves do not make a good feed for pigs because of their high and coarse fibre content, and even if the whole cob (corn and core as well) is ground, it has yet to be proved that there is an added value in them. The core is practically indigestible fibre that only burdens the pig's digestive organisation and causes indigestion.

After the pigs have taken all the corn from the cob, however, the waste cores can be raked together into a pile and burned to the point when it is all a live mass of coals. Water should then be sprinkled over the pile to put the fire out, and the partially charred cores gathered up for the pigs. If there are any other "chips" available, or any old corn husks, these should also be gathered and burned, and added to the charcoal made from the cores.

Some of the farmers in the "Rivers" district of New South Wales have for years followed this practice, and in these days when suction gas plants are in use to such an extent, quite a large trade has sprung up for the charcoal burner. In this case large pits are dug in the ground and suitable lengths of logs are pulled into these; they are then fired, and after a time are covered with earth. In a few days' time a good class of charcoal results. These farmers have been making good money, and, at the same time, clearing their holdings.

It pays also to burn all old bones, waste timber, &c., and thus convert these into a form of charcoal.

Provide More Water.

The water supply should have special attention, for certain it is that many pigs do not have a sufficient supply of clean drinking water, and, as a general rule, pigs from a few days old upwards will be found to appreciate liberal supplies; it is surprising how much water a pig a month old will drink if he has the opportunity of securing a supply.

Careful Handling in Transit.

Many pigs are handled so roughly in transit to market that they arrive at the markets, factories, &c., down in the back or otherwise disabled.

The writer has seen hundreds of cases like this in which the animals have been unable to walk from the railway trucks. The industry suffers heavy losses each year as a result. It should be the duty of every farmer to see that not only his own, but that all other animals in transit to market are handled carefully, and that no undue haste is made in rushing the animals into the trucks or other means of conveyance.

The Condition of the Breeding Sow.

Reference has been made above to the fact that frequently breeding sows suffer from paralysis of the hindquarters as a result of loss of vitality and condition from suckling a large litter of active, vigorous pigs. In this regard it is necesary that the breeder should know the correct condition in which to maintain his breeding sows.

Figures shown represent sows that are too low in condition to farrow and rear their litters successfully. These sows would, in all probability, suffer severely as a result, and their progeny could not be regarded as having the same chance as the progeny of the sows illustrated which represents the normal condition of breeding sows, the condition in which a sow should be maintained for best results; sows that are too fat are likely to have trouble at farrowing time, and their progeny will frequently prove to be weak, puny, and unable to battle for themselves.

The importance of diet and the necessity for careful attention to all details of management are strikingly illustrated in the plate from Henry and Morrison's latest book on "Feeds and Feeding."

Overfeeding Young Pigs on Corn—A Cause of Paralysis of the Hindquarters.

The importance of properly balanced rations cannot be too strongly stressed. Many bacon pigs suffer from paralysis of the hindquarters as a result of being overfed on a ration consisting almost exclusively of corn and water or even of corn and milk; in fact, many authorities condemn the use of corn as a food for young pigs, but the writer's experience demonstrates that, provided corn is fed in comparatively small quantities during the early stages and is well balanced up with liberal supplies of milk, green stuff, &c., that it can be fed to very considerable advantage to all classes of pigs. In these days there is no demand for heavy fat bacon, hence there is no profit in over-feeding pigs on expensive grains, though some grain is necessary, especially in the case of young growing pigs.

Departmental Suggestions.

Paralysis in pigs is brought about by several causes in addition to the other causes referred to above—viz., deficiency of vitamines, &c. In these cases the following lines of treatment are suggested:—

Treatment.

If due to rheumatism, see that the pigs are housed at night in a dry place, and allowed to sleep on wood flooring instead of on concrete or earth. Give daily salicylate of soda 15 to 30 grains, and bicarbonate of potash 1 to 2 drachms, in the food or as a drench.

If due to worms give, in the food or as a drench, 1 teaspoonful of oil of turpentine, 20 drops of perchloride of iron, and 3 or 4 oz. of raw linseed oil. This is sufficient for 50 lb. body weight.

It should be given after the animal has been fasting for some hours, and can be repeated several times, with an interval of three or four days. When due to feeding, as mentioned above, stop the corn and give once daily in a mixed diet or in milk 1 dessertspoonful of the following powder for every 100 lb. body weight (after it has been well mixed and powdered):—Sulphur 2 oz., sodium bicarbonate 4 oz., sodium sulphate 2 oz., black antimony 2 oz., sulphate of iron 1 oz., wood charcoal 2 oz.

A useful mineral mixture well worth trial also is made up as follows:—Add 1 dessertspoonful of the following mixture to the food of each pig daily:—Sulphate of iron, 1 part; sulphur, 2 parts; sterilised bone meal, 10 parts. Very young pigs should receive about half these doses. The following excerpt is also of interest in studying this peculiar disease—paralysis of the hindquarters.

Causes.

When asked why pigs go down behind and suffer from a form of paralysis, Dr. K. W. Stouder, an Extension Service Specialist at the Iowa State College, U.S.A., said—

Weakness of the legs and back to such an extent that the animal is unable to stand is commonly seen among pigs. It is seen more often in recent years, perhaps, than it was some years ago.

We must not assume that it is all caused by the same thing, nor that all cases are exactly alike. In fact, they can easily be divided into at least two groups, the old sow that goes down and the growing store pig. Most sows go down after suckling a vigorous litter of pigs, and such cases are usually due to a lack of enough minerals, proteins, and vitamines in the rations to support the litter she raises and to provide for her own body-maintenance needs as well.

Many of these cases recover as the experienced feeder knows, if the patient is put on a ration of whole cow's milk every day, as it supplies the deficiencies, but it is more important to remember that this type of going down behind would not have occurred had the food ration been well balanced during the gestation period and while she was suckling her litter.

Young pigs may also go down because of the unbalanced rations, particularly it seems if the ration is low in mineral content and of the vitamines so essential to good health. It may also result from generations of breeding and selection, together with forced feeding for early maturity, rapid gains and excessive fat production, disregarding constitution, good bony framework and vigour. Cases of this kind are common, we believe, and they strongly indicate why these animals and their close relatives should be discarded as breeding animals to perpetuate the herd, for in such cases predisposition has much to do with its occurrence. Its occurrence one generation after another in certain families can thus be accounted for in part at least.

Some animals that go down show deficiency of bone; some show degeneration of nerves that control the muscles of the back and legs; others are found to suffer disease of the bony surfaces that come together at a joint, particularly where the thigh bone attaches to the body. These lastnamed cases of diseased joints may be the result of navel infection during the first few days after birth and could have been avoided had the pig been farrowed in a very clean place and kept under the cleanest surroundings, together with iodine or other antiseptic treatment of the navel until it dried up.

Difficulty of Diagnosis.

The treatment of these cases gives variable results, perhaps depending first upon the difficulty of diagnosing with certainty the exact trouble in each case presented for treatment. Some cases improve on a mineral mixture, especially if given calcium phosphate, and others do better on spoonful doses each day of cod liver oil because the latter is rich in vitamines.

It is suggested that breeding animals and growing animals be given well balanced rations, so far as providing plenty of protein is concerned in relation to the fattening foods; that minerals be kept available and a mixture of equal parts of air-slacked lime, salt, and bone meal by weight serves as good as any.

Preventive Measures.

When young pigs are born, apply tincture of iodine to the navel daily until it is dry. Don't keep even the relatives of the pigs that show this trouble for breeding purposes. When it occurs, give whole milk, cod liver oil, calcium phosphate, and carrots, if you have them available, in addition to a well-balanced ration, and some cases will recover, but there are those that never get up though appetite and general health otherwise seem good.

There are cases, of course, in which the ailment is due to accident. The treatment for these cases must be on common-sense lines, and must aim at keeping the animal in good heart and in otherwise healthy condition. There are other cases in which intestinal worms, and possibly kidney worms, are the direct or the indirect causes; these cases must receive a course of treatment that will tend to clear them of the parasites and put them in a condition to battle against future infestation.

Another American authority has this to say on the subject:—

"Professor L. A. Weaver, Swine Specialist of the Missouri (U.S.A.) Agricultural College, states that the two minerals most frequently lacking in the food for pigs are calcium and phosphorus. Experiments have shown that pigs are able to use these minerals when supplied either in an organic or inorganic form. In other words, ground limestone, which is calcium or lime phosphate, serves as well as a source of phosphorous as does wheat bran, where the phosphorus is in an organic form. Calcium may be satisfactorily furnished in almost any form, such as lime, ground limestone, or bone meal."

Included among suggested remedies by other authorities as well as by our own experience in handling animals in a paralysed condition are as follows:—

Where animals have the benefit of a grazing area, it would be an advantage, if possible, to subdivide this, allowing them to use only one portion at a time, the other portion resting and sweetening up meantime. Where the ground is at all swampy or low lying, some endeavour should be made to drain the area. It is on these low lying, swampy areas where infection from kidney worms or from intestinal worms would be suggested—hence the advisability of changing the pigs from one pasture to another frequently. Pigs infested with kidney worms, however, seldom recover normal condition, though they may appear perfectly healthy and have good appetites. There is, unfortunately, no external indication of the infestation unless paralysis be accepted as a definite symptom.

Results of Experiments.

A series of experiments carried out at one of the Agricultural Colleges in England demonstrated that pigs fed on an exclusive corn diet have a weaker bone than those having a better balanced ration. If, therefore, animals are receiving corn alone, other foods, especially skimmed milk and green foods (with minerals), should be added to make up the deficiency.

Within the last year or two, a very extensive investigation overseas regarding this disease, has demonstrated among other things that pigs affected with paralysis of the limbs have a broken down condition of the nerves that supply the muscles of the hind limbs with innervation. While it is possible that this is not always the case, still it was found in a large percentage of the patients examined, and as degenerated or broken down nerves cannot be restored to their full function, we are forced to come to the conclusion that paralysis of the hind parts of the pig is, in many cases, incurable. The cause of this breaking down of the nerves is not known, and, therefore, intelligent curative treatment cannot be recommended. Preventive treatment is always somewhat vague, but it is always well to separate the diseased from the healthy pigs, to disinfect all pens by spraying them or by the application by hand of limewash, and by avoiding the use of affected pigs or pigs closely related to them for breeding purposes, as there is some danger that there may be a hereditary predisposition to the disease.

In cases due to accident or injuries, common-sense methods must, of course, be employed in treatment. Meanwhile, the animal requires careful housing and a course of medicinal treatment to keep the bowels and bladder free. The food should be of a soft, nourishing nature. Allow water and green food also.

The use of cod liver oil appears to have the general recommendation of a number of investigators handling paralysed pigs. This oil given at the rate of one teaspoonful per pig (from 6 months old upwards) daily mixed in the food is suggested.

Another remedy recently suggested in dealing with the disease, as one due to a deficiency of mineral matters and to a lack of vitamines, indicates that something needed for nutrition is absent in the foods in use for the affected pigs. The Colorado Agricultural College authorities in answering an inquiry on these lines recently give this advice—"That as the foods being fed to the animals under review had on analyses shown a deficiency of minerals, and were particularly deficient in vitamine B., it was recommended to try feeding the pigs on a ration consisting of plenty of milk and carrots, using new milk for a start and skimmed milk later. Results under experimental work with this ration in case of pig paralysis have been remarkable.

An Incurable Form.

Paralysis resulting from tuberculous bones is incurable, and as the carcases would not be fit for human consumption the sooner they are destroyed the better. It is, of course, possible to test pigs with the tuberculin test, though this is not a very satisfactory business with pigs for the reason that it must be carried out by a competent veterinarian and the expense incurred would hardly be justified except in the case of very valuable stud pigs.

If there is any conclusive evidence that the animal is tubercular, he had better be destroyed immediately and be burned to ashes on the spot on which he is killed.

In addition to paralysis resulting from tuberculous bones, any abnormal condition affecting the spinal cord, such as abscesses, tumours, parasites, or even diseased and softened bones may be a primary cause for the trouble. Paralysis immediately following farrowing is, in our experience, not common, but it may result from a weakened condition of the animal and in cases of this description the preventive measures indicated should be adopted, as also in cases attributed to lumbago and rheumatism.

Early Signs of the Trouble.

As a rule, paralysis comes on gradually, being indicated in the first instance by a wobbly, uncertain gait, the animal failing to control its movements, particularly if hurried or if the animal is turning around. Walking gradually becomes more difficult as the weakening of the nerves and muscles of the hindquarters progresses, but in almost every instance the appetite and general health of the animal is not affected, hence any abnormal change in the appetite or any other indication of sickness must be looked to as premonitory of other and perhaps more serious troubles. Constipation must be relieved by repeated doses of Epsom salts or castor or linseed oils. Massaging of the affected muscles and the application of liniments as referred to above are suggested.

Finally it is suggested that in every instance where the trouble appears in more than one animal, or where it apppears that ordinary care and attention is ineffective in bringing about the desired result, the services of a qualified veterinary surgeon should be requisitioned to take complete charge of the case.

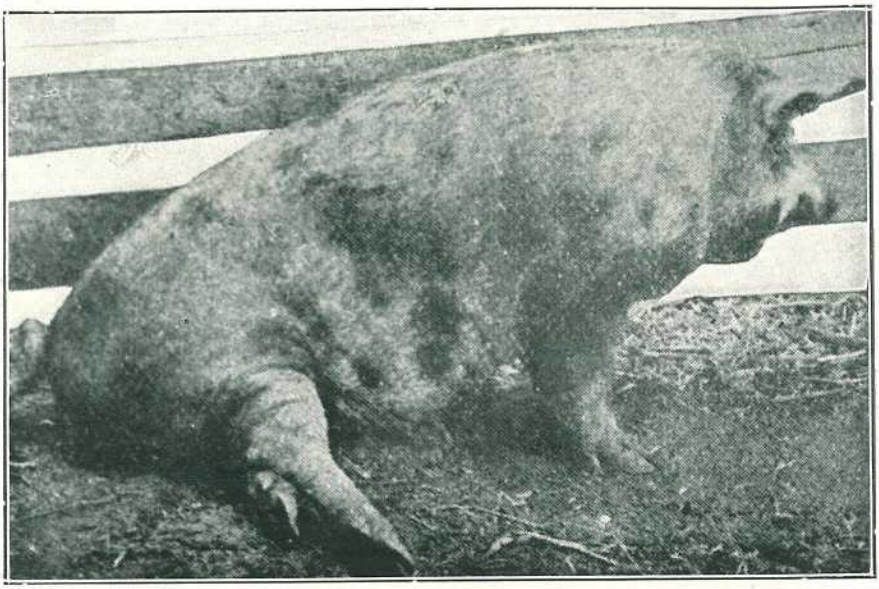

PLATE 171 (Fig. 1).

A typical case of Paralysis of the Hindquarters. It will be noted that although paralysed in the hindquarters to the extent that she cannot raise her hind legs or use them in any other way the animal has not lost condition. Strangely enough, the appetite is not usually affected provided the animal is otherwise normal.

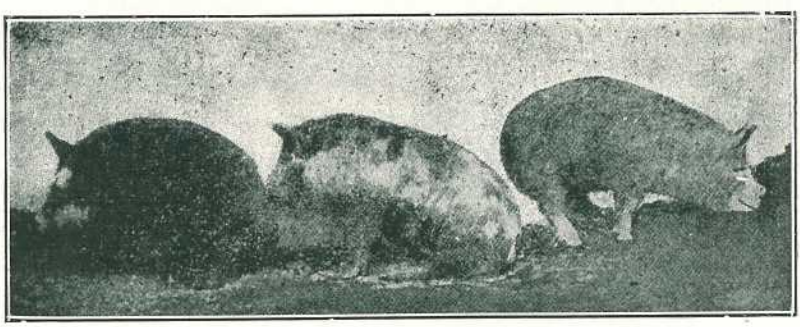

PLATE 172 (Fig. 2).

These pigs are suffering from a very severe attack of paralysis of the hindquarters. The pig on the right is still able to move about but with great difficulty and a very uncertain gait, but as is the case with the other two is quite unable to control its movements. The photograph is of pigs fed on a ration containing a very low mineral content. Stiffness and partial loss of control followed after about six weeks' feeding. In the same experiment a second lot fed the same ration plus five times as much calcium phosphate as lot No. 1 had gained 89 per cent. more weight and were not affected with paralysis. Both lots were afterwards slaughtered. The skeletons of the pigs illustrated in Fig. 2 weighed 1,193 grams. That of the pigs fed in separate pen and which were given sufficient calcium phosphate weighed 2,371 grams, or 100 per cent. more.

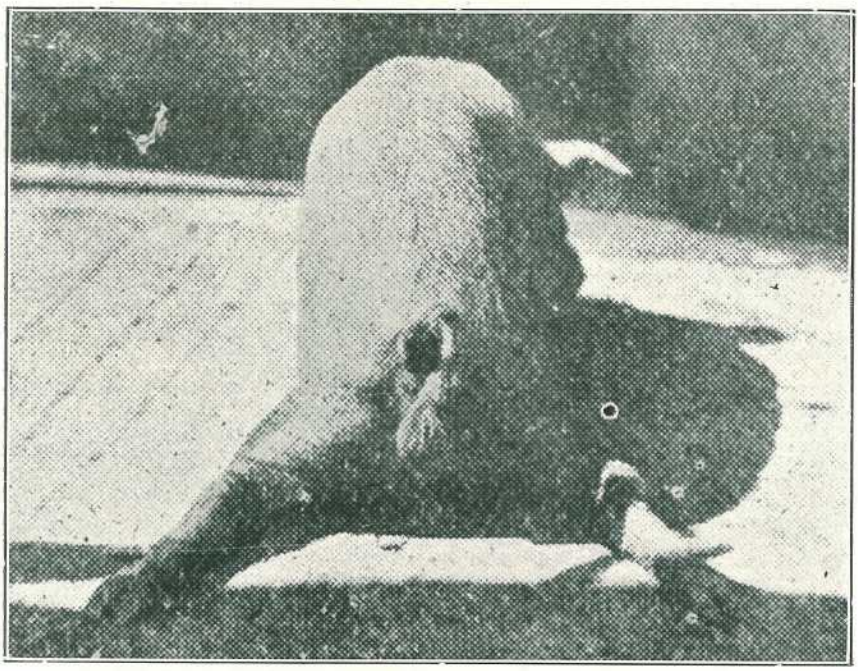

PLATE 173 (Fig. 3).

Symptoms of posterior paralysis (breaking down in the back).

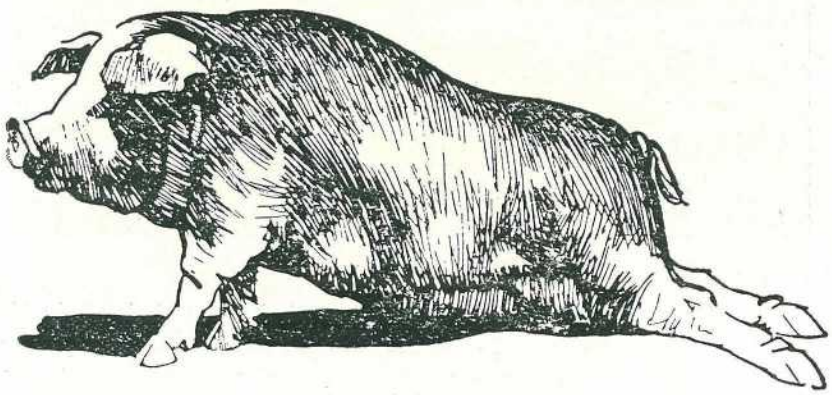

PLATE 174 (Fig. 4).

Illustrating a pig that has been injured in transit and unable to travel. Many pigs arrive at our bacon factories and saleyards in such a condition, resulting in their market value being reduced probably 75 per cent. This emphasises the necessity of giving careful attention to the animals in every stage, particularly in transit.

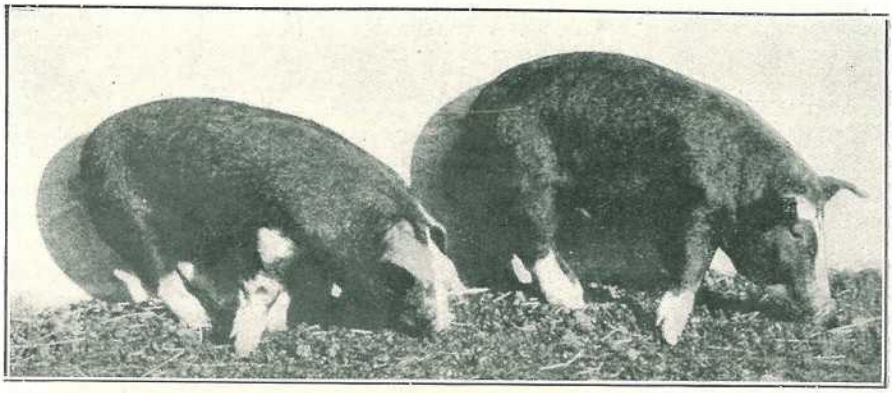

PLATE 175 (Fig. 5).—PIGS SUFFERING FROM SEVERE CASES OF RICKETS.

These pigs received a ration of white corn and skim milk, without pasture. Note the paralysed condition. The pig on the left died within a week after the photograph was taken, while the one on the right gradually recovered when cod liver oil was added to the ration.

(From Henry and Morrison's "Feeds and Feeding.")

These pigs are suffering from an advanced form of the disease Rickets, a similar condition to that referred to as paralysis of the hindquarters. The reference to this illustration emphasises the necessity of careful feeding and the provision of a liberal supply of mineral matters and vitamines in the food.

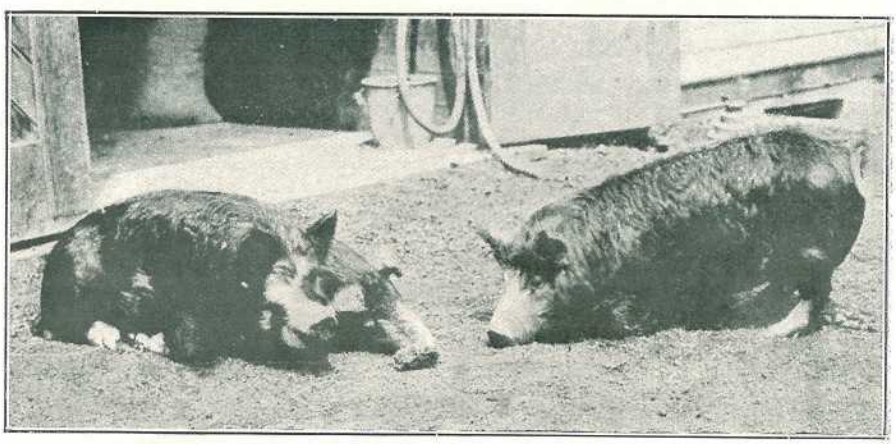

PLATE 176 (Fig. 6).

These pigs were raised at the Wisconsin Station (U.S.A.) on grain and grain by-products, without pasture or any other food. They became stunted, and finally developed the severe paralysis depicted. The proteins in such a ration are unbalanced in composition; there is a deficiency of mineral matter, especially calcium; and there may be a lack of vitamines. (From Hart, Wisconsin Station, in Henry and Morrison's "Feeds and Feeding.")

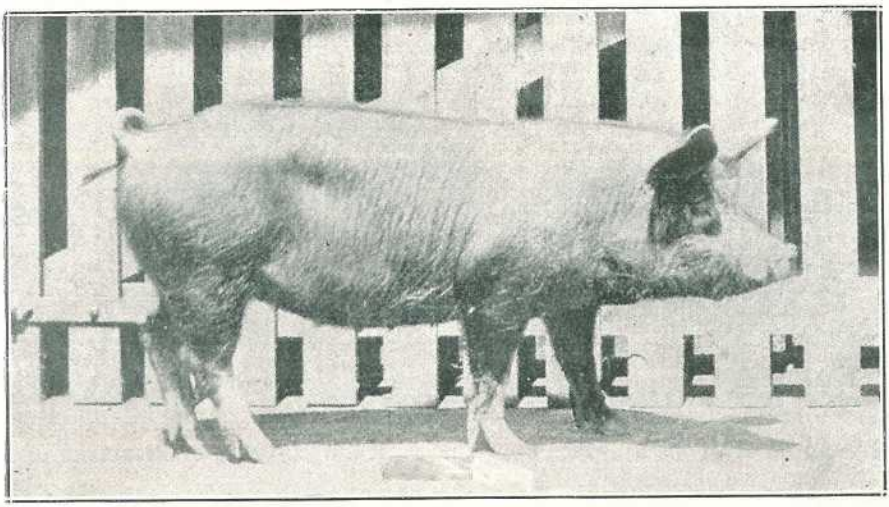

PLATE 177 (Fig. 7).

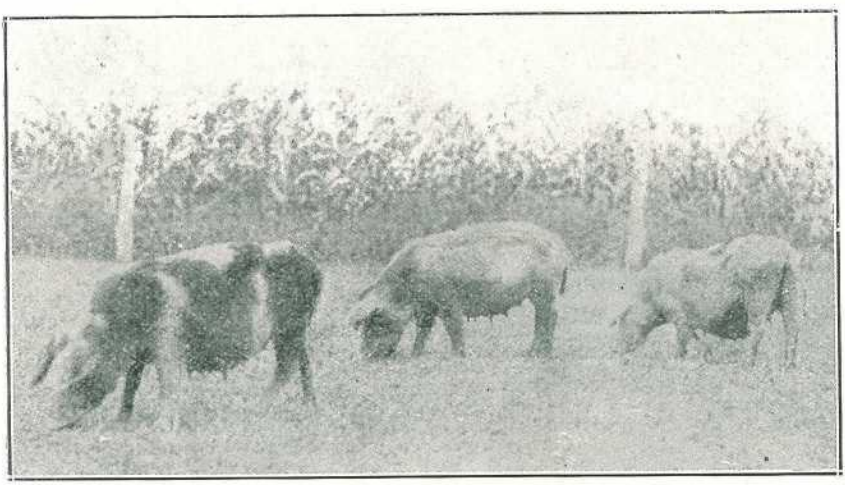

PLATE 178 (Fig. 8).

