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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment.

The Current Issue.

The new cover on the Journal will be appreciated by readers as a departure from the colder, official type hitherto in use. In the new design is typified our main agricultural industries, and with its warm maroon tints, Queensland's colour, it will be accepted as altogether pleasing. The completion of Sir Matthew Nathan's term with us as Governor is fittingly marked by a report of his valedictory address at Parliament House in the State Capital. His Excellency has favoured the Journal with a special farewell message to the farmers of Queensland, in which he shows again his regard for the men, women, and children of our great Bushland, together with an appreciation of their problems and their fine, straight Australianism. The importance of developing the State along sound lines and of paying particular attention to modern methods of marketing farm produce are dealt with by the Minister, Hon. W. Forgan Smith, in a notable second-reading speech on the Primary Products Pools Amendment Bill, which is also presented. Maize-growing on the Atherton Tableland and Northern potato trials are discussed by Mr. Pollock. Dairy fodder plots at Toogooloowah are the subject of interesting notes by Mr. Gibson. In response to numerous requests for information on coffee-growing in Queensland we have reprinted useful notes which appeared in an earlier issue. Mr. Shelton discusses this month, in addition to pig marketing, Yorkshire pigs and paralysis in the hindquarters of pigs. On the science side, Mr. Hardy, of the Queensland University, has a note on the fecundity of Mormoniella and some problems in parthenogenesis. The work of entomologists in connection with our sugar problems is described in copious accounts. Other matters of agricultural interest are also strongly featured, and the October number is sure to be appreciatively received.

The Farmer's Feathered Friends.

The folly that lies in the wanton destruction of Australian birds and the need for more stringent measures towards their preservation were stressed strongly by a Southern deputation recently. The importance from an economic point of view of native birds as insect exterminators is well known to every nature student, and thanks to the efforts of the Gould League of Bird Lovers, particularly among school children, some measure of protection has been afforded the farmer's feathered friends in Queensland. Greater effort is, unfortunately, needed to maintain an enlightened public opinion in this connection. Australian fauna has been described as the most interesting and most beautiful in the world by scientists of other countries. In spite of what has been done to curb the destructive tendencies of the unthinking and the juvenile, there is still evidence of great ruthlessness in this regard. Holiday shooters are particularly destructive, and bird nesters, who, besides taking eggs, often capture young birds during the breeding season, also take tremendous toll of native bird life. It is a sad fact that, even in areas set apart as sanctuaries, there is often very little respect for game laws and the rules of true sport. The trapper and the poisoner apparently give little thought to the immense economic losses that will inevitably follow the killing wholesalely and indiscriminately of our insectivorous birds. Foxes and domestic cats are also great offenders. A strong public opinion against indiscriminate destruction of native bird life is a need in every district, and every effort should be made, if only from a business standpoint, to create and sustain such a worthy public spirit.

Queensland Agriculture.

The annual report of the Department of Agriculture and Stock, which has been tabled in the Legislative Assembly, contains much valuable information on the position and condition of our rural industries. Though conditions climatically in the course of the year were conducive to good returns generally, the season was more favourable to the pastoralist than to the farmer. Excessive wetness in some districts and meagre rainfall in others affected production, but, all in all, harvests were bountiful and stock returns high. The season was so favourable to graziers that interest in fodder conservation was unwisely allowed to wane. This form of dry-time insurance is regarded as so important that no opportunity of emphasising the need for the practical application of this principle of ordinary common prudence should be missed.

Marketing.

The whole question of marketing is demanding more and closer attention. The necessity for common sense in production and good business sense in selling is becoming more clearly evident. The position of the