Figs. 7 and 8 are of farm sows of uncertain breeding too low in condition to prove satisfactory. The young sow in Fig. 7 is too low in condition to mate to the best advantage, while the sows shown in Fig. 8 are too low in condition to rear their young satisfactorily. Sows in such a condition frequently suffer for many months after farrowing, and even if they do not develop paralysis their progeny are more liable to disease and to abnormal troubles than the progeny of sows in medium breeding condition. Sows of the types illustrated should not be retained as breeders, as their breeding is doubtful and there are plenty of better type sows available at prices compartively low.

Fig. 9 is of a Poland-China sow too fat to prove satisfactory as a breeder. She is carrying far too much condition and would be liable to suffer from troubles such as heat apoplexy as well as paralysis. This photograph was taken a few days after this sow arrived from America some years ago. Her condition was in part due to the generosity of the passengers on the same steamer who were anxious that the pigs should arrive in the very best of condition. The sow proved a failure as a breeder largely as a result of this overfattening.

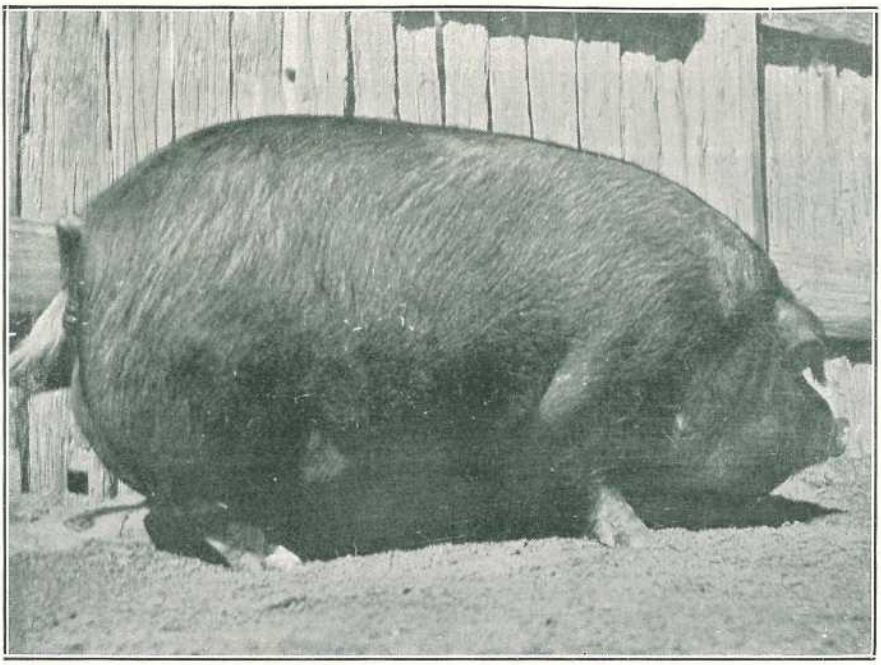

PLATE 179 (Fig. 9).

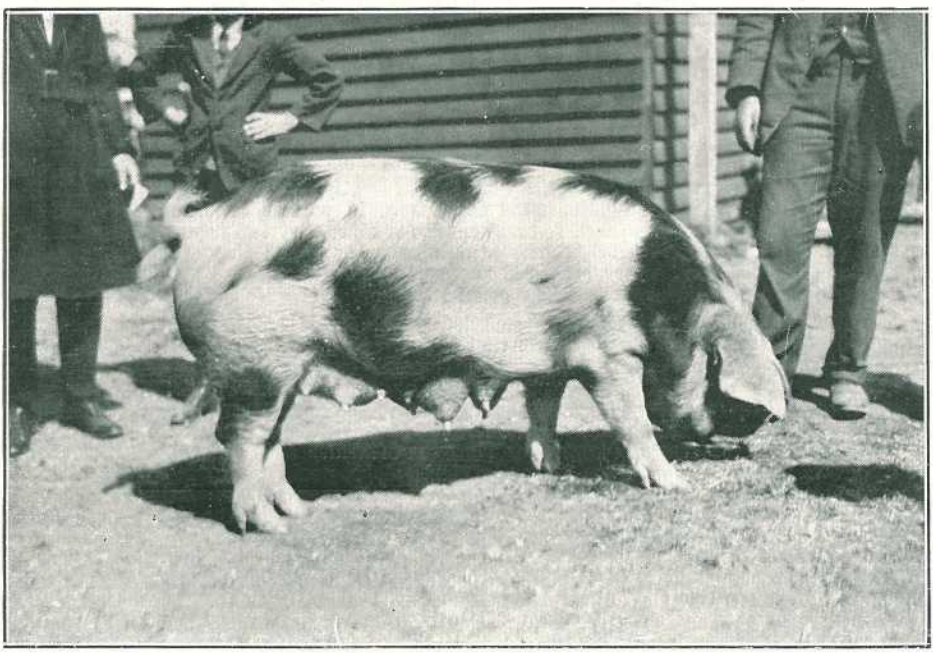

PLATE 180 (Fig. 10).

Fig. 10 is a prize-winning Gloucester Old Spot sow. This sow was rearing a large litter of active, vigorous pigs approaching weaning age. She is in ideal condition for a sow at this stage, for it is not to be expected that a sow will hold her condition whilst suckling. This emphasises the necessity of having the sow in proper condition prior to farrowing time in order that she may be able to do justice to her pigs.

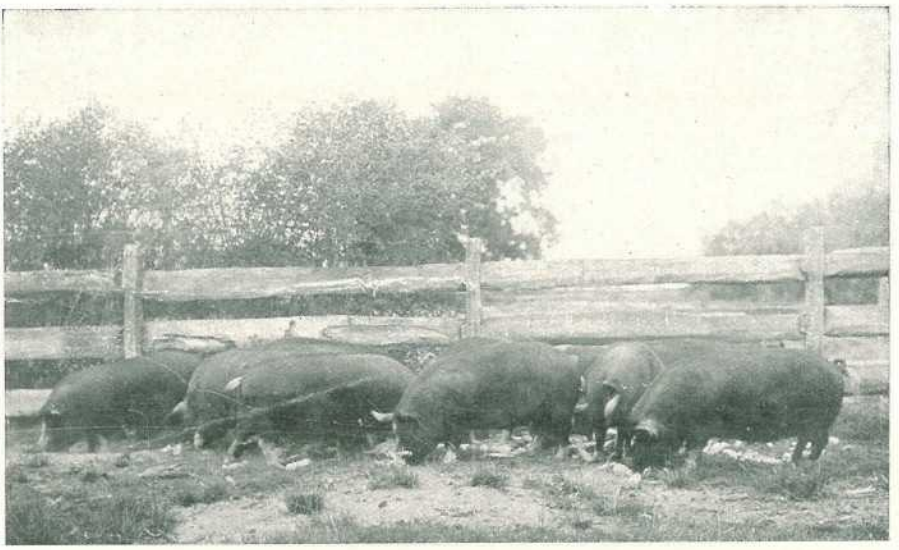

PLATE 181 (Fig. 11).—A GROUP OF SELECTED BERKSHIRE BROOD SOWS.
Sows of this description always realise good values in normal seasons, and are worth special care.

Fig. 11.—Berkshire sows in medium breeding condition, the condition conducive to satisfactory results. This is the ideal condition for in-pig sows, for they will farrow with little or no trouble and be able to rear their litters satisfactorily and without risk of going down in the hindquarters or suffering from other diseases.

TICK PARALYSIS IN PIGS.

A correspondent informed us recently that he had a well-grown, three-months-old sow that had become suddenly very ill; she went off feed and lay down. On rolling her over, the owner found a whitish coloured tick (known as a dog tick), and he sought information as to suitable treatment for an animal so affected.

Another correspondent advised: "I have recently purchased three first-class Middle York sows, three months old. They were in perfect condition when they arrived here, and have been well fed and cared for since, but two days ago I noticed that two of them were suffering from some ailment or other; they would not come up for their food, were very stiff and 'dopey,' and appeared to be getting worse. I am at a loss to know what is wrong or what to do . . ."

The following information was supplied:—The fact that the ailment suddenly manifested itself in the pigs suggests that it may be attributable either to bush-tick poisoning or to severe constipation. The common bush-tick fastens itself on the animal, usually about the head, ears, neck, or under the foreleg, and the poisonous effect of its bite causes a temporary paralysis of the hindquarters (particularly) and frequently severe constipation. These ticks (*Ixode holocylus*) are comparatively common along the coastal districts of New South Wales and Queensland, and one species is found inland. They generally attack dogs, poultry, and pigs; but other animals are not by any means immune, nor even are human beings. After attaching itself to the animal the tick forces its feeding apparatus through the skin (it usually selects a thin-skinned portion of the body for its temporary abode) and commences to suck blood from the affected part. The tick gradually fills up, increases to two or three times its normal size, and at the same time apparently injects a certain amount of poison into the animal, the result being that the animal goes off its food, is disinclined to move from its bed, and when disturbed appears stiff, sickly, and paralysed, particularly in the hindquarters (later the forequarters may also be affected), breathing becomes laboured, and there may be a discharge from the nostrils; bowels are inactive and severe constipation follows; kidneys and bladder become inflamed and congested, and the urine is scanty and high coloured. If not attended to the animal gradually becomes worse, loses condition, and death occasionally results.

Careful search should be made for the ticks, and if found they should be cut off close to the skin with a sharp pair of scissors, or, better still, with a sharp razor. Do not attempt to pull the tick away. After cutting the tick off, rub the affected spot with antiseptic ointment, kerosene, or Stockholm tar.

Remove the pigs to a pen where they can be attended to regularly. Give each pig two tablespoonsful of castor oil in a half-cupful of warm milk as a drench immediately. About three hours after give each pig a mixture of one dessertspoonful of aromatic spirits of ammonia and ten drops of nux vomica (the chemist will make this up for you) in a small cupful of warm milk.

Compel the animals to take exercise; provide dry and warm, clean sleeping quarters, and treat the patients kindly for a few days. Give soft nourishing foods—milk, pollard, a bran mash, and similar foods.

Another remedy that has proved successful is as follows:—Give castor oil or olive oil as already advised, and an hour later give six drops of tincture of aconite each in a small quantity of warm water. Three hours later, if the patients have not recovered, give three drops of the same drug and repeat until four doses have been given; do not give more than four doses. Follow the instructions with regard to feeding and housing.

PRECAUTIONS AGAINST SWINE FEVER.

The most potent factor in the spread of swine fever among pigs is undoubtedly the infected pig, which may even pass on the disease to others several days before symptoms are exhibited, says Major C. G. Saunders, in an interesting article in the current issue of the "Pig Breeders' Annual." It must also be remembered that this infectiousness remains during the whole course of this disease. The virus of the disease is also spread through the medium of urine, fœces, eye and nasal discharges; and the floors, bedding, and manure in the pens or sties where infected pigs are housed become saturated with the virus which may be carried from one farm to another, or to different parts of the same farm on the feet of men and animals, or on the wheels of vehicles, and probably by birds. Stock attendants may also, by medium of their hands and any instruments or tools they may use, be the means of spreading the disease far and wide. The chief danger is, however, the infected pig, and attention is specially drawn to the fact that unthrifty pigs may have swine fever without showing any definite symptoms of the disease, and may be moved from one farm to another under the impression that they many only be suffering from some non-contagious disease. Another danger is the pig that has apparently recovered from the disease but is, in reality, suffering from it in a very chronic form, as such pigs may be infective to others for eighty days or longer. Carcases of pigs which have died from swine fever may retain the virus for months, and even cured meats are not always safe in this respect. Hence the necessity of boiling all offal and garbage before feeding to pigs.

The following precautions will reduce the danger of an outbreak of swine fever:—

(1) Quarantine all newly purchased stock and all pigs returned from show or market for three weeks in a remote section of the farm, and admit to the main herd only after careful scrutiny has revealed nothing suspicious.
(2) Locate pig yards and sties away from streams, highways, and keep strangers away from them, and especially pig dealers and persons who have unthrifty pigs upon their premises.
(3) Buy only from herds that are known to be healthy.
(4) Do not visit a farm where there are sick or unthrifty pigs.
(5) Cook all swill and offal before feeding, and make the man that has handled the raw material disinfect himself immediately after.
(6) After an outbreak of swine fever see that all carcasses are burned or buried deeply with quicklime.

It is well to remark here that in Australia stock regulations compel pig breeders to immediately report to the nearest stock inspector, police officer, or other Government official any suspected outbreak or serious trouble amongst pigs, and to carry out the instructions issued by these officers so that there will be no possible chance of disease spreading from herd to herd. Heavy penalties are imposed upon those who neglect or fail to carry out instructions issued under the Acts controlling these diseases, and the premises concerned may be quarantined for whatever period is deemed necessary. There is everything to gain and nothing to lose by reporting the matter immediately it is suspected there is anything seriously wrong with the pigs. The Departments of Agriculture in the various States will supply all information relative to these matters upon application free of cost. In any case it would be very unwise to introduce other pigs into such premises that were suspected of being infected until the matter was cleared up and only healthy stock remained on the property, and all buildings and stys, yards, paddocks thoroughly cleansed and freed of infection.—E. J. Shelton, H.D.A., Senior Instructor in Pig Raising, and approved by the Chief Inspector of Stock, Major A. H. Cory, M.R.C.V.S.

GESTATION CHART FOR BREEDING SOWS.

Jan.	Date of Farrowing.	Feb.	Date of Farrowing.	March.	Date of Farrowing.	April.	Date of Farrowing.	May.	Date of Farrowing.	June.	Date of Farrowing.	July.	Date of Farrowing	Aug.	Date of Farrowing.	Sept.	Date of Farrowing.	Oct.	Date of Farrowing.	Nov.	Date of Farrowing.	Dec.	Date of Farrowing.
1	22 April	1	23 May	1	20 June	1	21 July	1	20 Aug.	1	20 Sept.	1	20 Oct.	1	20 Nov.	1	21 Dec.	1	20 Jan.	1	20 Feb.	1	22 Mar.
2	23 ,,	2	24 ,,	2	21 ,,	2	22 ,,	2	21 ,,	2	21 ,,	2	21 ,,	2	21 ,,	2	22 ,,	2	21 ,,	2	21 ,,	2	23 ,,
3	24 ,,	3	25 ,,	3	22 ,,	3	23 ,,	3	22 ,,	3	22 ,,	3	22 ,,	3	22 ,,	3	23 ,,	3	22 ,,	3	22 ,,	3	24 ,,
4	25 ,,	4	26 ,,	4	23 ,,	4	24 ,,	4	23 ,,	4	23 ,,	4	23 ,,	4	23 ,,	4	24 ,,	4	23 ,,	4	23 ,,	4	25 ,,
5	26 ,,	5	27 ,,	5	24 ,,	5	25 ,,	5	24 ,,	5	24 ,,	5	24 ,,	5	24 ,,	5	25 ,,	5	24 ,,	5	24 ,,	5	26 ,,
6	27 ,,	6	28 ,,	6	25 ,,	6	26 ,,	6	25 ,,	6	25 ,,	6	25 ,,	6	25 ,,	6	26 ,,	6	25 ,,	6	25 ,,	6	27 ,,
7	28 ,,	7	29 ,,	7	26 ,,	7	27 ,,	7	26 ,,	7	26 ,,	7	26 ,,	7	26 ,,	7	27 ,,	7	26 ,,	7	26 ,,	7	28 ,,
8	29 ,,	8	30 ,,	8	27 ,,	8	28 ,,	8	27 ,,	8	27 ,,	8	27 ,,	8	27 ,,	8	28 ,,	8	27 ,,	8	27 ,,	8	29 ,,
9	30 ,,	9	31 ,,	9	28 ,,	9	29 ,,	9	28 ,,	9	28 ,,	9	28 ,,	9	28 ,,	9	29 ,,	9	28 ,,	9	28 ,,	9	30 ,,
10	1 May	10	1 June	10	29 ,,	10	30 ,,	10	29 ,,	10	29 ,,	10	29 ,,	10	29 ,,	10	30 ,,	10	29 ,,	10	1 Mar.	10	31 ,,
11	2 ,,	11	2 ,,	11	30 ,,	11	31 ,,	11	30 ,,	11	30 ,,	11	30 ,,	11	30 ,,	11	31 ,,	11	30 ,,	11	2 ,,	11	1 April
12	3 ,,	12	3 ,,	12	1 July	12	1 Aug.	12	31 ,,	12	1 Oct.	12	31 ,,	12	1 Dec.	12	1 Jan.	12	31 ,,	12	3 ,,	12	2 ,,
13	4 ,,	13	4 ,,	13	2 ,,	13	2 ,,	13	1 Sept.	13	2 ,,	13	1 Nov.	13	2 ,,	13	2 ,,	13	1 Feb.	13	4 ,,	13	3 ,,
14	5 ,,	14	5 ,,	14	3 ,,	14	3 ,,	14	2 ,,	14	3 ,,	14	2 ,,	14	3 ,,	14	3 ,,	14	2 ,,	14	5 ,,	14	4 ,,
15	6 ,,	15	6 ,,	15	4 ,,	15	4 ,,	15	3 ,,	15	4 ,,	15	3 ,,	15	4 ,,	15	4 ,,	15	3 ,,	15	6 ,,	15	5 ,,
16	7 ,,	16	7 ,,	16	5 ,,	16	5 ,,	16	4 ,,	16	5 ,,	16	4 ,,	16	5 ,,	16	5 ,,	16	4 ,,	16	7 ,,	16	6 ,,
17	8 ,,	17	8 ,,	17	6 ,,	17	6 ,,	17	5 ,,	17	6 ,,	17	5 ,,	17	6 ,,	17	6 ,,	17	5 ,,	17	8 ,,	17	7 ,,
18	9 ,,	18	9 ,,	18	7 ,,	18	7 ,,	18	6 ,,	18	7 ,,	18	6 ,,	18	7 ,,	18	7 ,,	18	6 ,,	18	9 ,,	18	8 ,,
19	10 ,,	19	10 ,,	19	8 ,,	19	8 ,,	19	7 ,,	19	8 ,,	19	7 ,,	19	8 ,,	19	8 ,,	19	7 ,,	19	10 ,,	19	9 ,,
20	11 ,,	20	11 ,,	20	9 ,,	20	9 ,,	20	8 ,,	20	9 ,,	20	8 ,,	20	9 ,,	20	9 ,,	20	8 ,,	20	11 ,,	20	10 ,,
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22	13 ,,	22	13 ,,	22	11 ,,	22	11 ,,	22	10 ,,	22	11 ,,	22	10 ,,	22	11 ,,	22	11 ,,	22	10 ,,	22	13 ,,	22	12 ,,
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24	15 ,,	24	15 ,,	24	13 ,,	24	13 ,,	24	12 ,,	24	13 ,,	24	12 ,,	24	13 ,,	24	13 ,,	24	12 ,,	24	15 ,,	24	14 ,,
25	16 ,,	25	16 ,,	25	14 ,,	25	14 ,,	25	13 ,,	25	14 ,,	25	13 ,,	25	14 ,,	25	14 ,,	25	13 ,,	25	16 ,,	25	15 ,,
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27	18 ,,	27	18 ,,	27	16 ,,	27	16 ,,	27	15 ,,	27	16 ,,	27	15 ,,	27	16 ,,	27	16 ,,	27	15 ,,	27	18 ,,	27	17 ,,
28	19 ,,	28	19 ,,	28	17 ,,	28	17 ,,	28	16 ,,	28	17 ,,	28	16 ,,	28	17 ,,	28	17 ,,	28	16 ,,	28	19 ,,	28	18 ,,
29	20 ,,	—	—	29	18 ,,	29	18 ,,	29	17 ,,	29	18 ,,	29	17 ,,	29	18 ,,	29	18 ,,	29	17 ,,	29	20 ,,	29	19 ,,
30	21 ,,	—	—	30	19 ,,	30	19 ,,	30	18 ,,	30	19 ,,	30	18 ,,	30	19 ,,	30	19 ,,	30	18 ,,	30	21 ,,	30	20 ,,
31	22 ,,	—	—	31	20 ,,	—	—	31	19 ,,	—	—	31	19 ,,	31	20 ,,	—	—	31	19 ,,	31	22 ,,	31	21 ,,

NOTE.—Black figures in above table indicate date of service.

This chart presents in an instructive form figures relating to the gestation period of brood sows. For example, a sow mated to the boar on 1st January is due to farrow on 22nd April; a sow mated on 1st July is due on 20th October. The chart should be preserved for future reference by breeders of all classes of pigs. The normal period of gestation, *i.e.*, the period from the time of conception to the birth of the young pigs, is 112 days, this period is sometimes remembered as roughly three months three weeks three days, or 16 weeks. With very young sows the period is sometimes of shorter duration, and instances are on record where young sows have farrowed at from 100 to 108 days after becoming pregnant; on the other hand, old sows in abnormal condition have been known to carry their young for more than 140 days.—E. J. SHELTON, H.D.A., Senior Instructor in Pig Raising.

DISEASES IN PLANTS.

NEW LEGISLATION.

A Bill to consolidate and amend the law relating to diseases in plants and for other purposes was introduced in the Legislative Assembly by the Minister of Agriculture and Stock, Hon. Harry F. Walker, in the course of the month. Subjoined is an abridged report of Mr. Walker's second-reading speech taken from Hansard.—Ed.

MINISTER'S SECOND READING SPEECH.

The Secretary for Agriculture (Hon. H. F. Walker, *Cooroora*): At the previous stage I gave hon. members a few details regarding the contents of this measure in order that they should have some idea of its provisions. At this stage I can add much to my remarks, and also give some idea of what the alterations consist of with a view to helping them in the passage of the Bill through Committee. The existing Acts were certainly of some use for a considerable time, and have certainly served their purpose; but, as time goes on, amendments must naturally be required to bring the legislation up to date and to deal with the particular industries affected. That is the reason why we have decided to consolidate the Diseases in Plants Acts, 1916-1924 and the Diseases in Plants Act of 1929, to which I referred in Committee, and incorporate them in this Bill. The original Act was passed in 1896, an amendment in 1916, and another amendment in 1924.

A Necessary Measure.

The Bill covers the introduction into Queensland of any tree, plant, or vegetable which is likely to introduce any insect, fungus, or disease, and controls the removal of trees, plants, or vegetables from nurseries, orchards, and gardens within the State. In other words, the Bill seeks to control all plant life in Queensland. It is particularly far-reaching, but is necessary in the light of experiences during recent years, when it has been found most difficult to locate and control the spread of disease by reason of the minute character of the bacteria or aphides concerned, which makes it particularly essential that control should be exercised to cope with these diseases. In recent years scientific investigation has been particularly active in trying to combat these diseases, especially those affecting one of our most important industries—the banana industry, upon which I need not enlarge at the present moment, seeing that another Bill before this Chamber will give hon. members an opportunity of considering that industry.

We are all seized with the importance of production, and of the necessity of preventing the huge economic loss which occurs yearly from disease in crops, &c. That is a loss not only to those engaged in the particular industries but to the State generally. During the last few months—and no doubt the Leader of the Opposition experienced the same position during his term as Secretary for Agriculture—many deputations have approached me drawing attention to the fact that something must be done in the direction I have indicated; and the wide nature of the Bill now under discussion proves conclusively that such a measure has been needed for some considerable time.

This Bill is a consolidation of two other Acts, combined with the experience gained from recent investigations. It also adopts to a certain extent the experience of other States of the Commonwealth, particularly South Australia, proving conclusively that we must go ahead if we are to get into line with the action that is being taken in other States to deal with the ravages of plant diseases.

Mr. W. Forgan Smith: You will find that your Bill is a good deal ahead of similar Acts in other States.

The Secretary for Agriculture: The departmental experts inform me that this Bill incorporates many provisions contained in the legislation of Southern States, more particularly South Australia. It is mainly a Bill that has been initiated and worked up by the experts of the department, because, although I naturally had a little to do with it, the major portion of the Bill is the work of the departmental officers. It may be thought that the Bill is too drastic; but breadth of vision is required when dealing with the conditions of plant life in a State like Queensland, with its enormous area and its climates varying from the comparative cold of the Stanthorpe district to the tropical heat of the North.

PLATE 182.—DENSE PEAR ON A WESTERN ROAD.

Prickly-pear on the Morven-Charleville stock route, showing the density of infestation prior to the operations of the Prickly-pear Commission, which have definitely checked the further encroachment of the pear in Queensland.

PLATE 183.

Pear on a South-Western holding fourteen days after being sprayed.

Wise Exercise of Authority.

Most of those districts grow fruit of some description or other, which is more subject to disease than ordinary plant life. We are asking for great powers under this Bill, but so long as the administration is sympathetic no harm can be done. All Bills, no matter how hard or how soft they may be, can easily be spoiled by unsympathetic administration.

Mr. W. Forgan Smith: It all depends on the wise exercise of authority.

The Secretary for Agriculture: Exactly. This Bill can be spoiled if it is not handled sympathetically. Knowing the menace gathering around us to-day due to the fact that we have not sufficient power under present Acts to deal with many plant problems quickly and effectively, anyone occupying the chair I have the pleasure to occupy to-day must realise his responsibility in respect of the plant life of Queensland.

I venture to say that, if the danger of "bunchy-top" had been realised a few years ago, legislation of this character would have been brought in, and we would never have seen the disease as far North as it is found to be to-day. When I inform hon. members that "bunchy-top" has spread from the Tweed River to a little north of Buderim, it will show them how the disease is spreading; and we hope, with the assistance of a measure such as this and with the help of scientists, to control "bunchy-top" effectively. If not, we shall hold it back until scientists get to work so that it will not be allowed to spread to the beautiful country on the Tully River in North Queensland. . . . . In the Bill which I shall presently introduce provision is made for that matter to be handed over to a board consisting of two growers' representatives and two Government representatives, who will deal with it in whatever form they think fit, subject to departmental control.

The Insect Menace.

In recent years mankind has realised just how much our material welfare depends on successfully combating the various insect pests, fungus growths, and other diseases attacking economic plants on which we are so largely dependent for our food supplies. Competent observers believe that it is no exaggeration to say that the future will witness a severe struggle between man and insect for the world's available food supply. We have to be up and doing. We have to work hard and avoid unnecessary delay. We have to follow the lines we would like to follow if we owned Queensland individually. If Queensland was our private property, we would not wait for someone in some other part of the world to move when there was any danger ahead. We would immediately be up and doing, and that is what we want to do to-day with regard to things which are a menace to the food supply of the people of Queensland. Our first line of defence against new pests and diseases is the new Federal quarantine law and the vigilance that is being exercised to prevent further pests from gaining access to Australia. Of course, we are backed up in that direction by having a long sea boundary around us which ensures remoteness from other countries.

I venture to say that no disease can come here by air and become a menace to Queensland—it would die a natural death on the way—but we have pests inside our shores which have to be combated. In Queensland, for instance, our efforts so far have not been a complete success. We are still faced with many serious troubles within our gates. We have had an enormous number of pests introduced here, and I should not be surprised if 90 per cent. of the pests found here at the present time have been introduced in some form or another from other countries; but it is very hard to detect on the unloading from a ship of certain vegetable foods or grain, cotton seed, or anything of that description, anything that may be a disease, or that could be liberated in many cases without being detected by the departmental officers, who are particularly alive to the interests of Queensland in the discharge of their duties. That will give some idea of the serious nature of the question and how hard it is to keep such diseases within reasonable bounds in Queensland and other parts of Australia. . . .

Plant Disease and Its Economic Effects.

Dealing with the Darling Downs wheat crop, for instance, we all know how fine a crop we shall have this season, due to the very good rains. It would be a deplorable loss if any disease reduced the yield to a couple of million bushels—about half the anticipated crop this year. There are at the present time a great many other diseases that affect that crop. For instance, flag smut last year and

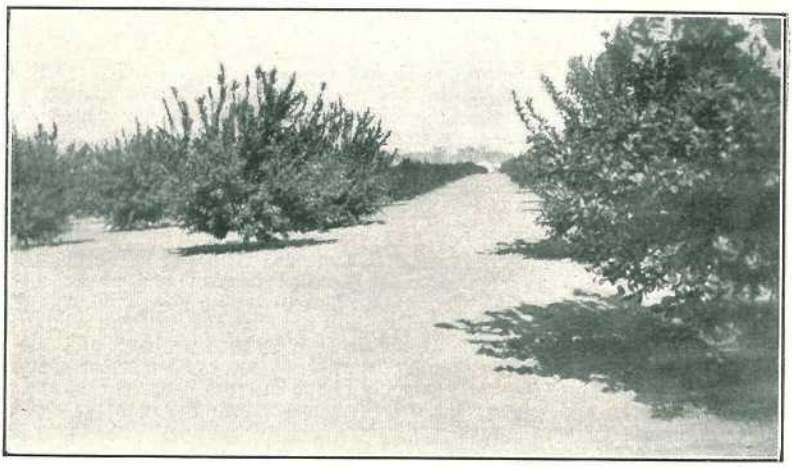
up to the present time has been responsible for an enormous loss. Then there have been losses from other pests. In combating diseases we have to take into consideration in regard to the farmer that there are serious losses from other causes than the uncertainty of seasons. The farmer has to combat danger from marsupials; and Queensland farms seem to have more marsupials to contend with than any other country I know of.

PLATE 184.—WHAT A PROGRESSIVE FARMER HAS DONE IN THE GAYNDAH DISTRICT.

Two views, showing heavy pear infestation on virgin land, on portion 47, parish of Wetheron, when selected by Mr. W. Benham. (See illustrations on the next page.)

Then the cotton crop is of vast importance in Queensland; and we are hoping that it will be more free in the future from pests than previously, as in the past various diseases have caused no end of trouble in connection with that crop. When cotton was introduced here and the question of ratooning came up, it was a debatable question whether the boll-weevil, commonly call the corn-ear worm, which attacks similar plants, backed up by many other weevils, was responsible for enormous

loss, and in some parts of the world would not practically annihilate the industry here. Through the care of the farmers in Queensland we are now producing cotton almost free from the diseases which affect many other countries. When cotton was produced in the Lockyer district the boll-weevil almost wiped it out. Fortunately the people there were able to switch on to some other industry, such as maizegrowing and dairy farming, and so did not feel the loss as severely as the settlers in the drier Burnett and Rockhampton districts, where farmers cannot go in for the other



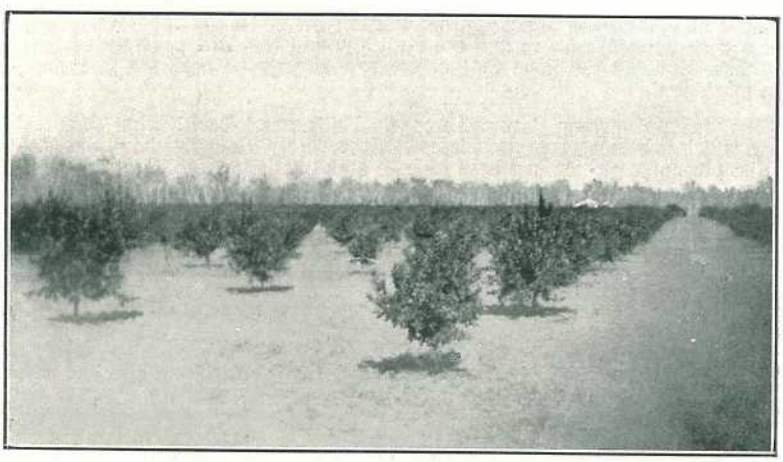


PLATE 185.

The same land on Mr. Benham's well-managed farm to-day, illustrating what can be done by practical methods of pear destruction and land settlement.

crops which I have mentioned. We all know that the value to the State of the maize crop, particularly on the Atherton Tableland, is very great; and we can imagine the effect of pests similar to the boll-weevil in cotton attacking that crop. They have at present to combat top rot, which has caused enormous loss. I venture to say that, if we could successfully fight this pest, it would add 20 per cent. to the value of the crop to the grower, and I am confident that the consumer also would get the benefit to a great extent.

Then we come to the banana-growing industry. Here we have the borer. We all know what that is. It has travelled from the South, and is now right up North. It brings about a general weakening of plant life. Then there is "bunchy-top," which appeared in the industry some seven or eight years ago, and has spread over the whole of the Southern district. We have been conducting experiments, but, generally speaking, we can look upon the beetle borer as the principal menace to the banana-growing industry.

Mr. W. Forgan Smith: Have you heard how the parasites from Java are getting on?

The SECRETARY FOR AGRICULTURE: Unfortunately, we cannot yet prove that they will be effective; still, there is hope in that quarter. We must not interfere with the eggs of the insect until the experiments are complete for fear that we destroy the work that the entomologists have already done. It is the scientist on whom we must rely. It is unreasonable to expect the farmer to do these things. In the first place, it is too expensive, and the experiments are too complicated, and in any case he has not the time to devote to the work.

Another disease which affects banana is leaf spot, which is taking a heavy toll of the industry to-day. Perhaps it is a greater menace than the beetle or "bunchy-top," owing to the fact that it closes up the pores of the plant and strangles it. We have authorised the employment of a pathologist to try to cope with this disease, or, at any rate, to check it. Hon. members will see that these three combined must present an enormous menace to one of the finest industries we have, and one which is the most calculated to assist closer settlement. When you remember that at the present time the people of Australia eat only about half the bananas that the people of America eat, you appreciate what a tremendous future the industry could have if we can only save it from the ravages of pests.

Then, in regard to citrus fruits, we have the bronze orange bug, the spiny bug, and many scale and other diseases. A list of them shows the heavy losses the citrus-growers must be suffering to-day.

Then we come to the apple-grower, who is situated in an entirely different part of Queensland. That fact reminds hon. members that we require a measure that will enable us to impose the necessary drastic restrictions to protect the apple-grower in the South as well as the banana-grower in the North. In the apple districts we have to cope with the codlin moth and the fruit fly, and this Bill provides for protection from those pests in the hope that better results may be achieved and the present losses minimised.

The pineapple-grower does not escape. He is worried with what they call water blister, which is causing enormous losses. Fortunately, the price has been such lately that the pineapple-grower has been able to stand a little loss. Our aim and object, however, is to grow bananas, pineapples, and all plants without loss from disease at all.

Then we have the diseases which attack crops like the tomato and the potato. There has been some controversy lately as to whether the tomato is a vegetable or a fruit; but, whichever it is, it is very nice to eat. There are diseases which cause enormous losses in connection with both these crops.

Then we come to sugar-cane. I venture to say that hon. members who represent sugar-growing districts may be surprised to know that on looking over the particulars given me by experts I find that sugar-cane suffers from more diseases than any other crop we produce. The department has done wonderful work in trying to combat these diseases. Of course, the organisation of the sugar-growers themselves is entitled to a certain amount of credit for what has been done; but, apart from that organisation—which is a credit to the State—the Government have also done something to combat the borer and other diseases which attack cane.

Roughly speaking, that pest has caused a loss of £120,000 per annum. That is an enormous loss, and will give some indication as to why it is necessary that a Bill of such a drastic nature as this should be introduced. An enormous number of pests and a large number of industries will be controlled by the one measure, and that is the reason why this Bill appears to be of a drastic character to a certain extent. An additional feature in connection with the Bureau of Sugar Experiment Stations has recently been brought into being by the appointment of a sugar-cane pathologist to provide the cane farmer with information as to how to combat diseases and clean up the farm.

PLATE 186.—THE PEAR-POISONERS' WORK.

Poisoning is less arduous than burning, and the plants are killed where they grow, instead of being moved, and thus increasing the risk of reinfestation from dropped leaves and fruit.

PLATE 187.—POISONED PEAR ON VIRGIN COUNTRY.

The work of the Prickly-pear Commission well illustrated.

A Public Duty.

I think it is just as well now to leave the question of diseases and to remind hon. members that it is the duty not only of hon. members but also of those engaged in farming industries—particularly those who take a prominent part in various agricultural organisations—to try to enlighten the farmer on the subject of combating many of the diseases, and to achieve that end through the organisation and by means of literature circulated from time to time. If that were done, it would mean an enormous advantage to those concerned, and be of considerable assistance to the department. Roughly speaking, the estimated loss in primary production due to pests and diseases ranges from 5 per cent. to 20 per cent. and even 25 per cent. on crops produced in Queensland to-day, showing that when the Bill is passed and becomes subject to sympathetic administration it will effect an enormous saving in the loss that now occurs. That loss clearly indicates the urgency of taking drastic action. That factor is recognised, not so much from the point of view of increased entomological and pathological investigation but from the point of view of the legislation necessary for the enforcement of measures designed to combat the different pests and diseases.

As I have already stated, the original Act was passed in 1916. It was amended in 1924, when provision was made for the constitution of a board of advice. There is no doubt that at that particular time the board of advice, which consisted of the heads of the various branches of the department, had the advantage of the services of particularly able men. . . . We are superseding that board by a board of experts controlled by the department—a board that will be in touch with the incidence of plant disease all over Queensland, and will report direct to the Minister. The board of advice has been out of existence for some considerable time, and we do not intend to reconstitute it. The Bill will serve the dual purpose to which I have already referred. It provides for the examination of all plants, fruit, and vegetables entering the State, and provides for the imposition of a charge for the necessary examination. That will be given effect to by regulation. It is not proposed in any shape or form to tax the small man who has a home in Brisbane or any other town in Queensland. We want him to go on in his usual thrifty way growing vegetables and plants of other descriptions to reduce household expenditure or for experimental purposes, but in other cases it is intended to exercise control. We cannot allow "bunchy-top" in a man's back yard on one or two banana plants, thereby becoming a source of danger to surrounding farms. It is our object to prevent the spread of "bunchy-top" leaf spot, and other diseases from spreading to adjacent farms and then operating at large very much to the detriment of our State.

I have already referred to the fact that it is the intention to examine all plants, fruit, and vegetables entering from other States, and I think I should point out that the other States of the Commonwealth have passed similar legislation, thereby demonstrating the wisdom of introducing this legislation. The Diseases in Plants Act has been responsible for protecting Queensland from the invasion of many diseases up to the present time.

Administration of the Measure.

For evident reasons work has been carried out in the past in respect of plants, fruits, &c., coming into Queensland from other States; but this Bill will give power to cover the whole lot. Naturally, finance comes into this Bill to a great extent, because to carry out all the things the Bill provides for, in addition to the powers it confers, a regular army of inspectors would be required in the industries to which I have referred; but, by the incorporation of the other Bill, which I have said is supplementary to this Bill, there will be an enormous saving effected to the banana industry. The men now loading bananas and carrying out inspectorial work will be used for a dual purpose. This will effect an enormous saving, and provide the department with greater control over them. Naturally, the work they do will be reflected in a good deal of saving of time to the department. Freer action to work is necessary; and, when a report is received from a field inspector in regard to a particular disease, and it also covers anything suspected of being a disease, prompt action will be taken. That may seem drastic, but action in such a case is necessary and warranted. We want disease reported as quickly as possible with a view to combating it, or to keeping it in check for the moment with a view to combating it ultimately. Any disease affecting trees, plants, fruits, or vegetables caused by an insect, fungus, or any other disease is to be dealt with promptly. The present Bill has the support of all our organisations. As a matter of fact, they have asked for it knowing full well that we have not the power under the present Act to control disease effectively.

The definition of "abandoned or neglected orchard or nursery" is a new idea, and is one which requires a little thought before criticism is made with respect to it. We have had an enormous amount of trouble up to the present in connection with abandoned orchards. Only last week I gave instructions for several orchards to be cleaned up because the department was not able to locate the owners. Several orchards were abandoned and reverted to the Crown. We had them cleaned up, knowing the menace they were to the industry, and knowing that they were right on the border-line. An abandoned orchard may not be affected by disease at the time of its abandonment; but it is likely to create disease on account of the heavy weed growth which comes up all over it in consequence of its abandonment. It is then a greater menace than an orchard affected with "bunchy-top," which can be immediately dealt with. This Bill provides that, after a period of six months, on an inspector proving an orchard to be an abandoned orchard, the department shall have power to enter upon and remove the trees growing therein. If there is no owner of a neglected orchard, we have to find out whether the orchard has reverted to the Crown. If it has not, then the owner pays pound for pound in connection with the expense of cleaning it up.

The Bill further provides that the owner of a banana orchard must keep his orchard clean for a distance of 1 yard around each stool. Naturally, the number of plants in the stool increases. Sometimes an owner grows four or more in a stool; but it has been proved that the growth of three plants in a stool is the best method. That enables a man to get into his orchard after heavy rain and to clean up for a yard around each stool, and later to take out the weed growth. The object of this clause is to give him a chance to keep his plants clean, and, naturally, if he keeps his plants clean, as good farmers generally do, disease is obviated. We find that power absolutely necessary. Power of appeal is provided for in certain cases where action is taken to deal with abandoned orchards. This is a new departure, but I understand that it was considered in 1925 and 1926. When this Bill is passed, if an owner has a grievance, he has the right of appeal without going to law. It is a cheap method of getting over the whole trouble, and one which, in my opinion, will have the desired effect of giving a man satisfaction, and at the same time enable the department to clean up the whole of the affected area.

The definition of "disease" has been widened by adding a provision which will enable an inspector to deal with suspiciously dangerous symptoms, which he may not at the moment be able to diagnose definitely. For instance, where a plant shows symptoms which, in the opinion of an expert, look like a disease, the inspector can immediately quarantine that plant. The object is not to allow something to get hold which may later on prove a menace. The vegetable pathologists attached to the sugar branch of the department specially asked for this provision; and a recommendation from such an authoritative source cannot be ignored.

The definition of "occupier" will now be "the person in actual residential occupation of any land." The old definition of "occupier" was "a person in actual occupation of any land, or, if there is no such person, then the person entitled to possession thereof." That caused a considerable amount of trouble, but under the new definition, if a lessee has abandoned a property, the department will be in a position to approach the owner at once.

There is another clause in the Bill which provides that the cost incurred in cleaning a plantation shall remain a first charge on the land.

The registration of orchards is also provided for. A fee for registration may be charged—that will be done by regulation—but it will be a nominal one.

Under the Bill which I propose to introduce later this afternoon in connection with the banana industry, provision is also made for inspectors to report first to the board and then to the department in connection with the issue of permits for planting new areas. We propose that the board shall constitute a board of appeal to see if the inspectors have done their work wisely and judiciously. It will be seen that the Bill now under consideration enables fresh planting to be controlled, even when a grower uses plants grown on his own property.

Provision is made to prohibit the introduction of any insect or fungus except with the consent of the Minister. Naturally the matter will be decided by the expert to whom it is referred.

Failure to gather and destroy fallen fruit is now made a specific offence. That has caused enormous trouble, more particularly in the citrus fruits districts. It is made obligatory on the part of the owner to clean up his orchard. Power is given to inspectors to clean up a place and recover the cost.

Provision for Compensation.

There is also provision for the payment of compensation where healthy plants are destroyed to prevent the spread of disease. For example, we may want a quarantine area, and it may happen that healthy plants are destroyed in that area. It is proposed that compensation shall be given in respect of those healthy plants.

PLATE 188.—THE ATOMISER AT WORK.

The supply of cheap and effective poisons for the destruction of prickly-pear and apparatus for their application has made it possible to control infestation on clearable land. In this way a greater area can be effectively cleared in a given time at a far cheaper rate.

PLATE 189.

An eloquent testimony of the value of the service of the Prickly-pear Commission to Queensland. A stretch of reclaimed forest country, near Mundubbera, now carpeted with nutritious natural grasses.

Similarly, if we should decide to proclaim an area, say, from Eumundi to the Burnett watershed to keep back "bunchy-top," we would have to compensate the owners of clean banana orchards in that district.

Fighting plant diseases is considered to be one of the most important functions of Departments of Agriculture in every part of the world. Many highly-trained specialists are maintained; legislation, often of a very drastic nature, is enacted; and large sums of money are spent for this purpose, as it is universally recognised that profitable returns cannot be obtained unless plant diseases are constantly and systematically fought. The Bill, if passed, should have the effect of materially reducing the loss that is being annually sustained by our primary producers as the result of the damage caused by plant pests.

SOILS IN THE NORTH-WEST.

ON THE OPEN ROLLING DOWNS.

Leaving Townsville by car on the 14th September, Mr. N. A. R. Pollock, Northern Instructor in Agriculture, accompanied by Professor Prescott of the Waite Institute, Adelaide, Mr. Hines of the Brisbane University, and Mr. Winks of this Department, who were desirous of making an inspection of the principal soil types of the North, entered on an interesting tour of duty.

The profiles of soils from desert sandstone at Sellheim, the black and red soils from granite at Charters Towers, the recent alluvials at Balfe's Creek and elsewhere on the road to Pentland, desert sandstone soils near Torrens Creek, typical black soils between Torrens Creek and Jardine Valley, the downs soil both brown and chestnut from Hughenden to Winton via Richmond, and a further example of the desert sandstone soil at Colane near Winton, were all examined on the outward journey.

Professor Prescott expressed himself as well pleased with the result of his inspections and stated that the soil of the rolling downs country was comparable with the black soil regions of Russia and the prairies of America. He was emphatic in agreeing with the opinion so frequently stressed by Mr. Pollock that the growth and conservation of members of the Sorghum family for fodder, either as grain, hay, or ensilage, in the rolling downs regions were not only practicable, but necessary to provide for periods of shortage, and stated that under similar rainfall and climatic conditions in the Sudan, where he had been stationed for a number of years, the cultivation of Sorghums largely for grain was the chief industry.

Professor Prescott and party remained at Winton and left later for Longreach. Mr. Pollock went on to Kynuna, Mackinlay, Gilliat, and other centres to Richmond, and then back to Townsville.

During his travels the unequal distribution of the rainfall last season was evident in well-grassed areas contiguous to others on which there was little or no feed, this alternation being noticeable in all the districts passed through.

Graziers who had not been favoured with sufficient rain had experienced no difficulty in securing agistment for their sheep at no great distance from their holdings on country that was lightly stocked as a result of flock depletion in recent dry years. All sheep noticed were in excellent condition, while the pasturage was calculated as sufficient to last until the rains of the wet season commence.

Interest in the growth and conservation of fodder, he found, has increased rather than diminished, while the use of phosphate licks is becoming general.

At Colane, near Winton, Sudan grass germinating after a fall of rain in April had given excellent results, being cut for hay and grazed by sheep during several months. At the time of his visit, though most of the Sudan had died several clumps were showing a growth of up to a foot in height, despite the fact that no rain had fallen since April.

At "Colwell," near Mackinlay, Mr. Desmond Collings had made experimentally a small quantity of silage from summer grasses cut in the channel country. Though a good deal of waste occurred by reason of the unchaffed material not being compacted in the small pit provided, the centre was excellent and greatly relished by the house cow to which it was being fed.

Arrangements have been made to supply seed for trials with Mr. J. M. Chisholm, Wantalayna, Winton; Mr. E. P. Phillott, Colane, Winton; Messrs. Collings and Wells, Colwell, Mackinlay; and Mr. C. Morell, Lonsdale, Richmond. Mr. Morell expects to have somewhere about 80 acres under crop, when, if a normal season is experienced, a satisfactory demonstration of fodder growth and conservation should be obtained.

COMMONWEALTH SOIL RESEARCH.

ADDRESS BY PROFESSOR J. A. PRESCOTT.

PROFESSOR PRESCOTT, Chief of Division of Soil Research, Council for Scientific and Industrial Research, addressed a gathering of officers of the Departments of Agriculture and Stock, Public Lands, and the Provisional Forestry Board in the Land Court Room, Brisbane, on 8th October. The Minister for Agriculture and Stock (Hon. H. F. Walker) presided.

The Story of Soil Research.

Professor Prescott said that the purpose of his meeting those present was to enable him to express some of his general impressions, and to tell something of the story of Commonwealth soil research. Some of them might perhaps be interested to learn something of the origin of the Commonwealth soil work.

The Waite Institute of the University of Adelaide was barely five years old and was founded as a result of a donation of £100,000 to the University of Adelaide by Mr. Peter Waite, a South Australian pastoralist. Mr. Waite intimated to the University that it was to help his brother farmers that he had donated that large sum. Among the problems which the University of Adelaide had set itself to solve were those relating to crop production primarily, and soil problems as one of its branches. Soil problems, of course, interested them primarily from the agricultural point of view, but they were beginning to realise the importance of research work in connection with pastoral soil problems, in the study of which Mr. Brünnich (Queensland Agricultural Chemist) had led the way, especially in relation to animal nutrition.

Southern Investigations.

The Commonwealth Council for Scientific and Industrial Research some two years ago found itself in the position of being responsible for two experimental stations, both in the irrigation areas, in which soil problems were of extremely great importance. On the irrigation areas of the Murray and Murrumbidgee were a number of soldier settlers, many of whom were struggling to make a living, and before any advice could be given to those men as to the fertilisers to be used, it could be seen that a soil survey would have to be taken so as to get a complete understanding of local soil types. They set to work at Renmark, in South Australia, where on the irrigation area there were about 4,000 acres occupied by returned men producing dried fruits under very adverse conditions. The difficulty, of course, was to find a suitable man to carry out that work. There was only one man in the whole of Australia who had had any experience at all in soil survey work, and that was Mr. Taylor. He had been sent to the United States of America by the New South Wales Government to study soil survey methods, and they were fortunate enough to secure his services from the New South Wales Department of Agriculture. This work indicated to them that there was a very close relationship between the productivity of the soil and the actual soil type as defined by the survey.

The next area they investigated was that of Wimmera, in Victoria, where there was a settlement of returned men on reasonably good land. It was found that there were something like five different soil types in an area of 2,000 acres, and the difficulty there was that the Irrigation Commission was supplying the same quantity of water to all the men, and it was necessary to get some understanding of the soil types so that this service might be beneficial.

The third area they investigated was the Lower Murray swamps. They had been reclaimed, some of them fifty years ago, and others since the war, and they presented an entirely new soil type in South Australia, if not in Australia as a whole. Lucerne was the main crop grown, but there was a tendency for the dairy farmers to rely on perennial pasture. As a result of their survey they could almost definitely state that this inclination for the practical farmer to drop lucerne and go in for permanent pasture had a sound scientific basis. The soil was not a lucerne soil at all, although it had been growing lucerne for twenty years or more.

There were several thousand acres in the Murrumbidgee and Murray Valley, and it was, of course, a very difficult matter to attempt to survey those soils within a short time. They were not attempting to do it, but had given themselves twenty years in which to carry it out. The reason for the delay—if it could be called delay—was the fact that the work demanded special training, for the men could only get their experience in the course of the work, and they must be fully qualified for it if it was to be placed on a sound basis.

Soil Survey and Classification.

In the Murrumbidgee Irrigation Area they were working on a special type of soil which was suitable for rice growing. There again the Irrigation Commission thought the soil was a lucerne soil. It proved entirely unsuitable for lucerne, but most suitable for rice. This illustrated the necessity of strict scientific methods when soil surveys and soil classifications were being made. The Government expected the classification of the soil to be according to its productivity. There might be first, second, and third class forest land and first, second, and third class agricultural land. The third-class forest soil might be better than the first-class agricultural soil, or vice versâ. That classification was only a temporary one. It depended on the economic conditions of the time at which the classification was made, so that it was necessary for them to adopt a system of classification which would extend beyond any economic point of view and which would stand for all time.

In Other Countries.

There were two countries in the world in which soil survey work was being carried out as part of the duties of the Department of Agriculture—the United States and Russia. The United States had a fully competent soil survey, which had been going on for somewhere about twenty years. Their methods had been changing gradually, and to-day they had fallen in line with methods which were universally recognised. Something like one-third of the United States had now been completely surveyed. Unfortunately, the area that was of most interest to us in Australia (the arid zone) had only been surveyed in part, but a considerable portion of Texas had already been described.

The other country which had contributed most, possibly, to soil survey work was Russia. We were accustomed to regard Russia as one of the backblocks, but for something like fifty years the Russians had been engaged in soil survey work, and there was more known about the soils of Siberia than there was about the soils of Australia. The Russians had developed their methods so much that they felt themselves competent to draw two maps of Australia, indicating the soil types—one in 1914 and the other in 1928. These two soil maps were really wild guesses, but at the same time they were shrewd guesses, and one of Professor Prescott's purposes was to correct Glinka's guess and place it on a sound scientific basis based on observation. A soil survey map from an advisory point of view would be of great benefit. For instance, there was the case of the Renmark survey. The Irrigation Commission was actually waiting for the soil map of Renmark and within a day of its being drawn up were able to call a meeting and to act immediately on that survey. There were something like 2,000,000 acres of land in the Murray Valley which could be irrigated, and this would be done when the Hume dam was completed. He believed there were more like 10,000,000 acres which were capable of being irrigated—that is, they had the proper slope, and other features. It was obvious that they must utilise these 2,000,000 acres in such a way that they would be as productive as possible. To do that they must have a knowledge of the various soil types in that area.

Russian Research.

The next scale in connection with soil maps was the broader one, in which one could make full use of scientific methods. He had already indicated that the Russians were able to classify soils in such a way as to map a whole continent, and that was based on a recognition of two main factors—one of which was the recognition that the soil is something in itself. The original soil classification was based on the fact that the soil came from granite or some partly disintegrated rock. The Russians recognised that the soil was something quite independent from its parent rock. They developed a technique in which they described the soil just as they found it. In that way they were able to classify soils into a series of types.

The lecturer continued:—The first type that they defined is known as the Podsol or Ashlike soil, and this type is found in the Wallum country of Queensland or the gray soils around Brisbane. It is generally regarded as forest savannah country such as the pine forests of Northern Europe and Northern Siberia.

The next type is one which was not familiar to the Russians, known as the Brown Earth. It carries the greater part of the wheat in the Southern States, and it is one of the most serviceable of all soils in temperate regions. The fact that it does not leach readily means that it rarely needs liming. It may be low in plant foods, but under special conditions the Brown Earth may be rich in plant foods.

The Red Basaltic Loams are soils which are endeavouring to turn themselves into Brown Earths. They form a group by themselves, and are found in Queensland at Bundaberg, Childers, and the Atherton Tableland, also in Northern Tasmania.

There is a type of soil called Laterite which is of extreme scientific importance. It is one in which Mr. Hines and Dr. Bryan, of the Queensland University, are taking a great deal of interest at the present time.

The next soil type—which occurs in a zone where the rainfall is sufficient to produce a good native vegetation—is the famous Black Earth, first described thirty years ago by the Russian workers from their knowledge of the Russian Steppes.

Queensland Soils.

In Queensland there is the greatest development of Black Earths in the Empire outside of Canada. Black Earths develop under conditions where there is a rainfall of approximately 20 to 30 inches. They are seen at their best on the Darling Downs, and also the Liverpool Plains in New South Wales, and Peak Downs, Upper Callide, and Upper Burnett. They are rich in lime, so rich that it would always be found sufficiently marked for one to see it in a section of soil at a depth of from 15 to 30 inches. In South Australia, strangely enough, this Black Earth does not occur. There is another related series also very rich in lime, which was not described by the earlier Russian workers, but was actually discovered in Siberia. This series is very closely related to the Black Earth, and occurs in the rolling downs of the West, also in the black soil plains of the South-west and the Western plains of New South Wales in the Riverina and Wimmera. It is interesting to note that the lands at Hughenden are identical so far as soil type is concerned with the soil of the Wimmera. It is also interesting to note the difference that rainfall makes on the value of such land. In the Wimmera, it is worth about £15 per acre, and in Hughenden it would scarcely be worth 10s. per acre. The difference, of course, is entirely due to rainfall. The rainfall of Queensland is a summer rainfall, very unreliable. The rainfall of the Wimmera is just ideal for the production of wheat, and 40-bushel crops are quite common on that soil. The Riverina is a little less reliable, in so far as some of the rain comes in summer. Similarly in Queensland the Brown Loam or the Brown Downs soil is not a wheat soil, except in the Darling Downs, but is essentially a sheep soil.

In Africa, where these Brown soils were also developed, they were used for sorghum growing, and there was a possibility that the solution of the feed problem would be found if it were recognised that this soil is essentially one of the best growing soils if the climatic conditions could be studied sufficiently to get an appreciation as to which crop would be most suitable for the growing of sufficient fodder.

The Basalt Series.

The next are the Basalt series, such as are found in the Mallee country and at Oodnadatta. On this soil in the Wheat Belt of South Australia, crops are being produced with a rainfall of less than 6 inches.

"I would like to get some expression of opinion from the people here in Queensland," continued Dr. Prescott, "regarding the way in which the Commonwealth work can be linked up with the work that is projected for Queensland itself." It was one of their aims to publish a soil map of Australia in reply to the one published by Glinka last year. He was hoping that such a map when published in Australia would lead to discussion among scientific people, so that the map could be corrected by agricultural officers and surveyors, mining engineers, &c. As an aid to that work maps were being prepared and in part published in South Australia and Western Australia, showing the distribution of native vegetation prior to settlement. The surveyors throughout Australia had discovered very early that the native vegetation was a very fine index of the possibilities of the soil. He would suggest that one of the things that could well be done in Queensland would be the preparation of a map showing what was already known of that native vegetation and of the soil types.

Future Plans.

The Commonwealth Division of Soil Research had not yet been founded completely. The agreement with the University of Adelaide would date as from the 1st June, 1930, and it was their intention, in addition to having a map by a man working on soils problems, to have a soil survey staff which would be trained in the irrigation areas of the Murray, and which would eventually take an interest in soil problems throughout the whole of Australia, and if such a survey staff could be associated in the initial work of the Queensland survey, they would be very happy to secure co-operation in that way. The future of the soil survey of Queensland would depend very largely on the men who were placed in charge of that work, and the closer settlement and economic development of Queensland.

DISCUSSION.

Mr. H. T. Easterby (Bureau of Sugar Experiment Stations): Does the Commonwealth intend to prepare a soil map for the whole of Australia eventually?

Professor Prescott: What I personally hope to do as a result of this visit to Queensland—because Queensland is the key for the whole of Australia—and also my visits to Tasmania and Western Australia, is to write a discussion for the benefit of my Australian colleagues, of the principles underlying modern methods of classification, and in the course of that discussion I hope to put right Dr. Glinka's two maps. I already have a tentative map of Australia, which is not correct, but I hope to publish another map which will form a basis for future discussion.

Mr. Harvey (Lands Department): The Development Committee is faced with many problems in survey, more particularly in areas that are likely to become closely settled, and it would be helpful to us if Dr. Prescott could indicate to us some of the methods for more detailed examination of the soils in closely settled areas, and if he could indicate the type of survey that is required for the different conditions of settlement, I am sure it would be of great help to the committee.

Professor Prescott: That, of course, is a question of detail, and is one reason why I generally insist on the soil survey being in the hands of well-trained men, who are sufficiently responsible to select their methods for themselves. Mr. Taylor has a free hand in that direction entirely. The detail required in a survey of blocks of 20 acres is very different from what is required for blocks of from 600 to 700 acres, which would not need the close survey necessary in an irrigation settlement.

The general principle is really to have a staff of field officers adequately trained in soil survey methods. They go to a certain district and set to work at once to define the soil types from a purely scientific point of view. Generally speaking, there are people in the district—officers of the Departments of Agriculture and Lands—who can give them some idea as to the possibilities of the district, and this would act as a guide for them in their work. We dig holes at intervals and examine the soil profile at a depth of from 4 to 8 feet, and in some cases deeper. That soil is described, and when the whole area has been covered, the surveyor gets to work and maps it out. We are also enlisting the assistance of the Royal Air Force to help us in our work. They have prepared mosaics of the whole of the Renmark settlement. Aeroplane maps do not show soil types, but they show very distinctly the native vegetation and crops, and I should say that half of our work has already been done by the Air Force in the Renmark area, and I would not like to commence any survey in irrigation areas without a preliminary aeroplane survey of the native vegetation. In Rhodesia an aeroplane survey has been made to determine biological formations in connection with prospecting, and it has been very successful.

Mr. Swain (Chairman, Provisional Forestry Board): As you know, Dr. Prescott, Queensland is a very huge place, and we have in mind the idea of making a soil survey of the whole of it in due course. I think the principal proposals are first of all to make an extensive survey of the whole, using the vegetation as an index, and then to concentrate on particular areas for an intensive survey. We apparently have done neither of those two things, and we as a committee would like to know just where we should start and how we should start. The suggestion of the Air Force seems to be a very good one. We know something of the question of vegetation, and Mr. Harvey (Surveyor-General) has prepared many maps. With regard to the detailed soil survey, the question is where we should start that intensive survey—whether it should be, say, in the Cooktown district, where we know practically nothing of the possibilities, or in the Brisbane district, which is capable of intensive development. That is the issue in my mind—where to start the intensive survey, whilst planning some extensive work on the whole soil survey of the State.

Professor Prescott: The actual starting point depends very largely on local circumstances, but I would like to say in the matter of soil survey that the surveyors should be permanently engaged as field officers, rather than that the soil survey should be a side-line. They must be gaining experience. Usually, in our organisation in South Australia we have a senior soil surveyor and junior surveyors, and as men become available I shall add to the junior staff. In the Brisbane district, I think you will find that Dr. Bryan and Mr. Hines would be only too pleased to co-operate with the Department of Agriculture.

Mr. Graham (Under Secretary, Department of Agriculture and Stock), in moving a vote of thanks to Dr. Prescott for his informative address, mentioned that the Development Committee had in mind a soil survey of Queensland, but they were only feeling their way in connection with that particular work. Mr. Brünnich (Agricultural Chemist) and other officers had done much that might perhaps form a basis for future work. Queensland would remain a primary producing country for many years to come, and soil surveys would have a most important influence on efforts to increase production.

Mr. EASTERBY, in supporting the vote of thanks, said that the Bureau of Sugar Experiment Stations had done much in the matter of soil surveys in Queensland. Dr. Kerr had been specially sent to America to study the methods adopted there, and the sugar industry in the State would benefit as a result of his experience in the United States.

Mr. BRÜNNICH also spoke on the importance of Dr. Prescott's visit. He had been more or less responsible for the arranging of Dr. Prescott's itinerary, and knew that his visit would be of much benefit to the State.

Dr. PRESCOTT, in responding, expressed appreciation of the work which Mr. Brünnich and others had done, of the fine spirit of reciprocity he encountered in Queensland, and of the practical and valuable assistance that he had received from officers of the Department of Agriculture, and of the cordial reception accorded him by co-workers in the scientific field.

SUMMER CULTIVATION IN THE ORCHARD.

In reminding orchardists that the cultivator should be kept at work in order to maintain the surface soil in a proper condition, officers of the Fruit Branch of the Department of Agriculture point out that the use of the cultivator not only maintains a surface mulch and destroys weed growth, but also encourages vigorous tree and bud development. Keeping the soil in good tilth is a very important factor in successful orchard management.

Water rises in the soil by the process known as capillary attraction. The rise of moisture in the soil and the checking of it may be demonstrated by a series of glass tubes, the first being very fine and the others somewhat wider in diameter. The tubes are set upright in and projecting well above the surface of a vessel containing water. It will be found that the water in the very fine tubes will rise to a considerable distance above the level of the water in the vessel, and as the tubes increase in diameter so the height to which the water rises in them decreases.

The soil particles run together, forming minute spaces through which the moisture rises to the surface of the soil, where during the hot summer months it soon evaporates. Cultivation tends to break down the capillary tubes in the top layer of soils, thus retarding the rapid rise of the moisture to the surface and reducing the loss of evaporation to a minimum.

Soil left in a very rough condition exposes a far greater surface to the air than when left with a fairly fine tilth. This rough condition may be advantageous during the winter months, but is not so during summer, for the larger the surface exposed to the action of the air and sun the greater the evaporation of moisture. Summer cultivation should tend to work the soil thoroughly to a depth of 3 or 4 inches, breaking down large lumps and leaving the surface fairly even.

The question as to how often the cultivator should be used during the summer will depend on circumstances. In non-irrigated areas where the land is fairly level and the likelihood of soil washing is not great the cultivator can be used frequently, and always after rain immediately the soil is in a fit condition for working. In areas where the summer rainfall is heavy and especially on steep hillsides, summer cultivation may have to be considerably modified. In such circumstances it is not always wise to work the soil down to a very fine mulch, and it may be advisable to leave a certain amount of weed growth in strips between the rows of trees across the hillsides. These precautions will tend to reduce the loss of soil during heavy rain by preventing in some measure the rush of water down the slope.

In irrigated areas the cultivator should follow each irrigation and fall of rain as soon as the soil is in a fit condition to work. The irrigator's motto should be: "The minimum of water with the maximum of cultivation." Well cultivated plantations require less water than poorly worked ones, and are not as likely to develop seepage troubles so early.

The cultivators should be kept going right through the summer until early autumn, at which period it is usually advantageous to allow the early rains to germinate the grass seeds, where green manure crops are not sown. The day of "all the year clean orchards" has passed, as it is recognised that organic matter is essential in the soil. This may be partly provided by the ploughing under of grass that is allowed to grow during the autumn and early winter months.

THE FARM TRACTOR.

By E. T. BROWN.*

THE STEERING GEAR.

The steering gear must be kept in proper working order, whether the outfit be used solely on the land or partly for road work. For some reason or another this component of the farm tractor is frequently neglected. The operator should consider it an important duty to look after the lubrication of the steering mechanism.

Owing to the conditions under which the tractor has to work, mud and grit enter these joints, and, if allowed to remain, will inevitably, and in a very short time, produce wear and slackness. It is commonly thought that slackness is not of much moment. In reality, it is of great importance, not only from the mechanical point of view, but from that of safety as well.

When the tractor is new the driver finds that he can place his outfit wherever he may desire, and he has a feeling of confidence that he is able to do so. After neglect he finds that this is impossible, and he is, therefore, in doubt as to whether he can steer his machine at will in the desired direction. Failure to do this is, of course, of greater consequence on the road, but it is also troublesome on the land.

Points to be Looked After.

All joints should be lubricated in accordance with the maker's instructions. Grease should be used where grease is recommended; oil where oil is advised. Periodic attention to this part of the machine well repays the operator for the little trouble involved. It may prove helpful to discuss a typical steering layout and indicate those points that require lubrication, and also where a slackness may develop.

Beginning with the front wheels the first point is the bearing upon which the front wheels swivel when turning a corner. This is the stub axle swivel pin and is one of the chief parts to keep lubricated, and to look out for slackness. Secondly, there is the lever fixed to the frame wheel hub at one end and to a rod that may either lie across the tractor or be in line with the length of the frame. The former is found in the case of transverse steering; the latter in the case of fore-and-aft steering. The point where the lever is fixed to this rod—termed the drag link—requires lubrication, and if play appear, it should be taken up.

The same care should be extended to the other end of the drag link. The joint here is between the drag link and the drop arm or steering lever, which is fitted to the end of the shaft protruding from the steering box. This, too, is sometimes spring-loaded; hence requires no taking up, but it should be lubricated.

The Steering Box.

The steering box must be lubricated and looked after most carefully. There are many designs of steering boxes, of which the worm and wheel, the worm and nut, and the cam and roller are the most popular types. The maker's instructions should be followed faithfully, both as regards lubrication and taking up any play that may develop.

Returning to the front wheels, it is found that there is a rod tieing the two wheels together, this being known as the track rod. Its duty is to make one wheel turn when the other is moved by the steering gear. There is a joint at each end of this rod. These joints require lubricating, and, in time, stand in need of taking up.

Shock Absorbers for Tractors.

Shock absorbers are not usually fitted to farm tractors. This is certainly a mistake on the part of the makers, since the vibration is excessive when working on rough land. There is not the same need for these additional springs when the outfit is employed on the road, since no great speed is ever attained. The tractor owner is strongly advised to fit some form of shock absorber to his machine, since they reduce wear to a remarkable degree.

Shock absorbers may be divided into two main classes. These are the hydraulic and the friction. In the former the damping action is secured by a plunger or vane moving in oil or some other fluid. In the latter the rubbing action of two or more friction surfaces has the same effect in controlling the springs. The frictional type is the better of the two for the farm tractor.

It is generally necessary in the hydraulic type to replenish the liquid after every 5,000 miles with the special fluid sold for the purpose. When the arms are fitted with ball joints, these, too, must be lubricated periodically. The best form of frictional shock absorbers are those that incorporate a self-lubricating material. With these the only attention they require is after the first hundred miles, when the tension should be adjusted, this being necessary owing to the fact that the discs have bedded down. With other types it is necessary to renew the friction material from time to time.

* In the "Farmer and Settler."

RURAL LIFE IN OTHER LANDS—VI.

By the EDITOR.*

JOURNEYINGS IN GERMANY.

Our last halt was at Cologne, where we reviewed briefly the development of the co-operative movement in Germany and its general influence on the improvement of rural conditions in that country.

We shall now go further up the Rhine, and then on to a consideration of some recent developments in German agriculture.

The Story of a Great River.

The Rhine has been a great commercial highway for many centuries; it is still a great traffic artery, and by a remarkable canal system it is united with the river system of Northern France on one hand and the Weser and the Elbe, two other famous German waterways, on the other. It is possible for large steamers to navigate it as far as Mannheim. From Cologne to Mayence, or, to be strictly accurate, from Bonn to Bingen, is the most historic and picturesque stretch of its long course from Switzerland to the North Sea. In that section, the most beautiful part of its whole course, ruined castles crown every romantic point and rocky crag. Its banks are clothed with sunny vineyards, and at intervals, along cliff-like margins, lateral ravines and valleys open up many delightful inland vistas. From the Seven Mountains, near Bonn to Andernach, the river seems to force its way through ranges of erupted rock, and flows through deep gorges which are a revelation of natural beauty. Historically, the story of this great stream is really the story of the western half of central Europe. In its first historical period its rich valley was probably the home of Celtic tribes whose possession was later disputed by the Teutons. Its second historical period began with the coming of the Romans who held up the advancing Teutonic tribes. Augustus, the Mussolini of the period, and his successors took good care to fortify its banks, and many Roman regiments were constantly in garrison there. Under Roman domination the Rhine valley became a great centre of civilisation and culture, which was later swamped by a Teutonic invasion. Under Charlemange, whose headquarters were at Aix-la-Chapelle, much of its ancient culture was restored. During the early middle ages the Rhine formed the most cultured province of Germany, basing its civilisation on its Roman past. It was then the classic river of Europe and has remained since the subject of romantic story and legendary lore.

To the stranger, however, if one ignores for a while its historical associations, but for which, as one lives longer on its waters or its banks one feels such a remarkable fascination, it is not difficult to think of other waterways that rival it in natural scenic splendour. Our own Hawkesbury River is, in my opinion, quite as beautiful; so, too, is the Hinchinbrook Channel, though of quite a different order, in North Queensland. The Derwent in Tasmania, shadowed by the great mass of Mount Wellington, also may fairly be thought of in comparison, not forgetting that interesting Scottish waterway, the Caledonian Canal, or that picturesque channel that leads up through the Kyles of Bute on the run from Glasgow to Ardrishaig. Our own beautiful Brisbane River at Hamilton Reach, when the setting sun is gilding the crest of the D'Aguilar Range, will also compare quite favourably with the Rhine.

Bonn to Coblentz.

After leaving Cologne with its majestic architectural monuments and great modern bridge, we stopped again at Bonn, a well-ordered town with a world-renowned university and the birthplace of Beethoven. There, anyone musically inclined may join in a perennial argument as to the relative merits of Wagner and Beethoven. Bonn shares in the wealth of myth and legend woven around the Rhine, and Drachenfels dominates a near-by river bend. Following the river further, the Seven Mountains with their peaks, cones, and rounded ridges densely timbered were passed and then we came to Coblentz, at the confluence of the Moselle and the Rhine, the centre of an important wine trade. Its situation at the junction of two of the most picturesque rivers in Europe is one of striking beauty. We had come through great grape country and some remarkably fertile plain lands, or what we would call rich river flats. The extraordinary industry of the German vinegrower was evident in his remarkable system of terracing the steep river banks, and that reminded one so much of the hanging gardens at Thuin, where once we were billeted, near Charleroi in Belgium. The steep slopes lined with walls and arches, showing

* In a radio address from 4QG.

how the soil is held and the vines, for which Rhineland is so well famed, are carefully preserved, were eloquent of years of patient industry. It was worth the journey itself to see those wonderful vineyards set on rocky terraces with the vines bright with the green gloss of early summer amid outcropping crags decked with brownish-green and purples of moss and lichen.

Historical landmarks were everywhere; there was a story in every contour. It was at Coblentz that Julius Caesar and his legions crossed the Rhine. Other famous landmarks spoke of the history of the river down the centuries. Looking out across the stream was the great monument to William I. of Prussia. All this was very interesting, but, with what significance was regarded the great fortress of Ehrenbreitstein frowning on the river from its seemingly impregnable crag crest, with the "Stars and Stripes," the symbol of alien occupancy, floating freely in the breeze above its crenellated battlements!

Invading legions had once more crossed the Rhine at Coblentz. The Briton held the bridgehead at Cologne, and thus history was once again repeated.

Agriculture in Germany.

Though it is a very attractive by-path, this brief excursion into history and survey of very pleasant romantic scenery, we will return to the rutted roadway of hard though not uninteresting facts and consider for a while some aspects of recent agricultural development in Germany.

At a critical period in the Great War it became apparent that, if agriculture had made no more progress in Germany than it had in Great Britain during the previous ten years, the German Empire would have been at the end of its food resources long before the end of the second year of the war; and that, as a matter of fact, the war was being fought by it just as much on the agricultural as on the military organisation of the nation. It is interesting and useful, therefore, to consider just what had been the development of agriculture in Germany, and how that development had been accomplished.

It was commonly believed then that British farming was the best in the world. Certainly, throughout the 19th century the British people led all the other nations, relatively at any rate, in agriculture. Success in food production was the criterion of good farming in the old country in the 18th century. During the 19th century Great Britain was not altogether dependent on the products of its own soil and the farmer's aim and claims were modified. He reduced his ploughed fields and extended his grazing areas. On the score of good cultivation, high yields of certain crops, live stock breeding of a very high order, and machines and implements of top-grade construction, British farming still holds the leading place; but if we return to the criterion of success accepted by our old improvers of husbandry, from whom Germany learned—the quantity of production of food from the soil—then it seems that the agricultural position in the old land would suffer in comparison with that in Germany.

An Interesting Comparison.

An examination of available figures shows that on each hundred acres of cultivated land—that is, arable and grass lands—(excluding the poorer pastures) the British farmer feeds forty-five to fifty persons, the German feeds from seventy to seventy-five persons. (These figures are based on the estimate that, of the total "energy value" of food consumed, Great Britain imports about 60 per cent. and Germany imports 10 per cent.) The British farmer grows 15 tons of cereals, the German farmer grows 33 tons; the British farmer grows 11 tons of potatoes as against the German farmer's 55 tons. The British farmer produces 4 tons of meat, the German farmer 4¼ tons. In milk the proportion of production is 17½ tons against 28 tons, and while British beet sugar production was, until recent years, quite negligible, the German production is 2¾ tons.

The area of cultivated land in Germany has, however, decreased in later years. The agricultural population has also decreased. Rather less than more farm labour is being employed now than in former years. From those facts it may be fairly deduced that larger production in Germany is due to better farming. The soil has been better cultivated; crops more skilfully manured; plants and animals improved in type; the use of improved stock foods extended; and animal husbandry faithfully followed. Side by side with improved technical methods, improved business methods were employed and the profits of agriculture have, in turn, been used in further developing the means of production and the processes of manufacture and distribution.

Efficient Agricultural Education.

The chief factor in this development was unquestionably a well-organised system of agricultural education. Investigation at the research stations established the exact uses of fertilisers; trustworthy advice was supplied both personally and in various forms through the press. The German farmer, being accustomed to regimentation, soon brought his methods into line with those set down by recognised authority. Sound lessons, of course, may be taken from all this.

The German farmer produces about the same weight of cereals and potatoes per acre as the British farmer, but, as has been shown, a much greater weight per 100 acres of cultivated land. He produces about the same weight of meat and nearly twice as much milk for 100 acres of cultivated land. He feeds from seventy to seventy-five persons for 100 acres of cultivated land, while the British farmer feeds from forty to fifty.

The German farmer has attained this position in the last forty or fifty years. The soil and climate of Germany are less favourable than those of Britain. The actual methods of tillage in Britain are not inferior to the methods adopted in Germany. The difference in production is due chiefly to the circumstance that in Britain more than two-thirds of the cultivated land is now in grass, while in Germany less than one-third of cultivated land is in grass.

German land is mostly tilled by peasant owners, British land by tenants. The German depends to a great extent on women labour provided by the families of the occupiers. Wages are relatively low in Germany, and rural industries help to provide winter employment and tend to cheapen summer labour.

In Germany, in organising production, the farm-credit system is generally well adapted. Co-operation is largely resorted to. Societies have been created to provide rural leadership.

The national economic policy has also favoured the German farmer. The general effect of these agencies and influences have been the production of a very rapid improvement in the technical methods of the German farmer.

It is not meant to create the impression that the German farmer is much more skilful than the British farmer (I have taken conditions in Great Britain up to a few years ago merely for convenient comparison); he is not, nor is he likely to be. The British farmer has not lost, nor is he likely to lose, the art of good husbandry, but he has had to modify his methods for reasons that are quite obvious to any student of economics, political and otherwise. Through force of circumstance, a big proportion of ploughed land has gone to grass in British counties.

Two Fundamentals in Rural Industry.

In any "speed the plough" policy there must be two fundamentals, which the German has recognised—security of capital and sufficiency of labour. Though that sounds like an ordinary trite truism, it must be remembered that behind that truism there are points that are often forgotten and for which provision must be made in any policy that seeks to improve and develop the agricultural industry.

To summarise the impressions produced by a brief, and admittedly incomplete, study of progress in German agriculture, the conclusion is that in points of agricultural policy we may learn something, and from the admirable machinery—administrative, educational, and commercial—set up to lead, teach, and finance agriculturalists, we may learn much. On the other hand, from the actual methods of German farming there is relatively little to learn. In Britain, the tillage of the soil and the breeding and management of stock are as good as if not better than in Germany. The difference in production is because the plough is worked harded in Germany; and, for the farmer, the economic conditions are, or were, speaking generally, easier.

In recent years, we know, there have come revolutionary changes to agriculture in Germany, and rural industry there is faced with the social and economic problems that are common to every country in the world to-day.

BUTTER BOXES.

SUITABILITY OF QUEENSLAND TIMBERS.

A CONFERENCE convened by the Minister for Agriculture and Stock, Hon. H. F. Walker, was held at the Department of Agriculture and Stock recently for the purpose of discussing the type and design of butter box most suitable for Queensland requirements. Representatives from both the dairying and timber industries were invited, and those present were:—Hon. H. F. Walker (in the chair); Messrs. T. F. Plunkett, C. H. Jamieson, H. M. Russell, MM.L.A.; E. Graham, Under Secretary, C. McGrath, Supervisor of Dairying, G. H. E. Heers, Senior Grader (representing the Department of Agriculture and Stock); N. E. Hancock, Manager, Forest Service Timber Yards, E. C. Tommerup, B.Sc., Forest Assistant (representing the Forestry Service); J. H. Hancock, S. J. Cossart, C. C. Grimley, F. Haas (representing the timber interests); J. Purcell, Chairman of the Butter Board; W. T. Harris, Secretary, Queensland Co-operative Dairy Companies Association; D. Saxelby, F. W. Uhlmann (representing the Butter and Cheese Factory Managers' Association).

Apologies for non-attendance were received from Messrs. W. A. Russell, M.L.A., and J. T. Tod (Chairman, Queensland Co-operative Dairy Companies' Association).

The Minister in opening the conference welcomed the representatives of the several interests concerned and stressed the importance of both the dairying and timber industries. He mentioned that Queensland was the largest exporter of butter of any of the States of the Commonwealth, and that it required 1,320,000 boxes each year to contain the butter produced in this State, and that the sawmilling interests received approximately £127,000 each year from the dairying industry on account of the butter boxes supplied to meet trade requirements. The Minister then called attention to the agenda item that had reference to the essentials to be sought in selecting a suitable container to meet the requirements of the industry. These were listed as follows:—

(1) Freedom from timber taint.
(2) Strength of material.
(3) Effective methods of fastening.
(4) Facility of opening and closing after grading or examination of contents.
(5) Practicability of adopting a uniform box, taking into consideration the location of factories and patents involved.
(6) Suitability for packing by hand or machine.
(7) Economics—(*a*) Cost of boxes; (*b*) saving in thin timber.
(8) Attractive appearance of box.

Mr. Walker also quoted the contents of a cablegram from the Agent-General in London relative to the quality of Queensland butter on its arrival in London.

Reported Timber Taint in Butter.

In the discussion that ensued there was unanimity of opinion as to the desirability of utilising boxes made of Queensland timber to the fullest possible extent. The reported incidence of wood taint was fully ventilated. Those present were definitely of opinion that timber suitable for butter-box purposes was available within the State, and the occurrence of wood taint flavour in butter was attributable to the omission to exercise adequate supervision in the selection of pine intended for the making of butter boxes. Provided proper precautions were taken to eliminate timber which was likely to be capable of conveying wood taint, no trouble resulted. It was mentioned that butters packed in boxes made of Queensland timber had met with success in competition with butters produced in other parts of the Dominions at many of the important dairy shows which had been held in Great Britain, New Zealand, and within the Commonwealth, thereby demonstrating that Queensland was capable of producing a timber that was eminently suitable for the making of butter containers. The conference agreed on all essentials and resolved that a committee, composed of representatives of the several interests, should be constituted to give consideration to the various details and prepare a report for discussion at a later conference.

The conference recognised that wood taint flavour was to an extent discernible in a proportion of the butter supplied to the overseas markets, but was unable to determine definitely the exact percentage affected by wood taint. It was, however, of opinion that there existed a tendency to exaggerate the proportion of affected butter, and they felt that there was a possibility that on occasion flavours other than those actually attributable to wood taint were included under that designation, which appears to be synonymous with the terms "sidey" and "toppy" used in Great Britain. However, the seriousness of there being ground for complaint against the quality of a product from this State was fully appreciated, and those assembled were confident that the action they had in view would quickly remove any foundation for complaint under the score of wood taint.

BUSH FIRE CONTROL.

Every summer heavy losses are sustained in rural districts as a result of fire. Some of this loss is inevitable, but a large proportion might have been prevented by timely precautions on the part of individual landholders and some organised scheme of fire-fighting. With the summer months at hand, the following advice on the preventive aspect, contained in a paper read by Mr. S. Wilson, Lake Cowal, New South Wales, before a conference of farmers, may be submitted for the consideration of landholders generally.

Once a fire has started, observed the speaker, quick action to get it out is essential, but prevention is the main thing in bush fire control. As preventive measures all farms and grazing properties should have at least four furrows ploughed round all paddocks, a second set of four furrows ploughed not less than 11 yards from the first set, and all timber between these furrows burnt off prior to the grass becoming dry. A further set of plough furrows should intersect all large areas. The ploughing should be done so that it leaves the one open furrow inside the area between the two sets of ploughing, thus facilitating the burning of the buffer area by only two men.

Formation of Local Brigades.

All landowners should form district brigades, and agree on a set of rules, such as binding themselves to at once cease the work they are at and rush off to any fire that is within a certain distance of their property, say, five to seven miles, as a minimum. For brigades to be effective the following measures should be adopted:—(1) An equipped water tank of 100 or 200 gallons should be provided for each 2,560-acre holding, or one for all smaller holdings aggregating 2,560 acres. (2) An agreement should be made that the man whose property the fire is on shall be boss and give instructions, or chaos will soon result. (3) When a fire has gained larger dimensions several bosses are required, and they should then work on an arranged plan, particularly as to where the advance trail should be.

The Necessary Plant.

The plant should consist of a spring cart with a good horse to carry a 100-gallon tank and pump, with sufficient hose to reach 12 feet past the horse's head; also an ordinary washing tub and several buckets. A loop of rope should be tied on to the hames with the hose through it to prevent the horse treading on the hose. A motor lorry instead of a cart greatly increases expedition, which is most important. Another tank of 200 gallons on a dray for replenishing the 100-gallon tank should be provided, with two horses to pull it, as if filling from a dam or tank that is low it might get bogged. Several axes and shovels are necessary, also plenty of beaters fastened on to mallee handles or similar sticks.

Beaters made of tanned leather are the best, but have been expensive in recent years. A good useful beater can, however, be made out of a piece of saddle cloth or even half a wheat bag twitched on with wire to the handle. Beaters should be dipped in water, which should be carried in the tub already mentioned, as if dipped in the 100-gallon tank the ashes, leaves, grass, &c., off the beaters will choke the pump, and this may occur at a most critical juncture.

To make fire-lighting trailers, cut a wheat bag down the sides, then cut it crossways—with shears preferably—into strips, say, 16 to 18 inches long. Roll those up, and put a twitch of double wire round one end of the roll, leaving a small loop, and another twitch further along, so as to leave the final 6 inches loose. Dip this loose end in boiling fat. So as to be prepared, these should be made every spring, and if not required they can be replenished with fat the next year. Before using, the loose end should be split into three pieces with a tomahawk (which should always be carried by the trail-lighter at the back of his belt), and, for a handle, a double-twisted piece of No. 10 wire about 5 feet long fastened into the loop of the wire twitch. Some water should then be poured on the top end to prevent the whole trailer from catching fire, and water added whenever required. To stop the trailer burning during intervals, put a shovel of earth over it.

A bag rolled as described and damped with water, with the end saturated with kerosene, is a good substitute; the man using this should carry a gallon tin of kerosene in his hand.

Answers to Correspondents.

BOTANY.

(Replies selected from the outgoing mail of the Government Botanist, Mr. C. T. White, F.L.S.)

Sophora Fraseri.

W.F. (Kingaroy)—

Your specimen is a native shrub of the legume family (*Leguminosae—Sophora Fraseri*). It occurs in a number of places in South-eastern Queensland, but we cannot say it is anywhere very abundant. Species of Sophora in other parts of the world are said to contain poisonous properties which are very powerful and this is the first instance of the plant coming under our notice, but owing to the suspicious nature of other members of the genus it would be as well to get rid of it from paddocks where it is growing.

Melilot or "Hexham Scent."

E.T.F. (Sandy Creek, Kilcoy—

The taller growing plant is *Meli'otus parviflora*, the Melilot or Hexham Scent. This plant is fairly common in Queensland, comes up with the winter or spring rains. It is widely spread as a weed in most warm temperate countries and has some value as a fodder though its peculiar scent is transferred to the cream of dairy cows that are fed on it. This plant was boomed some years ago as King Island Melilot, and in sandy soils, where ordinary lucerne will not grow, has some value for fattening purposes.

Creek Cherries.

G.C.F. (Toobanna, Ingham Line)—

Your specimen is *Eugenia tierneyana*. Several species of Eugenia grow along creek banks in Queensland and are commonly known as Creek Cherries. The one you sent is quite common in Northern Queensland, and we have had no reports about it causing trouble in any way. Most of the species of Eugenia yield edible, rather acid fruits. Unless, however, one knows very definitely the properties of these plants it is very difficult to say much about them, **owing to their close relationship to the Finger Cherry (Rhodomyrtus macrocarpa), known to cause blindness in persons eating it.**

Sand-Binding Grasses.

INQUIRER (Brisbane)—

It is always a difficult matter to get sand-binding grasses for the tropics. There are, however, several native grasses that grow in North Queensland, such as *Stenotaphrum subulatum*, *Spinifex hirsutus*, *Lepturus repens*, and *Thuarea sarmentosa* and others that might be obtained from neighbouring islands and planted at Saibai. These sand-binding grasses are usually not propagated by seeds but by roots. We think Panicum muticum is also worthy of trial, but do not know how this would grow in a moving sand dune. However, a bag of roots could be obtained from Cairns, or from the Director, Botanic Gardens, Rockhampton.

Central Queensland Plants Identified.

M.L.F. (Dalma, via Rockhampton)—

Your specimens are:—

1. *Usnea* sp. A lichen. Sometimes called Old Man's Beard.
2. *Alphitonia excelsa*. Red Ash. Family Rhamnaceae. Cattle and horses are fond of the leaves and the tree is a valuable fodder species.
3. *Myrtus Hi lii*. (?) Ironwood. Family Myrtaceae.
4. *Dodonaea viscosa*. Wild Hops or Hop Bush. Family Sapindaceae.
6. Doubtful. Could you watch the tree for flowers and send down specimen twigs about 6 to 8 inches long? You could dry the specimens for a few days by pressing them in newspaper three or four times in the course of one week.

   The piece of bark is of little value in most cases for determining species. Could you not obtain a leaf-bearing twig?

Dusky Coral Pea.

S.R.E. (Esk)—

Your specimen is *Kennedya rubicunda*, the Dusky Coral Pea, a rather handsome climber of the family Leguminosae, found in all the Eastern States.

Daisy Bush.

E.R. (Lamington, via Beaudesert)—

Your specimen is *Olearia nernstii*, a species of Daisy Bush found growing in several mountain localities in South-eastern Queensland. It is very closely allied to the garden Asters and by some botanists the genus Olearia is as a matter of fact not regarded as distinct from Aster. The plant is worthy of cultivation as an ornamental shrub and we think could be grown quite easily and successfully from seeds.

Curled Dock.

F.B. (Goomeri)—

Your specimen is the Curled Dock (*Rumex crispus*), a common European weed naturalised in most warm temperate countries. It is often seen about Brisbane as a weed of waste places, but is most abundant on the Darling Downs, where it is somewhat of a pest on the wheat fields. Docks as a rule are generally regarded as having little or no fodder value.

Burr Trefoil.

J.K. (Spring Creek, Stanthorpe)—

Your specimen is *Medicago denticulata*, most commonly known in Queensland and New South Wales as "Trefoil" or "Burr Trefoil." It is a native of Southern Europe, but now occurs in the pasture lands of most of the warm temperate countries of the globe. It is one of the most abundant plants growing in Southern Queensland and New South Wales, particularly in the wheat belts, and has largely displaced the original native pastures. It is a comparatively short lived plant, generally commences growth in the autumn, seeding about September or October. When in seed the plant bears a number of burr-like pods. These, however, are eaten by sheep and are most nutritious. Although not so palatable as the clovers and some herbage, it is fairly nutritious and is eaten readily by stock.

Twin Leaf.

T.H.M. (Columboola)—

The specimen is a species of Twin Leaf, botanically *Zygophyllum apiculatum*. About half a dozen species of the genus Zygophyllum occur in Australia and all probably possess similar properties. They have been accused, both here and in the other States, of being poisonous to stock, but not on very definite grounds. Though the present species is extraordinarily abundant in parts of Queensland, and during times of drought may be the only green seen, we do not remember having seen stock eat it to any extent. The late Mr. J. H. Maiden, however, writing in the "Agricultural Gazette" of New South Wales (vol. xi., p. 24) quoted Mr. Max Koch, a well-known botanical collector, as stating, about Zygophyllums, that "they form, in a good season like the present one, a most valuable adjunct to the winter pasture, providing succulent, if not very nutritious, fodder for both cattle and sheep. My horse is always ready to make the best use of a short halt by feeding on the plants indiscriminately and with a relish, and the cropped appearance of a neighbouring paddock which is stocked with sheep is ample proof of the usefulness of these plants. The foliage being of a watery nature, enables the sheep to do without a drink during the winter months as long as the herbs last, and to feed in the more remote portions of the paddocks. This is a matter of great advantage to the sheep-farmer, for the pasture near the wells (Mr. Koch is speaking of the dry country in the interior—J.H.M.), which is more or less heavily punished during the ever-recurring spells of dry weather, has an opportunity to recover. They mature seed in abundance, and perpetuate their kind regularly, provided seasonable rains fall at the end of February or the beginning of March." This would seem to indicate that the plants are not poisonous, but have a definite fodder value.

Lasiandra.

T.H.B. (East Barron, via Atherton, N.Q.)—

Your specimen is *Pleuroma splendens*, generally known by its other generic name of *Lasiandra*. It is a native of Brazil and belongs to the family Melastomaceae. We have several native shrubs of the family Melastomaceae, one or two of them with rather pretty flowers but not quite so large and showy as the garden Lasiandra.

Johnson Grass.

J.C. (Childers)—

Johnson Grass is poisonous to stock, especially in its more luxuriant stages, although very few deaths have been reported from it in Queensland. The only ones have been occasional losses among dairy cattle. Like Soudan Grass, Imphee, and other plants of the Sorghum family, Johnson Grass possesses a prussic-acid yielding glucoside, and if eaten in quantity may cause trouble. The symptoms you described, however, do not tally with poisoning by this grass, for when this does occur death is very rapid.

"Mexican Clover"—Common Flax.

A.C.R. (Bli Bli, via Nambour)—

1. *Richardsonia scabra*, a native of tropical America, but now common as a naturalised weed in most warm countries. It has been boomed in America as a fodder under the name of Mexican clover, but does not, of course, belong to the true clovers, or to the legumes at all, but to a totally different family, the Rubiaceae. Our experience in Queensland generally is that stock rarely touch it, though we have had one or two reports to the contrary.
2. A plant with blue flowers, is the common flax or linseed, *Linum usitatissimum*. It has apparently come up from some linseed that has been spilt or as an impurity in agricultural seed.

Roughage.

The Agricultural Chemist, Mr. J. C. Brünnich, in answer to a correspondent, advises as follows:—

"Under the term roughage we include all forms of dry grasses, chiefly found in the form of stubble after seeds have all been shed. This stubble is practically the only food available at the end of winter in many districts. The nitrogen contents are generally very low, as such roughage contains, as a rule, only from 1 to 3 or 4 per cent. of protein, whereas the green grass may contain as much as 15 to 18 per cent. of protein.

"The use of licks made from salt and lime phosphate, either in the form of bonemeal or finely crushed Nauru phosphate, not only supplies the animal with the absolutely necessary amounts of lime and phosphorus, but also greatly increases the digestive powers and appetite of the animal, and a larger amount of the poor roughage can be eaten and digested, which is of utmost importance when only such poor quality of fodder is available. For general purposes we recommend simply a mixture of one part of ordinary butcher's salt and two parts of finely-crushed Nauru phosphate. The great trouble is to make the animals consume a sufficient amount of this lick, as sheep require about 3 oz. per week per head, and cattle at least 1 lb. per week. The addition of a little molasses or some sort of meal is generally recommended to make the lick more palatable."

PIG RAISING.

(Selected from the outward mail of the Senior Instructor in Pig Raising, Mr. E. J. Shelton, H.D.A.)

Points in Pig Breeding.

M.V.I. (Biloela)—

As a general rule, stud boars and breeding sows are productive for about seven years of their life. Neither male nor female should be used for breeding until they are at least ten months old, and if they are twelve months old (especially in the case of the sow) so much the better. Young boars may be given a sow or two when from nine to ten months old, but should not

be put to active service under one year old. Both boar and sow should be culled after passing eight years of age, while if for any reason they become unproductive before reaching that age, it will pay to get rid of them. Both are in their prime when between three and four years old, though many boars are reliable stock getters and many sows dependable mothers for a longer period than eight years.

Generally, however, the teeth wear down and become uneven after eight years of age and the animal is not able to forage to the same advantage as younger stock, while in most cases as the stock increase in age they become heavier and less active and the sows overlie a good many of their young ones.

It is preferable, if at all possible, to have boar and sow of similar age and size, that is to say, it is inadvisable to mate an aged and heavy boar to young sows, as accidents frequently happen from following such a practice and it is inadvisable to have a very young boar for mating with aged sows by reason of the fact that very often animals of varying ages fight a good deal and aged sows will often punish a young boar to such an extent as to practically ruin him for service.

Aged animals also very often become lethargic and disinclined to breed though they are very strong and determined, and if permitted to feed at the same trough with younger stock will cause a good deal of trouble and losses in fighting among themselves.

Dealing with the question of mating the Tamworth boar with Berkshire sows versus the mating of Berkshire boar with Tamworth sows, it would be well to add that there is no hard and fast rule to follow in the mating of various breeds for the production of pork and bacon pigs, nor does it follow that the Tamworth-Berkshire cross is the only one advised. Experience proves it is largely a matter of individuality of the various animals used together with any particular fancy a breeder may have for one or other of the types commonly used. It is often a difficult problem to pick and choose in the matter of selection of breeding stock, for in many instances there is a shortage of one or other of the breeds and a liberal supply of others. Usually it is possible to secure reasonably good Berkshire sows in districts where Tamworth sows are in very short supply, and in these cases we recommend the use of a really good Tamworth boar; in any case the Tamworth boar is a reliable stud sire and is frequently more active and dependable than the Berkshire.

On the other hand a first class Berkshire boar mates to advantage with selected sows of the Tamworth and first class Tamworth-Berkshire type, the latter sows being in great request in most districts where pig-raising is carried on.

The same observations apply in the case of breeds other than the Tamworth and Berkshire; that is to say, a Berkshire boar mated to a Large Black sow should be productive of good results, the sow being large and roomy and of a type noted for prolificacy and heavy milk production.

Other of the larger breeds like the Gloucester Old Spot, Duroc-Jersey, and the Chester White may be used in much the same way, while under a proper system of feeding and management, purebred pigs of these breeds may profitably be produced as good pork and bacon pigs. The Yorkshire types, being of more medium build, are suited for porkers and light bacon pigs.

It does not pay to castrate aged boars with a view to fattening them for market, for the price they realise would not pay for the feed and expense incurred in their handling. If feed is plentiful and reasonable in price, old sows may be disposed of for small goods purpose, but these matters need careful study.

Points in Pig Feeding.

J. de V. (Mapleton)—

It is quite evident the illness from which the pigs suffered had as its primary cause improper diet and unbalanced rations, followed by inflammation of the stomach and intestines and severe constipation. It is possible also that some of the maize was mouldy and rotten, and that the troughs had not received a necessary daily cleansing.

Pigs fed on unbalanced rations, like a ration consisting almost entirely of boiled maize, would naturally have a craving for flesh-forming materials, minerals, and vitamins, and would in the absence of these resort to eating sand and soil, and possibly indigestible fibrous matter. It is very unkind and unprofitable to lock animals up in bare dusty pens or yards and feed them almost entirely on boiled maize, good and all as that food is when properly balanced with flesh formers, minerals, &c. In fact there is no profit at all in forcing pigs to consume large quantities of comparatively high-priced food and refusing them the more bulky succulent nutritious green foods. These green foods—lucerne, field peas, green corn stalks, sorghums, &c.—are all cheap and efficient foods when fed with maize and other concentrated foods, plus, of course, an abundant supply of clean drinking water, from an absence of which pigs may greatly suffer. There is no reason at all why pigs should suffer from such ills if they are properly fed and cared for.

Rice Meal for Pigs.

J.J.M. (Cinnabar)—

According to Henry and Morrison's "Feeds and Feeding," rice bran and rice polish, both products of the same class as rice meal, though not so concentrated, are economical foods for pigs. One hundred pounds of rice polish being equal to 133 lb. of corn and 100 lb. of rice bran equalling 112 lb. of corn. Rice meal and similar rice products are, however, relatively poor in crude protein and fat, hence it is not a good food from a purely growth point of view. The meal is a by-product from the manufacturing process of commercial rice; the small, broken, stained, and surplus grain is also ground into a meal and is doubtless mixed with the by-products in milling. It has a good feeding value, when fed with milk, maize, and other cereal meals and green foods. It is usually valued at about the same as pollard and is sold in bags containing 5 to 7 bushels (approximately 100 to 140 lb.).

Recent samples of rice meal analysed by the Department of Agriculture and Stock, Brisbane, gave the following result:—

Moisture	10.5 per cent.
Crude protein	12.6 per cent.
Crude fat	13.9 per cent.
Crude fibre	8.9 per cent.
Crude ash	8.8 per cent.

Pollard usually carries about 10.5 per cent. of moisture, about 15 per cent. of crude protein, 3.5 per cent. of crude fat, 6 per cent. of crude fibre, and 3 per cent. crude ash.

It will be seen therefore that rice meal carries less protein than pollard, but has a higher fat, fibre, and ash content, this indicating that it would need to be fed in conjunction with foods carrying more protein like milk, grain, lucerne, or lucerne chaff (soaked), peas, or pea meal, or even with a percentage of pollard if milk and green foods were in short supply. Where pigs do not do well on rice meal it would pay to reduce the supply down to a minimum and increase the supply of other foods like maize, for rice meal does not appear to be as palateable or as appetising as maize.

Try soaking the rice meal in milk or milk and water and if possible add a percentage of lucerne chaff. The addition of a very small percentage of salt and bone meal would also prove of considerable advantage, and in each of these cases the cost of feeding would not be materially increased, especially if a good supply of green lucerne or other green stuff could be worked in. It is useless trying to force pigs to consume meals, &c., on which they do not develop satisfactorily, hence if these suggestions do not lead to improvement we would recommend cutting out the rice meal and using pollard, barley meal, or commercial pig meals.

General Notes.

Canegrowers' Organisations.

An Order in Council and Regulations have now been passed under "*The Primary Producers' Organisation and Marketing Acts*, 1926 *to* 1928" setting out definitely the powers and functions of the Queensland Cane Growers' Council, District Cane Growers' Executives, and Mill Suppliers' Committees.

Banana Beetle Borer—Proclamation Rescinded.

On the 22nd September, 1927, a Proclamation was issued prohibiting the introduction of any banana suckers into the Wolvi district, which was then free from beetle borer infestation. On a petition being received from growers in the Wahpunga district and upon the recommendation of the Wolvi L.P.A., the Proclamation has been rescinded, thus allowing banana suckers to be introduced from outside areas. This prohibition has been lifted on account of the Wolvi district having become infested with beetle borers.

The Royal Society of Queensland.

The ordinary monthly meeting was held in the Geology Theatre on Monday, 30th September, 1929.

The President, Professor J. P. Lowson, M.A., M.D., was in the chair.

Mr. H. J. G. Hines, B.Sc., was elected to ordinary membership.

Professor E. J. Goddard, B.A., D.Sc., delivered a lecture entitled "Science and Agriculture in Java." A vote of thanks was carried on the motion of Dr. W. H. Bryan, M.C., seconded by the President.

Kikuyu Grass in Paspalum Pasture.

Kikuyu grass is a useful plant to work in amongst paspalum, or to plant in ploughed paspalum areas, as it will not only hold its own, but in most cases will choke out the other grass. Kikuyu is more drought resistant, and produces more feed during winter months than paspalum, although it must be remembered that it is primarily a summer grower. It does not form seed, and consequently roots have to be planted.

The best time to plant is during the spring. Where it is impossible to plough the roots in, such as on hillsides or in stony land, use a mattock or hoe, completely burying the roots 1 to 2 inches deep, so as to prevent stock from pulling them out of the ground during the early stages of growth.

The Silent Men.

There are many men of great ability who are not good talkers and the world owes much to them. We read the other day of a director, concerning whom the president said, 'His words are few, but his judgments were wise and influential.' We have known cases where the most voluble members of a committee or board would discuss a matter for hours, but in the end the decision nearly always rested upon the opinion of one or two men slow of speech, but of remarkably sane and well-balanced judgment. The idea that fluency must necessarily mean great mentality is an erroneous one; the thinker is often slow of speech and he is not apt to shine in society. Youth finds it difficult sometimes to realise this, and is apt to pin its faith to the man with the golden tongue, forgetting that intellect and heart are of much greater importance than facility in speech.—The "New Outlook."

The New Pace in Industry.

I am aware that in England we have some factories managed as well as any in the world; but I am afraid it is undoubtedly true that there is in this country a larger mass of cynicism regarding scientific management than there is anywhere else in the world. There is a larger proportion of men in charge of businesses who do not recognise the need for any intellectual preparation for the job of management. There is a larger proportion of people who think that just because a man is his father's son he can manage the business which his father managed. The fact is that the pace of industry is very rapidly increasing, and the standard of efficiency needed for success is rapidly rising. The British are second to none in technical matters, but they have been inclined to neglect the questions of administration and organisation.—Mr. Seebohm Rountree, in the "Yorkshire Post."

When Feeding Sorghum.

Sorghum should not be fed to stock until it comes into head; if fed prior to this stage there is a danger of what is commonly known as sorghum poisoning. The greatest yield of green fodder is obtained when the seed has formed, but is still in the milky stage. At this stage the crop is very palatable and digestible.

Sorghum poisoning is of fairly common occurrence in Australia, and has also been reported from other countries, but it is only necessary to adopt certain precautions to avoid loss. The poisonous substance gradually diminishes as the plants become old, and entirely disappears by the time the seed is formed. Stock should not be allowed to eat young sorghum, especially if it is wilted through hot, dry weather. Stunted sorghum may also cause death, and immature sorghum which has been frosted is dangerous. The mature sorghum is harmless, and can be fed with perfect safety.

A Temperature Tail—The Curl of the Pig's Appendage.

Owners of Berkshire pigs in the United States declare that they can tell when it is going to be a cold windy month by the curl of the pigs' tails. One farmer avers he has forecast weather for years by simply watching the pigs' tails. This is what he says:—

When the tail straightens out, you may depend on colder weather, because the Berkshire is reaching out for the heat. In other words, the Berkshire figures that the longer his tail the more radiation he gets, whereas a tightly curled tail gets the sun only a few hours a day. Naturally when a pig's tail is curled up he is not getting, nor does he need, the warming rays of the sun. I suppose this is the same with other breeds. Take it from me, says the writer, a Berkshire tail works the same as a thermostat. It contracts and expands according to the temperature.

Passion Fruit Yields.

"It is being asserted in some quarters," writes the departmental Fruit Instructor located on the North Coast (New South Wales), "that a yield of 200 bushel cases of passion fruit per acre is a fair average yield under North Coast conditions. This estimate is greatly exaggerated and is, no doubt, based on the fact that some five years ago yields of that quantity were obtained in the Tweed River valley. It is most unreasonable, however, to assume that what can be achieved in that particular district is also possible anywhere on the North Coast, from Kempsey to the Tweed Heads. Moreover, in recent years, brown spot and woodiness have substantially reduced yields, and the grower who to-day is harvesting 140 bushel cases per acre should be satisfied that he is obtaining a fair average crop. Even to obtain that quantity, he will need to have a fair knowledge of proper cultural practices and disease control measures, and, in addition, be favoured with a normal season."

Laymen as Research Workers.

The layman is often deterred from serious application to any branch of science by the length of the road he thinks it will be necessary to travel before becoming qualified for research. If it were essential to master a subject before attempting to contribute to its advancement by original work, none of us could hope to become more than industrious seekers after omniscience within a restricted field, said Professor A. C. Seward, F.R.S., speaking at the annual British Association meeting. Anyone of average intelligence, provided he or she has the driving force born of enthusiasm and the faculty of taking pains, is capable of making valuable contributions to knowledge in some department of scientific inquiry. Amateurs have taken an honourable and productive part in advancing geological and botanical knowledge; they have an advantage over professional teachers in that they are free to concentrate their energies where preference leads them. Moreover, laymen are more fortunate than professional men of science, who are expected to be able to answer all questions relating to the subject they profess, in not being expected to know more than they know.

Scours in Calves—Method of Treatment.

Scours is one of the commonest maladies affecting artificially-reared calves. It is almost always caused by careless feeding—of milk that is too cold, not quite fresh, or contaminated by the oganisms which cause scours, by too large a feed, or by too rapid a change from one class of food to another. Primarily, it is an evidence of

indigestion and should be checked before it reaches the stage known as "white scours" or the more dreaded "blood scours."

The best measures to adopt are—

1. Reduce the quantity of milk per feed.

2. Look for the cause of the trouble.

3. Heat milk (for affected animals at least) to a temperature of 180 deg. Fahr. for ten minutes and keep in perfectly clean surroundings.

4. Give the calf about 2 oz. of good castor oil (cold drawn) to remove the corrupt and undigested material from its stomach as soon as possible.

"What Was He Worth?"

"'What was he worth?' is no uncommon question after a man's death, and such a question is a painful tribute to the commercialism of to-day. If a man is worth no more than what he left, he is worth nothing," says the "Expository Times." "A man is worth what he is, not what he has; and that is true both of this world and of that which is to come. While he lives he may win and lose everything but one—his own personality. That is always his: ultimately it is all that is his. In that lies his worth—not in the abundance of the things which he possesses and can lose. And when he dies, he loses what he has, but he remains what he is. He who is unjust will be unjust still; he who is holy will be holy still; but he who is wealthy will be wealthy no more. When a man is said to be worth so much, let us ask, To whom? Who was the better for what he was worth? Was even he himself the better for it, or was he only the richer? Did his presence lighten any darkness, cheer any loneliness? Was any heart the sorer for his passing? Unless he was a worthy man, unless, that is, there was something in him we could worship—for worship is tribute to worth—he was worth nothing, though he had millions. The day is not yet come—will it ever come?—when inner worth is rewarded with its corresponding share of the world's good things, its honour, fame, and gold. There may be some world where worth and wages invariably and accurately correspond, but assuredly it is not ours."

A Story of Steady Progress.

Thus the "Queensland Producer":—The annual report of the Under Secretary for Agriculture (Mr. E. Graham) was tabled in the Legislative Assembly recently. Mr. Graham is to be congratulated upon the comprehensive review of the State's primary industries.

Mr. Graham makes no extravagant statements regarding Queensland's primary production. He indicates the steady progress that has been made in the various sections of agricultural industries.

The wheat yield showed a decrease on the previous year; sugar-cane production was well maintained; cotton showed a decrease due to the uncertainty as to the attitude of the Federal Government towards the industry; butter production was a record—a tribute to the magnificent work performed by the co-operative associations and the efficient organisation of the marketing end of the industry; steady progress has been maintained in the pig industry; the rapid expansion of the poultry industry has been maintained.

One feature of the year's operations was the improvement in the quality of fruit. There was a decrease in the number of cattle and horses, and an increase in the number of sheep.

Mr. Graham's story is one of steady progress, and indicates the wide range of Queensland's agricultural production.

Blowfly Trouble in the Central West.

The Minister for Agriculture and Stock, Mr. H. F. Walker, M.L.A., informed the Press recently that upon his being advised of a serious outbreak of blowfly attack in the Central West, he had arranged that Mr. J. Carew, Senior Instructor in Sheep and Wool, should investigate the methods adopted by pastoralists in combating this pest, and also to advise, in all necessary cases, as to the best way of dealing with it.

Mr. Carew spent some time in the Western country and discussed with a number of pastoralists their methods of combating the difficulty. Some flock owners picked out all affected sheep for treatment. This treatment consisted of crutching, cleaning, and swabbing the infected parts. The remainder of the flock were then jetted with a proprietary powder dip used in liquid form.

In one instance, Mr. Carew inspected ewes that had been jetted four weeks previously with this mixture, at the rate of two packets to fifty gallons of water, applied by power at a pressure of about 150 lb. to the square inch. The ewes had been crutched in May, and no stricken sheep were noticeable in this particular flock.

Generally, Mr. Carew found that jetting gives more protection than, probably, any other method, provided that the mixture is sufficiently strong and properly applied with enough force to reach the skin. The real jetting objective is to ensure that the fluid reaches the base of the wool fibre and the skin. It was found that in some cases where this contact was not effected the jetting fluid did not penetrate to the parts most likely to be affected by fly.

Both in the Longreach and Barcaldine districts it appeared that the intensity of the attack had abated, and that the owners generally were getting the pest well under control, although some sheep had been lost.

Millet as a Catch Crop.

Millet is perhaps the quickest growing of all plants cultivated on the farm, provided it finds suitable weather conditions, and its utility as a catch crop is becoming increasingly recognised.

Millet may be grown for hay, green fodder, or to be fed off by stock—it is useful for feeding to all classes of stock and poultry. The crop may be fed off green, and then allowed to produce growth for hay. Where it is fed off the stubble should be harrowed to loosen the soil and conserve the moisture, and in this manner a good second growth is usually obtained. Owing to its sturdy habit, millet has been found a splendid crop to grow on foul land to get rid of the weeds.

The most useful varieties are Japanese, Hungarian, Manchurian (white and yellow), White French, and Pearl, and of these Japanese is by far the most grown. Japanese is about the best stooler of all the millets; Hungarian is useful as a hay variety, but is not a good stooler and will not stand a dry weather pinch like Japanese; while where grain is required the Manchurian varieties will be found the most prolific.

Millet obtains its nourishment chiefly from the surface soil, and it is good farm practice to stimulate the growth with readily assimilable fertilisers or rotted farm manure; the fertilisers are best harrowed in, and the farmyard manure applied before ploughing.

From 8 lb. to 12 lb. seed per acre is required, according to the fertility of the land. Broadcasting is the usual method of sowing, but for grain production or silage drilling is advantageous. Where possible, sowing should be carried out after rains or when the soil is moist, to give the crop a start.

Water for Bees.

The bee-farmer should generally endeavour, when selecting a site for his apiary, to get near a permanent water supply, for bees require an ample supply of good water, especially during the hot weather. If there is neglect in making provision for water near the apiary, there is considerable wastage of energy on the part of the bees in searching for a supply, and in carrying it a long distance.

It is not a very difficult matter to provide a water supply even if containers have to be used. A container offering a good surface of water is preferable, and cork floats can be put in the vessel to prevent the bees from being drowned. Another method is to bank sand in each side of the vessel, and place a cover over the water, which is in the centre; the bees will obtain the water from the moist sand. It is important that the water supply be kept fresh. A supply of water in the apiary grounds is especially advisable where bees are kept in towns, so as to get the bees into the habit of obtaining water at home, and not searching about the neighbourhood for a supply.

There are many points to be considered in starting an apiary, particularly when bee-keeping is to be carried out on commercial lines. As in other activities, the start is all-important. Five well-hived colonies containing a fair breed of bees will, with ordinary attention, equal thirty of the "kept any way" sort, so far as production is concerned. It is quality, not number, that counts; and the beginner's first aim should be to keep bees the right way.

A very comfortable living can be made from apiculture, providing the apiarist will properly qualify himself to become a producer. The three main things are experience, locality, and energy. Small apiaries can be profitably worked as a side-line with other industries, providing time can be found for ordinary attention during the season.

Music in the Air.

A series of tests with the most modern creations of radio engineering from all parts of the world have been carried out by the principals of Paling and Co., of Queen street, Brisbane, in an endeavour to obtain radio sets that may be relied on to give best performance and utmost satisfaction. The result of this extensive research has been to bring Majestic and Victoradio to Queensland, Palings, of course, being Queensland agents. From every angle Majestic and Victoradio are said to represent the last word in radio design and construction. The cabinet work on all models is most artistic, the finish to all appearances perfect and the reproduction practically faultless. Both electric and battery sets are included, and, perhaps, the most interesting of all are the combination radio sets and phonographs—both Majestic and Victor. As radio sets they are very powerful and being equipped with the latest type of dynamic speakers, bring in all Australian programmes—including short wave stations —with unusual clarity and purity of tone. As far as the phonograph is concerned, one has only to play one record to realise that it is a machine of special quality. A button on the front of the instrument controls both the volume for the radio and phonograph, and, especially when the phonograph only is being played, results in a class of reproduction one rarely hears.

Both these combination instruments are beautifully designed, and being finished in perfectly matched walnut or mahogony, have the appearance of excellent pieces of furniture that would find a place in any drawing-room, no matter how elaborately furnished. Other Majestic and Victor models are also beautifully made and most efficient.

Marketing of Tomatoes.

Some time ago notice was given by the Committee of Direction of its intention to issue a Direction for the marketing of tomatoes. As a consequence, a petition was received asking for a ballot to decide whether or not such Direction should operate, and Regulations under the Fruit Marketing Organisation Acts were issued on the 31st August last, describing the procedure which should be adopted in the holding of the necessary ballot. Those entitled to vote were any growers of tomatoes within the District bordered on the north by Nambour, on the west by Rosewood, on the south by the New South Wales border, and on the east by the Pacific Ocean. The grower had to declare that he expected to have tomatoes for sale on a wholesale basis between the 15th September and 15th December, 1929. The Direction the growers had to vote on was:—

(*a*) All tomatoes to which the Direction applies shall be subject to inspection by the Committee;

(*b*) All mature tomatoes may be marketed by the growers;

(*c*) Tomatoes which are not mature may be diverted by the Committee to the factories; and

(*d*) All tomatoes are to be dealt with and handled by the loaders of the Committee of Direction, but this did not mean that all tomatoes would be sold by the Committee.

Briefly the object of the Direction is to deal with immature tomatoes, the intention being that growers themselves should be able to market mature fruit.

The poll was duly conducted and the result was that 147 voted for the Direction and 85 voted against. As this was more than the three-fifths majority required under the Act, the proposed control became operative.

Australian Wildflowers.

In view of the recent discussion on the ways and means of stimulating interest in Australian native flora, it is pleasant to note among the publications of the Shell Oil Company an attractive brochure on Australian Wildflowers, "issued gratis to the motoring public of the Commonwealth."

In the preface of this little book is expressed the desire of the company to stimulate public interest in our abundant natural flora. Although there are technical works on the subject for the botanist and many delightful reproductions of specimens on canvas, the need has long been felt for some non-technical descriptive work that may be both interesting and instructive to the general public, and may serve at the same time as a practical handbook to those who, taking trips into the country or living there, have the opportunity of studying the flora first hand.

Authoritative information on the parts of the country where the different varieties of flowers may be found is given in the small volume which contains some fine coloured plates of popular favourites.

More important still is the direct appeal it makes to the public to protect the wildflowers of this country. The need of such an appeal has been increasingly felt with the wanton destruction so much in evidence each season in the nearer country districts.

The Victorian Government Pomologist, Mr. E. E. Pescott, speaking at the Constitutional Club on 16th August, 1929, called attention to the manner in which Australian flora is slowly but surely disappearing.

By this publication the Shell Oil Company is helping to stimulate a greater public pride in the beauty of the countryside—especially so in view of its free distribution. The motorist, on applying for the book, should send in with his application to the Shell Company the registration number of his car.

Cleanliness in the Milking Shed.

Absolute cleanliness in connection with the operation of milking is of the greatest importance. The cow having been bailed or tied up, the milker should wipe the udder with a damp cloth; this is preferable to brushing, which only causes the dirt to float in the atmosphere and subsequently to drop into the milk bucket. A separate cloth should be used by each milker, and should be kept thoroughly clean and sweet —a smelly cloth is a source of contamination.

Where gravitation water is not available, a good plan is to have, say, two oil drums, into each of which is fixed a small tap. These drums should be fixed to the posts or walls and filled up with water, a system thus being installed that allows the milker to have clean water in which to wash his or her hands. Very often one finds basins of water used, but as this is probably not changed during the whole milking operation it becomes a thick soup containing myriads of organisms, and therefore a source of contamination instead of benefit. After the milking of each cow the milker should wash his hands in clean water, and dry them; if this is not done there may be bacteria in the liquid on the hands that will gain access to the milk in the bucket.

Dry milking versus wet milking is often a debated point, but the practice of drawing a little milk into the bucket and dipping the fingers therein is undoubtedly most insanitary. A good plan is to touch each teat with a little vaseline, which prevents friction, and also prevents cracks on the teats.

Any time occupied in washing the hands is made up eventually by reason of the water's invigorating effect on the hands and wrists of the milker. Moreover, as every dairyman knows, the more actively the milking is done the more the activity of the milk-secreting cells is stimulated, hence more milk of better quality. Clean milking also tends to lessen the risk of transmitting disease from cow to cow.

Not only should every process in connection with the milk itself be cleanly, but cow-bails should be so constructed as to allow of easy cleansing, and should be frequently lime-washed as well as cleaned daily.

Staff Changes and Appointments.

Mr. G. Bates has been appointed Field Assistant, Bureau of Sugar Experiment Stations, Department of Agriculture and Stock.

Constable C. F. Robson, of Mitchell, has been appointed an Acting Inspector under the Diseases in Stock Act as from the 19th October, 1929.

Mr. S. C. Allan, of Cloncurry, has been appointed an Inspector under the Brands Act of 1915.

Messrs. H. W. Kerr and E. J. R. Barke have been appointed Inspectors under the Fertilisers Acts.

Constable V. B. Saal, of Tannymorel, has been appointed an Inspector under the Slaughtering Act.

Mr. J. P. Ward, Clerk, Agricultural Bank, has been appointed an Inspector, Agricultural Bank, as from the 2nd October, 1929.

Mr. S. R. Frankcom, of Tamaree, has been appointed an Honorary Inspector under the Diseases in Plants Acts, as from the 26th October, 1929, vice Mr. T. Jones, resigned.

Mr. J. C. Pryde has been appointed a Temporary Inspector under and for the purposes of the Diseases in Stock Act for a further period from 29th September to 2nd November, 1929.

Mr. P. J. Short has been appointed a Temporary Inspector under and for the purposes of the Diseases in Stock Act for the period from 12th November to 12th December, 1929.

Mr. J. H. Smith M.Sc. (Agric.), Assistant Entomologist, Cairns, has now been appointed Entomologist, Department of Agriculture and Stock, and Mr. W. A. T. Summerville, B.Sc., Assistant to Entomologist, Brisbane, has been appointed Assistant Entomologist, Department of Agriculture and Stock.

Mr. W. B. Horneman, Inspector under the Dairy Produce Act, at present attached to Nanango, has been transferred to Rosewood; Mr. E. R. Boyd, Inspector under the Dairy Produce Act, has been attached to the Nanango district; Mr. A. Hossack, Inspector under the Dairy Produce Act, at present attached to the Herd Testing Staff, Brisbane, has been transferred to Gatton; and Mr. S. E. Pegg, Inspector under the Dairy Produce Act, has been attached to the Herd Testing Staff.

Wheat on the Downs.

The Minister for Agriculture (Hon. H. F. Walker) has received from Mr. J. J. Kemp, a well known farmer of Junabee, a statement regarding the prospects of wheat growing on the Darling Downs, from which the following note is taken:—

> "I have no hesitation in saying that wheat can be grown successfully on the Downs, as I have been growing wheat over thirty years, and during that time have had only one failure, that was in 1901-2. In normal years we get a return of 8 to 10 bags per acre, good years to 13 bags. In 1916, which was a very dry year, on ground that was fallowed we got a return of 8 bags per acre; that proves if fallowing were done more extensively that there would be no failures of wheat. In 1923, another dry year with no fallow, we got a return of 16 bushels per acre. In 1926, a drought year, we had to feed most of the crop to stock and we got 12 bushels from what we harvested. My experience is to work the ground as early as possible after taking off the crop so as to conserve as much moisture as possible for the next crop. No use taking plough in the paddock when the drill should be there, as it is only courting a poor crop or failure. We have as good wheat land as can be found anywhere. All it wants is working early and well to give a good return. If this were done I venture to say that there would be few failures in regard to growing wheat."

Commenting on this Mr. Walker remarked that as indicative of the confidence which results from stability and mutual agreement between those concerned in industry, he had received an intimation from one of the country millers of his willingness to erect substantial stores at his mill entirely at his own expense, conditional on a small area of Crown land controlled by the Railway Department being made available to him for this purpose. The miller in question offered to have these stores erected immediately, and if possible, in time for the safe housing and storing of portion of the coming season's crop. Mr. Walker added that he was looking into the matter with the Department concerned. Obviously it would be preferable to house as large a proportion of the crop as possible in modern stores rather than to sustain losses through mice or weather damage.

The Fencing Job.

In the days when fencing timber was plentiful, posts were usually placed about 10 feet apart, and experience has shown that the most efficient fences are those with panels of about that width. The increasing scarcity of suitable timber, however, together with much higher labour costs, have in recent years compelled landholders to exercise greater economy in the use of posts, and the panels now are of much greater width; in extreme cases posts are as much as a chain apart.

In erecting a fence, however, efficiency must be taken into consideration as well as cost, and it is very bad economy to endeavour to save a little on the original cost by reducing the number of posts if the result means higher costs of maintenance or a fence that will not give the desired protection. Serious loss may occur through weak fences. The loss consequent upon several valuable working horses breaking through a weak fence on to ripe wheat, for instance, may be much greater than the saving effected in the erection of the fence.

While, however, it has been found that the strongest fences are those with panels of from 10 to 12 feet, experience has also shown that fences strong enough to resist all reasonable strains can be erected with panels of much greater width, provided suitable droppers are used. The extra cost involved in erecting a fence with narrow panels where fencing timber is expensive or difficult to obtain is therefore not always justified. In general, if posts are comparatively cheap and plentiful, panels can be made about 12 feet apart, but where posts are not easily obtainable the panels should be made wider, and droppers used instead. A suitable width for a panel is then 22 feet.

The chief points to be considered in selecting timber for fencing—though the choice will of course be limited by the kinds available in the vicinity of the area to be fenced—are strength and resistance to decay and to the attacks of white ants, and also to fire. Size is also an important consideration, though this depends on the kind of timber used, and upon the age of the tree from which the posts are cut; as a rule small trees are sappy and decay quickly. The most desirable size for posts is

about 8 inches by 4 inches; they are then strong and usually durable. Some kinds of trees, however—notably, the buddah of the western country—are extremely durable and strong, and posts of 4 inches to 5 inches diameter are quite satisfactory.

Profit in Pigs—Excellent Weights.

Discussing the weights attained by the first and second prize litters in the large Yorkshire section at the recent Melbourne Show, Messrs. Fairchild and Clutterbuck, whose stud is at Tinamba, Victoria, stated that they devoted a great deal of care and attention to the preparation of these pigs and spared no effort to place them before the Judge in the very best form possible. The litters and the sows, too, were shown to perfection and were as pretty as paint, and considerably more profitable.

The weights of these show litters of large white pigs (that is, large Yorkshires) at sixty-two days old were—

	Name of Dam.	Name of Dam.
	"Vaucluse Vanity"	"Vaucluse Venus"
Pig Marked in Ear No.	373 boar 78 lb.	381 boar 68 lb.
	374 boar 75 lb.	382 boar 72 lb.
	375 boar 71 lb.	383 boar 59 lb.
	376 boar 68 lb.	384 sow 59 lb.
	377 sow 64 lb.	385 sow 69 lb.
	378 sow 71 lb.	386 sow 66 lb.
	379 sow 73 lb.	387 sow 73 lb.
	380 sow 61 lb.	388 sow 65 lb.
	—	389 sow 64 lb.
	Total 561 lb.	Total 595 lb.
	Average 70.12 lb.	Average 66.11 lb.

Their feed was comprised of crushed barley, crushed wheat, pollard, linseed meal, bone meal, and skim milk, with the addition of all necessary minerals, and ¾oz. of cod liver oil daily per pig. The feed was supplied three times daily in the form of a slop. Of course green feed was at all times available and they were allowed any amount of exercise.

These pigs were all tattooed in the ears at five weeks old and the tattoo marks were as clear and distinct as if they had actually been painted on. It would be interesting to have records of the weights attained by other pigs of this or other breeds, and these, if certified to, will be given publicity in these columns as opportunity offers.

Weed, Breed, and Feed.

The requirements for herd improvement may be put into three words—*weed, breed,* and *feed.* The first step to weeding, or culling, is herd recording, in order to discover the "boarders" among the cows, and with respect to breed also the joining of a herd-recording unit is helpful, for although a sire that is able to beget heifers that will be high producers of milk and fat is cheap at a great many guineas, his purchase may be impossible to an individual farmer. An association of farmers, on the other hand, as in a herd-recording unit, will find such a purchase possible. As to feed, it would be impossible to lay too much stress upon it in relation to production, and though the commercial factor must not, of course, be lost sight of, by means of recording the dairy farmer in eventually in possession of a herd well worthy of good feeding.

Herd recording is the recording of each cow in a herd systematically over a lengthened period to ascertain its annual yield in milk and butter-fat, at the same time setting down, not only this production, but all factors that influence it—writing each cow's history and putting it in a card index. No business can be carried on without bookkeeping—the more departments there are, the more urgent is the need for a complete system of accountancy, otherwise effort is wasted, profit disappears, and no progress is made. The average dairy-farmer has forty to fifty departments in his business in the herd alone—each animal is a separate entity.

But an accountancy system will not by itself make for success in any enterprise: it is but a guide and help to the management. Building up production in dairy herds in this is like any other business. Recording by itself is not the cure-all of the average farmer's present precarious position—it can only point out the results of his methods and the merits of his stock under his system of management. He may have cows that under good conditions would be high producers, but because of faulty management, such as bad feeding, ill-usage, &c., they are unprofitable. The production record shows this and stresses the lesson never to condemn an animal until it has had a fair chance to prove itself. By watching results one learns the value of

feeding fully and regularly, never to waste the surplus fodder of a good season, nor to allow stock to go half starved in the winter or in dry spells.

Loss through neglect to make provision for feed—not only against those periods of acute scarcity which occur occasionally but also to supplement the natural pastures during those short periods of scarcity which occur at one period or another every year—constitutes a heavy charge on dairying. Growing of fodder crops, conservation of fodder in the form of silage, and improvement of the natural pasture by top-dressing and the sowing of grasses are all important as means of reducing such losses.

Importation of Pedigreed Stock.

The Minister of Agriculture and Stock, Mr. H. F. Walker, has been advised officially that the Federal Government has agreed to co-operate with the respective State Governments, the Empire Marketing Board, and the shipping companies in the defraying of the freight incurred on the importation of pedigreed stock from the United Kingdom. The class of stock to which this concession will apply comprises approved registered pedigreed stud cattle, sheep, and swine. The details of the scheme are:—

1. The following proposals shall apply in connection with the transport of approved registered pedigree stud cattle, sheep, and swine from the United Kingdom to Australia.

2. All other incidental expenses connected with the transport of the stock from the port of export in Great Britain to the port of importation in Australia, such as provision of stalls, cost of water, fodder, quarantine charges, and attendance during the voyage, to be borne as follows:—

(i.) One-third by the purchaser.
(ii.) One-third by the Commonwealth and State Government concerned in equal proportions.
(iii.) One-third by the Empire Marketing Board.

3. Where assistance is granted to any breeder, he shall not dispose of the stock within two years of the date of its importation, and should it be necessary for him to sell during that period, the amount of any assistance granted to him shall be refunded.

4. The purchaser to insure any animal imported to place of destination and for one year thereafter. Special insurance to be effected to cover quarantine. In case of total loss, purchaser to replace the animal by importation from the United Kingdom or refund all assistance granted from Government sources under the scheme.

5. Scheme to operate for two years from 1st October, 1929.

Those desirous of taking advantage of the scheme should make application to the Under Secretary, Department of Agriculture and Stock, Brisbane, giving full particulars of the class of stock they wish to import, and obtain the approval of the Minister. In the event of approval by the Minister to the transaction the shipping companies will then be advised and the necessary arrangements will be adjusted on the basis of the terms set out.

How to Cure a Hide.

A clean, well-cured, good-shaped hide, free from scores, cuts, blemishes, and slip will fetch top values, but there is a heavy annual loss due to neglect with regard to the above-mentioned points. The following directions for the curing of cattle hides are given in a recently published departmental pamphlet:—

The hide must be kept clean of blood, dirt, manure, or other debris, and allowed to cool. It should be laid out in a clean place, and liberally and evenly sprinkled with coarse salt. The quantity necessary is about 18 lb. per hide. The legs, neck, and edges of the hide require special attention, as they are the first to show the effects of bad salting. If the hide is to be disposed of at once, it should then be folded by throwing the sides over the centre, then the neck and tail-end again folded over, and rolled up into a bundle and tied with thin rope or stout twine. Wire should never be used, as it will eventually stain the hide. Efficient, clean, and quick salting is necessary to prevent the hide from turning more or less putrid. Putrefaction causes the hair to fall or slip, and "slippy" hides are frequently not worth tanning.

If it is intended to store the hides to make one large consignment they should be cleaned, and when the animal heat has escaped, placed on a clean floor which has been sprinkled with coarse salt. The hide should be laid down, fleshy side up, and sprinkled evenly with clean coarse salt. The next hide may be laid on top of the previous one and salted similarly. After being salted for a fortnight or longer they can be folded ready for sale and firmly tied with thin rope. Before bundling, any superfluous salt should be shaken or swept off.

If it is intended to keep skins on hand for any length of time it will be necessary to spray or paint them with an arsenical preparation in order to prevent the ravages of weevils or other vermin. A satisfactory spray can be made by adding 1 lb. arsenic and 3 lb. soda to 5 gallons of water and then boiling the mixture; when dissolved make up to 15 gallons of water. If preferred, arsenate of soda, procurable at most country stores, may be used in the strength of 1 lb. to 5 gallons of water. Another preparation can be made in the following way:—Dissolve 1 lb. arsenate of soda in 5 gallons of cold water; place 1 lb. bitter aloes in 2 gallons of water and boil until the aloes are properly dissolved, and add 1 pint of the aloes mixture to every 5 gallons of the arsenate of soda mixture. The spray is then ready for use.

Any preparation should, of course, be painted on the fleshy side of the skin.

Calfskins may be treated and folded in the same way as cattle hides. Two or three or more may be folded together to make a fair-sized bundle, and tied firmly together with strong twine or thin rope.

Inefficient curing and the dirty and stained condition in which hides and skins are often marketed do much to depreciate their value. Carelessness in these respects, together with faulty methods of flaying the skins of cattle and sheep and excessive branding of cattle and calves, is responsible for reduced returns to consignors, other causes of depreciation of the quality of the product being cuts and score-marks received by the living animal through horning, contact with barbed-wire, and other external injuries.

Poddies or Pigs?

Which pays the better—to devote the skim milk available on the dairy farm to the rearing of calves or to the feeding of pigs? In the opinion of many dairy farmers the pig is much the more profitable proposition.

Discussing this question in an address referred to some time ago in these notes, one South Coast farmer observed that one could not help noticing the enormous quantity of skim milk that was somewhat aimlessly fed to calves each year. If the trouble were taken to follow these calves to their ultimate exit from the district, it would probably be found that they were bought for stocking districts where farmers considered it more profitable to raise pigs, and to buy their calves from the districts where the farmers had never taken the trouble to sit down and think things out a little more thoroughly. No sound reason existed for farmers in that district raising more than 15 per cent. of the herd in female calves each year in order to replace ordinary depreciation of dairy herds. If all male calves and all female calves not required for replenishing herds were destroyed and the skim milk fed to pigs, South Coast farmers would, in the speaker's opinion, be in a much better financial position.

The same view was expressed by Mr. J. Alcock, at the recent State conference of the New South Wales Agricultural Bureau. The time had arrived for the greatest economy in every detail connected with dairy farming, said the speaker, and the loss on calves constituted one of the great leakages. Advancing the case of the pig as against the calf, Mr. Alcock compared the costs involved in rearing in relation to the value of the products.

When the calf was, say, five days old, it had a cash value of about 5s. 6d. (4s. 6d. for the hide and 1s. for the carcase as pig feed). For the first two weeks it was fed 1 gallon of sweet milk daily, the third week it was fed ½ gallon of sweet milk and ½ gallon of separated milk daily, the fourth week it was fed ¼ gallon sweet milk and ¾ gallon separated milk, for the next ten week 1½ gallons separated milk, and for the following thirteen weeks 2 gallons. This made a total of £2 10s. 2d. for feed alone, or, adding the value of the calf, a grand total of £2 15s. 8d. This calf was worth only 30s. to 35s. on any market; in fact, he had seen them sold for 10s. a head. At the present time choice lines of Jersey heifers were changing hands at under £3, and these would average nine to twelve months old.

Suppose, on the other hand, a farmer were to buy a sow near farrowing for £8. The cost of feeding would be that of a gallon of separated milk plus 3 lb. grain daily for two months, or £1 12s. 8d., making a total (with the £8 for the cost of the sow) of £9 12s. 8d. He would assume that the sow produced nine pigs, which was only an ordinary litter. The sow was then worth, say, £4 10s. without the pigs, leaving the value of the nine pigs at £5 2s. 8d., or 11s. 5d. each. The ration for these pigs for the third month was 28 gallons of separated milk, plus 48 lb. grain, for the fourth month it was 45 gallons separated milk and 60 lb. grain, and for the fifth month it was 45 gallons of separated milk and 70 lb. grain. This made the total cost of the pigs £2 5s. 11d. A pig of this age and fed on the ration described, with pasture in addition, should weigh at least 120 lb. dressed weight, and the average price for this class of pig was £3 10s.

Thus, said the speaker, the pig showed a profit of £1 4s. 1d. and the poddy a loss of at least £1. He had charged nothing for pasture for either, but the balance would still be in favour of the pig.

The Home and the Garden.

OUR BABIES.

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

SAVE THE BABIES.

A Season of Danger for the Infant.

The hot season is coming. Probably more babies will die during the next three months than during any other three months of the year. It is (though it should not be) the dangerous season for babies. They will die of an infectious and preventable disease. Save the babies!

Last year 112 babies under one year died in Queensland of this disease; the year before 214 died—nearly twice as many. Have our Baby Clinics doubled the efficiency of their work in the past year? Are our Queensland mothers twice as wise? We wish it were so. A part of the decrease may be due to better mothercraft. Most of it was due to good luck. Possibly this year we may have bad luck. The summer before last Rockhampton suffered from a summer epidemic which killed fifty-one babies under two years of age in three months. This season some other town may be threatened by a similar epidemic. Shall we trust our infants' lives to luck, to chance, to fortune? Save the babies!

Summer diarrhœa, dysentery, gastro-enteritis, by whatever name you like to call it, is an infectious disease. It is caused by dysentery bacilli, which are carried about by flies. It is not caused directly by hot weather. Nor has the Jacaranda, which happens to flower at this time of year, anything to do with it. The infection is never present in freshly boiled or scalded milk, for boiling kills dysentery bacilli. If the milk was stale and dirty before boiling, it will give babies simple diarrhœa; it cannot give them dysentery. The milk may be infected after boiling, so may any kind of artificial food, so may the baby's bottles, teats, and dummies. Those who sell dried milks or patent foods may suggest that in them lies perfect safety. It is not true! Foolish beliefs put into mothers' heads are paid for in infants' lives. Save the babies!

Natural Food for the Young Australian.

Save your babies by giving them their natural food—the only food which is perfectly clean, fresh, and safe. Never wean a baby during the next three months if you can possibly help it. If you must wean it, or if it has been weaned already, exercise the utmost care. Scald the milk, scald the bottles, scald the teats, then keep them most carefully covered from flies. Every single fly may carry death for your babe, or, failing death, an anxious, painful, and enfeebling disease. The strongest and finest baby may die of it. Nothing can make the dummy safe. It is a perpetual attraction to flies. Burn it. You may think that the dummy keeps your baby from crying and makes him happier. You are mistaken; but even if you are right, it is better that some babies should cry a little than that one healthy baby should die of dysentery. Be warned in time. Save the babies!

The Responsibility of Local Authorities.

And you Municipal and Shire Councillors, you are partly responsible. The flies get most of their dysentery bacilli from your closet pans. No doubt you have excellent Regulations to prevent flies from getting access to these pans. Do you enforce those Regulations? Have you sufficient and efficient Inspectors? Do you prosecute? Unless you prosecute a few careless people, your Regulations are useless. Save the Babies!

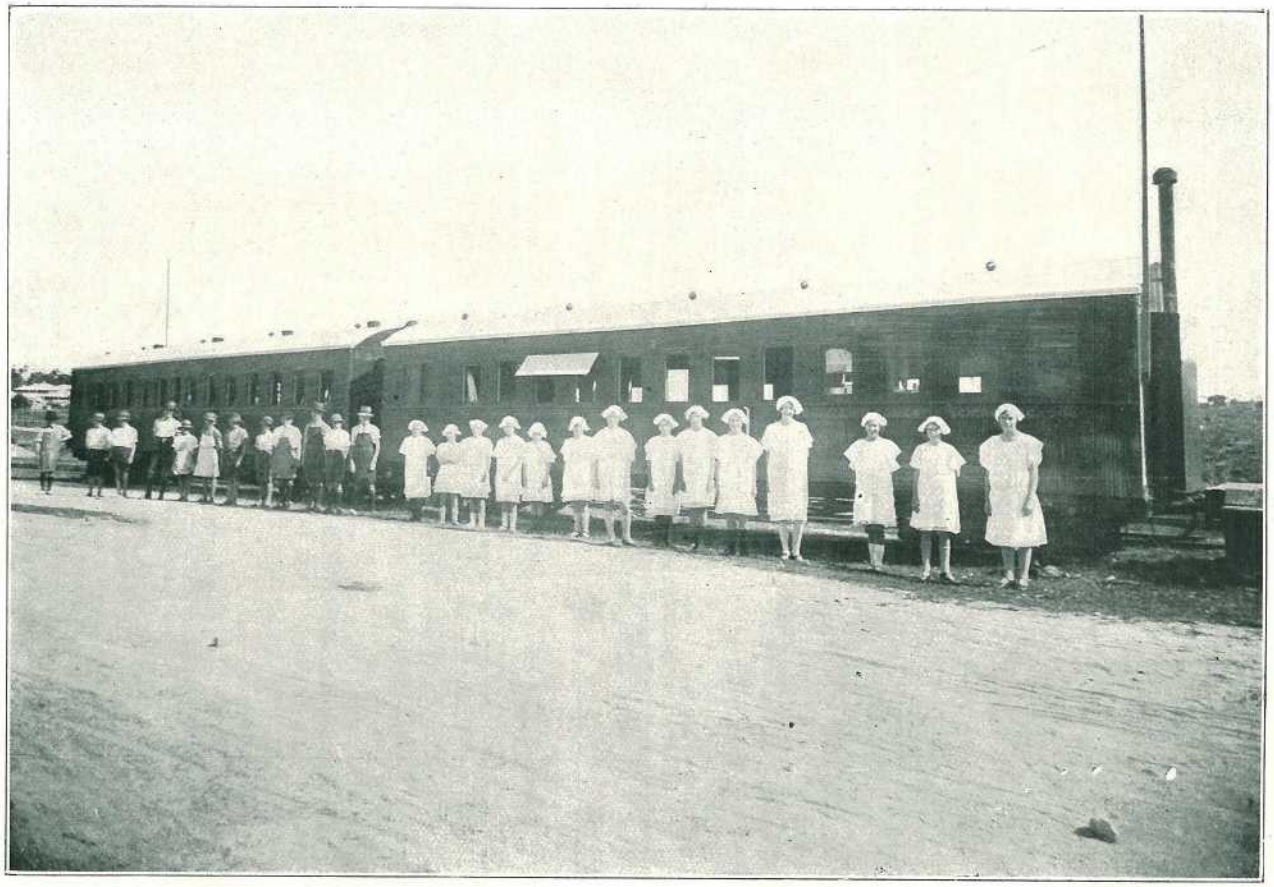


Photo.: Dept. of Public Instruction.]

PLATE 190.—A TRAVELLING DOMESTIC SCIENCE SCHOOL IN QUEENSLAND. A MUSTER OF SCHOLARS AT HERBERTON, NORTH QUEENSLAND.

There are very few schools in the State having an attendance of twenty girls over the age of twelve years for which provision is not made for Domestic Science Instruction. Even in very sparsely settled districts the travelling schools have been able to do very efficient work.

Keep Cool.

We do not say that every mother who does her very best will never lose her baby. That would not be fair nor true. There is no perfect safety for anyone in this world. But we do say that such cases will be very rare. There is no need, nor excuse, for foolish panic. Keep cool. Be very careful. Try not to make a single mistake. If you are in any difficulty, consult the Nurse at the Baby Clinic. She is always willing and anxious to help. If you live too far off, ask for a copy of the Queensland Mother's Book. It will be sent on application. Read it carefully. The lives of our Queensland babies are in the hands of our Queensland mothers. Resolve that this summer you will do your very best, God helping you. SAVE THE BABIES!

A CURIOUS INCIDENT.

There was, I am informed, a large gathering at the annual meeting of the Creche and Kindergarten. There is no institution in Brisbane that does more excellent and more delightful work than this. The best work is often least known, and it may therefore be assumed that this meeting was at least as well informed, and probably better, in child welfare as the general community. Just as some twenty years ago I heard the president of a medical congress declare that every child had its character formed at five years of age—a statement which then to me appeared startling—so at this meeting one of the speakers emphasised the importance of educating children between two and five years of age. A following speaker thought that education might begin a little earlier, perhaps at eighteen months, and appealed to the holder of the Chair of Philosophy at our University for his opinion. The Professor at once accepted the challenge, and said he thought it should commence at the first day; whereat the audience laughed, indeed their merriment was great and general. The unexpected, the incongruity, philosophers tell us, is closely allied to the ludicrous, and here were two unexpecteds—the absurdity of the opinion expressed, and the source from which it came. The Professor had made a joke!

No Joke.

But the Professor had made no joke. He had simply stated, what everyone ought to know. If he had said that the first thing a baby does is to breathe and cry, or that the first thing done to it is to put it in a bath, no one would have laughed. There are some who maintain that wherever there is life there is in some sense mind; an opinion which it is equally impossible to confirm or to refute. If it is not so, when and where does mind begin? Most of our knowledge is conjecture, and the commonest things are the profoundest mysteries. But it is certain that the new-born infant has some sort of a mind, for it can be taught bad habits, and those bad habits are strongly tinged with emotion. The experiment is frequently made, and is often successful. There is no need to repeat it. What is capable of bad must also be capable of good. Certainly the new-born infant should be taught good habits.

The Baby's Good Habits.

What are the good habits it may be taught? Firstly that of regularity, to take nourishment at the proper times, to sleep at the right periods, and so of all its bodily functions. Second, to exert itself when necessary, in other words to commence to work for its living, to co-operate at feeding time, not to have food passively poured into it from a bottle, nor to over-exert itself and clumsily swallow air, distending its stomach to its own great discomfort. Thirdly, it has to be taught confidence, trust, faith in its environment, by which we mean its mother. The babe that finds this environment irregular, untrustworthy, or spasmodic is not a happy babe. And so, fifthly, it has to be taught contentment, that state of serenity which only in infants, and sometimes in the very old, ripens into blessedness. Are not these important lessons? Need we argue the matter any further?

Laughter is good for body and mind. It is specially refreshing at public meetings. We hope that those who were present at this meeting will now have a quiet laugh at themselves, for not immediately recognising as a simple truth that which should be known by every woman and every father.

VEGETABLES.

Vegetables will require constant attention next month, particularly in the Granite Belt area. Tomatoes and potatoes should be carefully watched in order to prevent loss from Irish blight, and no time should be lost in spraying these crops should this disease make its appearance in any part of the district, as it can be prevented by spraying with either Bordeaux or Burgundy mixture. These fungicides effectually protect the plants to which they are applied if used in time. If leaf-eating insects, such as beetles, grasshoppers, and caterpillars, are doing damage as well, add 3 or 4 lb. of arsenate of lead to the 100 gallons of spraying mixture used for the prevention of early and late blight (potato macrosporium and Irish blight), so that the one application will be effectual for both classes of diseases.

Keep all kinds of vegetables well worked, stirring the land frequently to retain moisture, and taking care to prevent the formation of a surface crust should rain fall. Remember that vegetables require plenty of moisture; therefore leave nothing to chance, but do your best to retain all the moisture in the soil you possibly can.

THE COMPOST HEAP.

The compost heap is a valuable adjunct to the farm, and especially on small areas, where some intensive form of agriculture, such as vegetable growing, is being carried out. A heap or pit can be made very economically. It utilises all sorts of vegetable and animal refuse which would otherwise be wasted, and converts it into a valuable manure, rich in vegetable matter and eminently suited for soils low in humus or subject to droughty conditions.

The principle of the compost heap is the fermentation of easily decomposed vegetable matter in the presence of earth and lime. Not only are substances like peat and straw, which form the usual basis of compost heaps, thus decomposable, but almost every kind of organic substance, both of vegetable and animal origin, can be composted. Dead leaves, bush scrapings, sawdust, weeds, tops and stalks of vegetables, as well as bone and animal refuse can be treated in this manner. In the case of animal refuse the operation is much slower, and substances like bone should be first crushed. It is also important to be sure that animal refuse so treated is not derived from a diseased source.

The best way of making and maintaining the compost heap will depend largely upon local surroundings. As a general method of procedure the following will be found satisfactory. Make a heap with alternate layers of earth, refuse, and lime. Under the term refuse is included all the refuse material of animal or vegetable origin mentioned above. Cover the whole with a layer of earth. When a sufficient quantity of refuse is again collected, place it on top of the heap and cover with a layer of lime, and lastly of earth, until the heap is 3 to 4 feet high. The heap should be kept moist, and for this purpose all refuse water from the house, slops, &c., should be added. The heap may be conveniently watered by making a hole in the interior and pouring the liquid in. The final covering with earth has the object of absorbing any ammonia which is evolved in the process of fermentation and by the action of the lime.

When the heap has been prepared it must be left to itself to ferment for a greater or less time. Probably a few months will be sufficient, unless very refractory substances, such as bone, &c., are present. In a few months' time it should be well forked over and another layer of lime and finally of earth should be added. In the course of another month or two it should be ready for use, and will provide at a very slight cost an excellent manure rich in humus, and will have utilised for the purpose a great amount of refuse material which would otherwise have been lost or burnt.

When refuse material is burnt, the ashes, though still possessing manurial value on account of the lime, potash, and phosphates they contain, are of incomparably less value than the original substances out of which they are derived, owing to the absence of humus material and of nitrogen, which have been lost in the process of burning.

Instead of a heap, the compost may be conveniently prepared in a pit. In either case the bottom should be cemented, or so drained that the liquid escaping from the mass can be collected and returned to the compost.

It will be found advantageous to prepare a second heap while the first one is ripening and being used. It will also be found that if it is desired to use more concentrated fertilisers, such as superphosphate, potash, and ammonium salts, these can be mixed with advantage with the compost manure before it is applied to the land. Used in this way they will be in less danger of leaching away, and will be of greater benefit than if applied directly to the land.

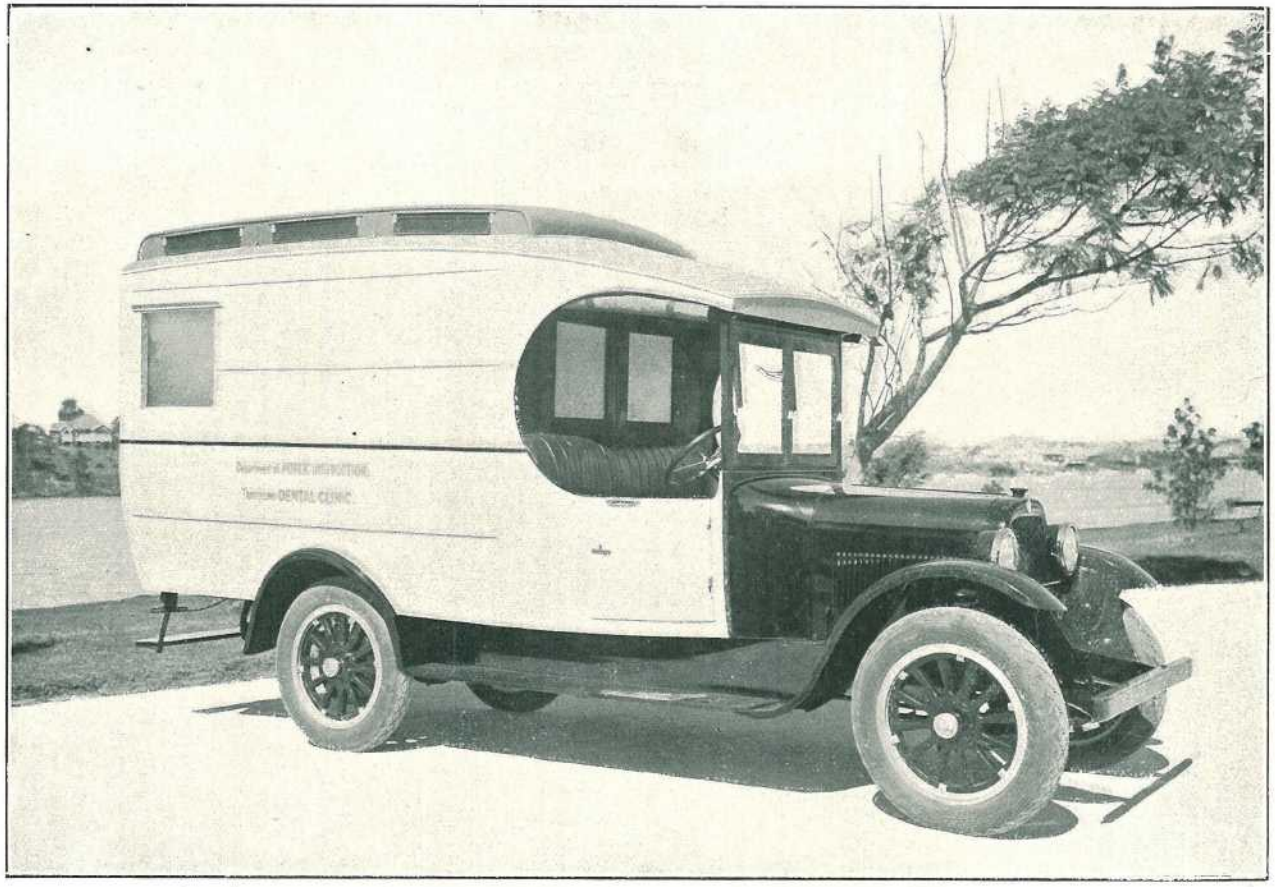


Photo.: Dept. of Public Instruction.]

PLATE 191.—A TRAVELLING DENTAL CLINIC IN QUEENSLAND.

The School Dental Service provided by the Department of Public Instruction is of inestimable value, particularly in the country districts. It is ever striving for the better control of dental disease with prevention as the ultimate goal.

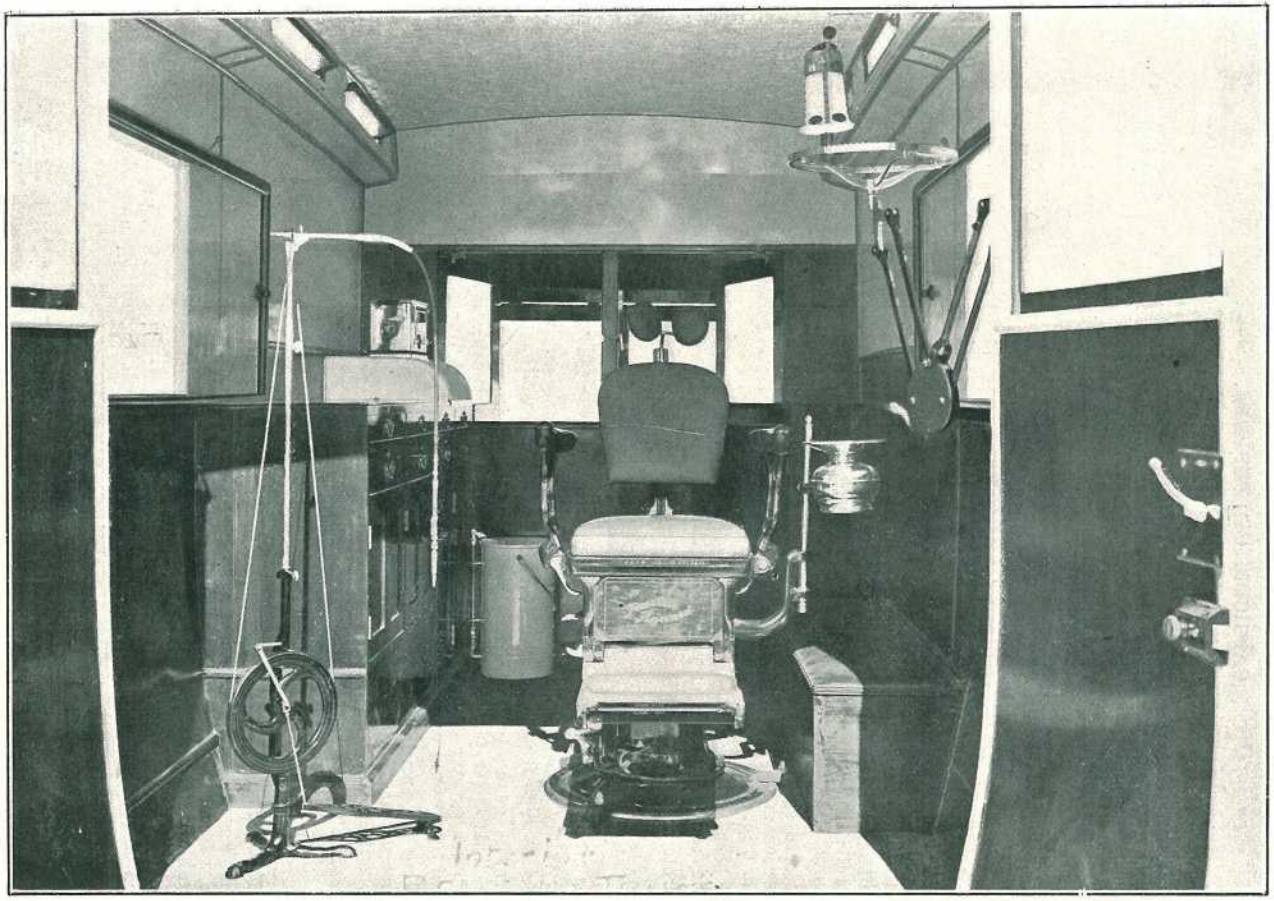


Photo.: Dept. of Public Instruction.]

PLATE .192—INTERIOR OF A TRAVELLING DENTAL CLINIC.

In a survey conducted by the Chief Dental Inspector of Schools last year a very great reduction in dental troubles among Queensland school children was recorded, and the number of scholars under conservative dental care had increased by 125 per cent. These results may be credited almost entirely to the corrective operative measures carried out by the Dental Service.

MARKET GARDENING.

(Continued from Previous Issues.)

CAPSICUM OR PEPPERS.

The capsicum or cayenne pepper requires a light, rich soil and warm situation. Sown in the early spring, the young plants, when large enough, may be transplanted out in rows 3 ft. apart, with a distance of 2 ft. between the plants in the rows. This plant is of easy cultivation and is in considerable demand for pickle and pepper manufacturing.

The larger varieties are milder than those of the smaller kinds. Those recommended are—Long Red; Bird's Eye (for pickling); Large Red (culinary); Dwarf Early Red.

CARROTS.

The best crops of carrots are grown on land heavily manured for the preceding crop. Deep cultivation is essential. If manuring should be necessary, well-decomposed stable manure may be used, but must be thoroughly incorporated with the soil, and a fine tilth obtained before sowing the seed.

Insufficient depth of cultivation has a tendency to produce forked roots. In shallow soils seed of the short varieties, such as Nantes and Guerande will give the best results.

The seed should be sown thinly, in drills, and care be taken to get the hoe at work as soon as the seed appears. When large enough they should be thinned out from 4 to 6 in. apart, according to size of variety.

The best varieties of long carrots are James's Intermediate and St. Valery, and for cattle-feed the white and yellow Belgian varieties.

Carrots are fit for use in about four months.

CELERY.

This crop requires a deep rich soil and a moist situation if possible.

Sow thinly in a good sheltered seed-bed during early autumn. When the plants are 3 or 4 in. high transplant into deeply trenched and well-manured soil.

Celery is generally grown in trenches, although it may be grown in the open ground. This latter plan has the advantage of saving considerable labour, and the plants have a greater depth of soil than if planted in deep trenches, where, in most instances, they would only have the subsoil to subsist on.

During the growing period the plants must be kept free from weeds, and when large enough, may be gradually earthed up, care being taken in the final earthing that the soil does not fall into the heart of the plant.

Varieties recommended—White Plume, Golden Self Blanching, Giant Pascal.

CHOKOS.

Where a sufficient amount of moisture is available chokos form an acceptable change in vegetable diet. Of climbing habit and easy of cultivation, they adapt themselves to most soils, but best results are obtained from those containing plenty of vegetable matter.

They are propagated from the fruit, which, if planted in the spring, produces a profusion of vines, and a large crop of this useful vegetable for autumn and winter.

CUCUMBERS.

Suited for rich sandy soils; and if the natural soil does not answer this description it is worth while bringing it up to the required standard in order to ensure success. Seed may be sown in early spring in shallow drills or in hills, with a distance of 4 to 5 ft. between the rows. The soil must be kept loose and free from weeds by frequent hoeings, and applications of liquid manure or abundant watering will be necessary during dry weather in order to procure long crisp fruit. Mulch well.

The variety recommended for market sale is Imperial White Spine, and for pickling Early Green Cluster.

SHALLOTS AND GARLIC.

The preparation of the soil is similar to that for the onion. The cloves should be placed in shallow drills spaced 6 in. apart, care being taken not to cover them too deeply. As they grow they should not be earthed up; on the contrary, when approaching maturity the soil may be lightly drawn away from them with a hoe. This exposes the bulb and facilities ripening. Shallots are used for culinary and salad purposes, their flavour being milder than that of garlic or onions. They may be planted in early spring or autumn.

GINGER.

Is suited only to warm situations, and is easily grown in any light loam rich in vegetable matter, and possessing good natural drainage.

Cultivation is similar to that necessary for potatoes, the only difference being that prior to planting the land is ridged with a drill plough, the ridges being 3 ft. apart, the rhizomes planted during September in the ridges 12 in. apart and about 3 in. under the surface.

The crop matures in about ten months, and should be harvested after the tops have died off.

In lifting, care should be taken not to injure the hands or rhizomes.

The preparation of these for market is the placing of them in boiling water for about five minutes and then drying in the sun.

HERBS.

These are worthy of more attention than is usually given to them, owing to the increased demand which at present exists.

Formerly the Australian market was supplied by European countries, large importations of dried herbs being made from England and France.

Herbgrowers in the Cleveland district are waking up to the fact that a profitable industry is at their doors, and this has resulted already in larger areas being put under marjoram and sage, for which local buyers have in many instances entered into contracts to purchase twelve months ahead.

Any soil of a loamy character and containing plenty of humus is suitable for the growth of herbs, but cultivation must be attended to and all forms of weed-growths kept down. Sage, thyme, and marjoram are usually propagated from cuttings or division of the roots, but they may also be raised from seed sown in early spring. Two or three cuttings may be obtained in a year, the crop being cut when coming into flower, a sharp sickle being used, and the plants cut close to the ground.

After cutting, they should be allowed to wilt in the sun, and then thoroughly dried under cover, to retain as much colour as possible.

KOHL-RABI.

Kohl-rabi, or turnip-rooted cabbage, is, as its name denotes, an intermediate between the cabbage and turnip combining the flavour of both. The edible portion consists of a turnip-shaped bulb, which is in reality a swelling of the main stem. For table, this should be used when quite small, as it is then tender and delicate, but if allowed to reach maturity it becomes tough and stringy. The purple variety is the best for table use; whilst for cattle-feeding the green variety is most suitable. This plant is remarkable for its immunity from insect attack and power to resist frost and fungoid diseases. It will stand transplanting better than any other root crop, thus rendering it valuable for filling up blanks.

The sowing and subsequent cultivation is similar to that for swedes.

LEEKS

Leeks appreciate a deep, friable, and rich soil. Sow in spring and early summer, and when the thickness of a goose-quill transplant into shallow trenches, spacing the plants 6 in. apart and nipping back the tops in the process of transplanting. Treat as you would celery, gradually drawing the soil up the stem as the plant grows, thus blanching them. Keep well watered during the dry months; liquid manure can be applied with advantage.

The seed may be sown in the autumn, and varieties recommended are—London Flag, The Lyon.

LETTUCE.

This useful salad plant may be had all the year round by frequent sowings and plantings.

A warm dry situation should be chosen for the winter crop, and one that is shaded and moist for summer sowings.

The soil should be loose and rich, for lettuces are only crisp when rapidly grown.

Summer sowings must be made where the plants are to stand, as they cannot be transplanted during the dry, hot weather with any degress of success.

Varieties recommended are—Neapolitan; Hanson; Iceberg; May King.

MUSTARD AND CRESS.

With a climate in which salads and green foods are necessary, these useful salading plants are usually conspicuous by their absence. The seed may be sown thickly in broad rows and cut when about 2 in. high. Cress being a slower grower than mustard, if intended to be used with it, should be sown a week earlier. For succession sow every ten days.

ONIONS.

The onion requires a deep, loamy soil, and one which lends itself to deep cultivation.

The character of the soil determines the depth of ploughing, which cannot be too deep, provided the subsoil is not brought to the surface.

Frequent cross-cultivation and harrowings are essential to reduce the soil to a fine tilth and destroy any weed-growth which might otherwise put in its appearance during the process of cultivation.

The soil having had a thorough course of preparation should be rolled for the reception of the seed, which is sown in shallow drills spaced 12 to 15 in. apart.

For large areas, sowing the seed by a special onion-drill is recommended. Several inexpensive makes are advertised by various implement makers.

From its first appearance above the soil the crop must be kept absolutely clean of all weeds and foreign growth if success is to be attained.

Where blanks are present, transplanting may be carried out, but care must be taken that the plants are not put in deeply, as this is conducive to thickness in the stem, with attendant poor keeping qualities.

On reaching maturity bending the stems over is of great assistance in ripening; when the tops are thus withered, the bulbs should be lifted; and where a considerable quantity of bulbs has to be dealt with, hand and horse-drawn implements are available at a moderate cost, considerably reducing what otherwise is a somewhat tedious operation.

The bulbs should be left in windows until dry, when they can be carted and stored in racks—not too deeply—in a well-aired shed; care being taken that they are not bruised in the operation. It is advisable to turn them from time to time and remove all damaged or decayed bulbs.

The seed for the main crop should be sown in the autumn. The varieties recommended are:—Hunter River Brown Spanish and Australian-grown Brown Spanish, for keeping; Silverskin or Queen, for pickling; White Lisbon, for pulling green for salads; White Italian Tripoli, for early cropping.

NOTE.—For pickling and salad purposes the seed requires to be sown thicker.

(*To be continued.*)

DRACAENAS.

Dracænas are hardy plants with very richly coloured and variegated foliage. They are closely allied to the genus cordyline, with which they are often confused. The difference between the two is chiefly in the character of the fruits, there being generally one ovule in the dracæna and many ovules in the cordylines. Dracænas are among our most beautiful foliage plants. Propagation is generally by cuttings, which root readily at any time of the year. The old stem of the plant, cut into short lengths and planted in a compost, invariably roots, and throws up shoots which may be potted up. The root suckers which are often found upon old plants are also useful for increasing stock. All that is necessary is to cut them off and pot them.

The best soil for potting the young stock is made of equal parts of loam and leaf mould, with sufficient sand to keep the soil porous. Dracænas do not require large pots, but they must be firmly potted and given plenty of water.

Mealy bugs and thrips are the chief enemies. The large leaves permit of the free use of the sponge. Dracænas are fine indoor plants, but they must not be kept inside for more than a week or so at a time, and they must be kept out of draughts.

Farm Notes for December.

Although November is regarded generally as the best period for planting the main maize crop, on account of the tasseling period harmonising later on with the summer rains, December planting may be carried out in districts where early frosts are not prevalent, provided a known quick maturing variety of maize is sown.

To ensure a supply of late autumn and winter feed, dairymen are advised to make successive sowings of maize and sorghums, to be ultimately used either as green feed or in the form of silage. The necessity for such provision cannot be too strongly urged. Farmers who have not had any experience in building an ensilage stack can rest assured that, if they produce a crop for this purpose, information and instruction on the matter will be given on application to the Under Secretary for Agriculture and Stock; also that, whenever possible, the services of an instructor will be made available for carrying out a demonstration in ensilage-making for the benefit of the farmer concerned and his immediate neighbours.

In districts and localities where supplies of lucerne are not available, sowings of cowpeas should be made, particularly by dairymen, as the lack of protein-yielding foods for milch cows is a common cause of diminished milk supplies and of unthriftiness of animals in dairy herds. Cowpeas and lucerne can be depended upon to supply the deficiency. The former crop is hardy and drought-resisting. When plants are to be used as fodder, it is customary to commence to feed them to stock when the pods have formed. Animals are not fond of cowpeas in a fresh, green state, consequently the plants should be cut a day or two before use. Economy is effected by chaffing beforehand, but the plants can also be fed whole. Chaffed in the manner indicated, and fed in conjunction with green maize, or sorghum, when in head, in the proportion of one-third of the former to two-thirds of the latter, a well-balanced ration is obtainable. Animals with access to grass land will consume from 40 to 50 lb. per head per day; a good increase in the milk flow is promoted by this succulent diet. The plant has other excellent attributes as a soil renovator. Pig-raisers will find it invaluable also.

A great variety of quick-growing catch crops, suitable for green fodder and ensilage purposes, may also be sown this month, notably Sudan grass, white panicum, giant panicum (liberty millet), Japanese millet, red and white French millet. Well prepared land, however, is required for crops of this description, which make their growth within a very limited period of time. French millet is particularly valuable as a birdseed crop, the white variety being more in favour for this purpose.

Successive sowings may be made of pumpkins, melons, and plants of this description.

In districts where onions are grown, these will now be ready for harvesting. If attention is given, in the case of garden plots, to bending over the tops of the onions, maturity of the crop is hastened. Evidence will be shown of the natural ripening-off process, and steps should be taken to lift the bulbs and to place them in windrows until the tops are dry enough to twist off. If a ready market is not available, and it is decided to hold over the onions for a time, special care should be taken in handling. Storage in racks in a cool barn is necessary; otherwise considerable deterioration is to be expected. Improved prices are to be looked for in marketing by grading and classifying produce of this description.

Cotton areas which were subjected to a thorough initial preparation, thereby conserving a sufficiency of moisture for the young plants, should now be making good headway and sending their taproots well down. Keep down all weed growth by scarifying as long as the growth will admit of horse work.

Orchard Notes for December.

THE COASTAL DISTRICTS.

The planting of pineapples and bananas may be continued, taking care that the ground is properly prepared and suckers carefully selected, as advised previously in these Notes. Keep the plantations well worked and free from weeds of all kinds, especially if the season is dry. New plantations require constant attention, in order to give young plants every chance to get a good start; if checked when young they take a long time to pull up and the fruiting period is considerably retarded. Small areas well worked are more profitable than large areas indifferently looked after, as the fruit they produce is of very much better quality. This is a very important matter in the case of both of these fruits, as with the great increase in the area under crop there is not likely to be a profitable market for inferior fruit. Canners only want first-class pines of a size that will fill a can, and cannot utilise small or

inferior fruit, except in very limited quantities, and even then at a very low price. Small, badly filled bananas are always hard to quit, and with a well-supplied market they become unsaleable. Pineapple growers, especially those who have a quantity of the Ripley Queen variety, are warned that the sending of very immature fruit to the Southern markets is most unwise, as there is no surer way of spoiling the market for the main crop. Immature pineapples are not fit for human consumption, and should be condemned by the health authorities of the States to which they are sent.

Citrus orchards require constant attention; the land must be kept well worked and all weed growth destroyed. Spraying or cyaniding for scale insects should be carried out where necessary. Spraying with fungicides should be done where the trees show the need of it. A close lookout must be kept for the first indications of "maori," and as soon as it is discovered the trees should either be dusted with dry sulphur or sprayed with the lime-sulphur, potassium, or sodium sulphide washes. Borer should be looked for and destroyed whenever seen.

Early grapes will be ready for cutting. Handle carefully, and get them on to the market in the best possible condition. A bunch with the bloom on and every berry perfect will always look and sell well, even on a full market, when crushed and ill-packed lines are hard to quit.

Peaches, plums, papaws, and melons will be in season during the month. See that they are properly handled. Look our for fruit fly in all early ripening stone fruit, and see that none is left to lie under the trees to rot and thus breed a big crop of flies to destroy the mango crop when it ripens.

Keep leaf-eating insects of all kinds in check by spraying the plants on which they feed with arsenate of lead.

Look out for Irish blight in potatoes and tomatoes, and mildew on melons and kindred plants. Use Bordeaux or Burgundy mixture for the former, and finely ground sulphur or a sulphide spray for the latter.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Early ripening apples, plums, apricots, peaches, and nectarines will be ready for marketing during the month. They are unsatisfactory lines to handle, as the old saw, "Early ripe, early rotten," applies to all of them; in fact, the season of any particular variety is so short that it must be marketed and consumed as quickly as possible. All early ripening deciduous fruits are poor carriers and bad keepers, as their flesh is soft and watery, deficient in firmness and sugar, and cannot, therefore, be sent to any distant market. The available markets are quickly over-supplied with this class of fruit, and a glut takes place in consequence. Merchants frequently make the serious mistake of trying to hold such fruits, in the hope of the market improving, with the result that, instead of improving, the market frequently becomes more and more congested, and held-over lines have to be sent to the tip. There is only one way to deal with this class of fruit, and that is to clear the markets daily, no matter what the price, and get it distributed and into consumption as rapidly as possible by means of barrowmen and hawkers. Most early ripening fruits are useless for preserving in any way, their only value being what they will bring for consumption whilst fresh. This being so, it is only a waste of time and money to forward immature, undersized, and inferior fruit to market, as it is not wanted, and there is no sale for it. It should never have been grown, as it is frequently only an expense to the producer, besides which, unless the fallen or over-ripe fruit is regularly and systematically gathered and destroyed in the orchard, it becomes a breeding ground for fruit fly and codlin moth, as well as of fungi, such as those producing the brown and ripe rots. Early ripening fruits should, therefore, be carefully graded for size and quality, handled, and packed with great care, and nothing but choice fruit sent to market. If this is done, a good price will be secured, but if the whole crop—good, bad, and indifferent—is rushed on to the local markets, a serious congestion is bound to take place and large quantities will go to waste.

Orchards and vineyards must be kept in a state of perfect tilth, especially if the weather is dry, so as to retain the moisture necessary for the development of the later ripening fruits. Where citrus fruits are grown, an irrigation should be given during the month if water is available for this purpose, excepting, of course, there is a good fall of rain sufficient to provide an ample supply of moisture.

Codlin moth and fruit fly must receive constant attention and be kept under control, otherwise the later-ripening fruits are likely to suffer severely from the depredations of these serious pests.

Grape vines must be carefully attended to and sprayed where necessary for black spot or downy mildew, or sulphured for oidium. Where brown rot makes its appearance, spraying with the potassium or sodium sulphide washes should be carried out. Leaf-eating insects of all kinds can be kept in check by spraying with arsenate of lead.

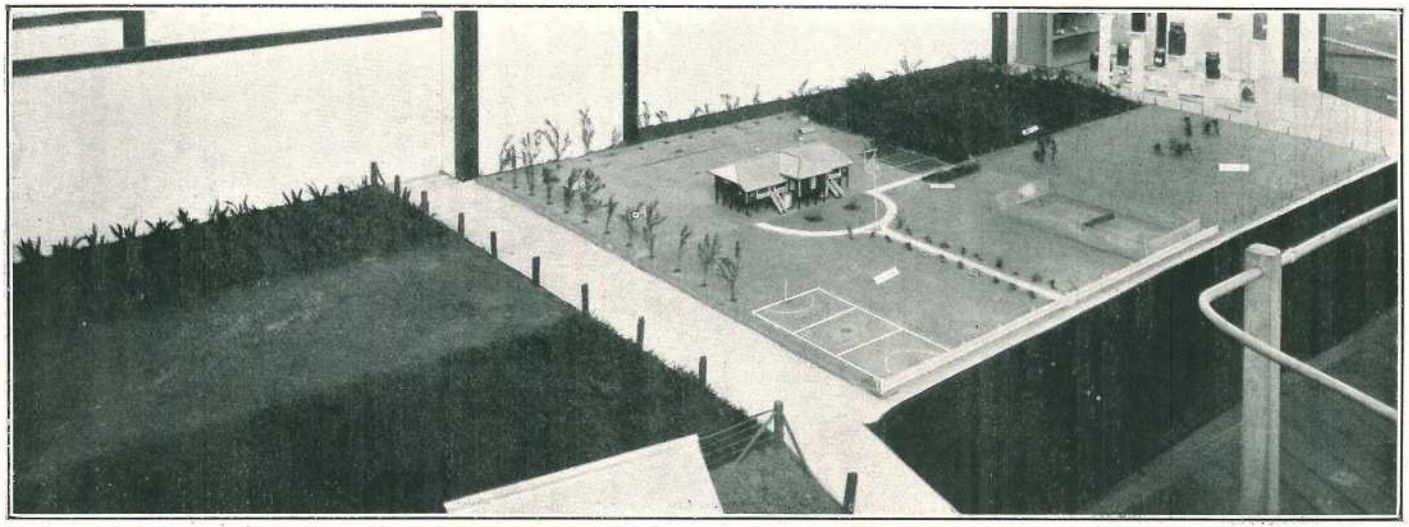


PLATE 193.—MODEL OF A QUEENSLAND COUNTRY SCHOOL IN THE RURAL SCHOOL'S DISPLAY. ROYAL NATIONAL ASSOCIATION SHOW, 1929.

DEPARTMENTAL PUBLICATIONS.

AVAILABLE FOR DISTRIBUTION.

All the publications on this list are available for exchange with Agricultural Departments, Universities, Agricultural Colleges, Experiment Stations, and similar institutions.

"Queensland Agricultural Journal"—Subscription to farmers, 1s. per annum. (Some back numbers available for free distribution.)

BOOKS.

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BULLETINS.

Economic Dairy Bulletins, 1D, 2D, and 3D.
Economic Sugar Bulletin, 5SC.
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Division of Entomology.

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The Banana Thrips Rust.
Ear Rot of Maize.
The Banana Weevil Borer.

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Banana Packing and Grading.
Citrus Culture.
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Cotton Growing in Queensland.
Annual Reports of Experimental Work on Cotton.
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Mealy Bug Attacking Paspalum Grass in the Cooroy District.
Baiting for Banana Weevil Borer Control.
The Banana Weevil Borer in Java, with Notes on other Crop Pests.
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Special Cattle Fatality in the Maranoa District and its Relation to the Larvæ of *Pterygophorus analis* Costa.
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Phosphorus Deficiency in Stock.
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Fertiliser Trials with Sugar Cane.
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Gestation Chart for Breeding Sows.
Flushing the Breeding Sow.
Precautions against Swine Fever.
Diarrhœa or White Scour in Young Pigs.
How to Make a Rope Pig-Net.
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Poultry Raising.
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Judging Utility Poultry.
Eye Worm of Poultry.
Caponizing Poultry.
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J. F. F. REID,
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Please address all requests for copies of these publications to THE UNDER SECRETARY, Department of Agriculture and Stock, Brisbane.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	November, 1929.		December, 1929.		MOONRISE Nov., 1929.	MOONRISE Dec., 1929.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					a.m.	a.m.
1	5.4	6.8	4.50	6.32	4 42	1.24
2	5.3	6.9	4.50	6.32	5.6	5.9
3	5 3	6 9	4.50	6.33	5. 50	5.57
4	5.2	6 10	4.50	6.34	6.30	6 48
5	5 1	6.11	4.50	6.35	7.15	7.42
6	5.0	6 12	4.50	6.35	8.4	8.37
7	5.0	6.12	4.50	6.36	8.57	9.31
8	4.59	6.13	4.51	6.37	9.49	10.26
9	4.58	6.14	4.51	6.37	10.38	11.20
						p.m.
10	4.58	6.15	4.52	6.38	11.40	12.16
					p.m.	
11	4 57	6.16	4.52	6.38	12.36	1.11
12	4.57	6.16	4.53	6.39	1.33	2.9
13	4.56	6.17	4.53	6.39	2.29	3.10
14	4 55	6.18	4.54	6.40	3 28	4 17
15	4 55	6.19	4.54	6.40	4 30	5.27
16	4.54	6.20	4.55	6.41	5.33	6.36
17	4 54	6 21	4.55	6.41	6.43	7.46
18	4 54	6 22	4.55	6.42	7.52	8.50
19	4 53	6.23	4.56	6.43	9.0	9.47
20	4.53	6.23	4.56	6.44	10.4	10.39
21	4.53	6.24	4.56	6.44	11.3	11.9
22	4 53	6.24	4.57	6.45	11.53	11.43
23	4.52	6.25	4.57	6.45	...	...
					a.m.	a.m.
24	4.52	6.26	4.58	6.46	12.46	12.16
25	4.52	6.27	4.58	6.46	1.15	12.46
26	4.51	6.27	4.59	6.46	1.42	1.18
27	4.51	6.28	4.59	6.47	2.13	1.51
28	4.51	6.29	5.0	6.47	2.44	2.27
29	4.51	6.30	5.0	6.47	3.14	3.6
30	4.51	6.31	5.1	6.48	3.39	3.52
31			5.2	6.48		4.43

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

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

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

Phases of the Moon, Occultations, &c.

1 Nov.	● New Moon	12	1 p.m.
10 „	☾ First Quarter	12	10 a.m.
17 „	○ Full Moon	10	14 p.m.
24 „	☽ Last Quarter	2	4 a.m.

Apogee, 7th November, at 9·0 p.m.
Perigee, 19th November, at 3.48 p.m.

If it were not for their apparent nearness to the Sun, the remarkable proximity of Mercury and Mars to one another on the 30th would form an interesting spectacle. They will rise practically with the Sun, but, of course, will be entirely lost in its effulgence. Venus and the Moon will be looking on from the near neighbourhood, but it will be a day later before the Moon joins the brilliant gathering by drawing, apparently, much nearer to the Sun.

By the time the Sun sets on the 1st November the Southern Cross reaches a position so low down in the south-west that it may be said to be lost to the evening sky for the next four months, as far as Queensland is concerned.

1 Dec.	● New Moon	2	48 p.m.
9 „	☾ First Quarter	7	42 p.m.
16 „	○ Full Moon	9	38 p.m.
23 „	☽ Last Quarter	12	27 p.m.
31 „	● New Moon	9	42 a.m.

Apogee, 5th December, at 3.24 p.m.
Perigee, 17th December, at 10.6 p.m.

Conjunctions of the Moon with Mercury and Mars will occur on the 1st, when all are below the horizon in Queensland.

Mars, which was disappearing from the evening sky soon after sunset in October, will be passing from the east to the west side of the Sun on 3rd December. It will then be on the far side of its orbit and about 140 million miles beyond the Sun. Mars will be rising and setting so nearly at the same time as the Sun that it will be practically invisible this month, but the much larger planet Jupiter, being on the opposite side of the sky, will rise on the 3rd as the Sun sets. Venus will be noticeable only in the early morning a little before sunrise, and will be loosing her brilliance as the month advances.

Mercury, apparently amongst the stars of Orphineus, and higher up Saturn, apparently in Sagittarius, will be noticeable near the western horizon as the twilight decreases on the 15th.

Mercury and Mars, which appeared to be in nearly the same place in the sky on 30th November, will set only about a quarter of an hour after the Sun on 1st December, but the rapid motion of Mercury will carry it eastward so quickly that it will not set until an hour and three quarters after the Sun on the 15th, while Mars will set a quarter of an hour before the Sun. Jupiter will rise at 6.41 p.m. on 1st December, and at 5.36 p.m. on the 15th; Saturn will set at 8.6 p.m. on the 1st, and at 7.17 p.m. on the 15th.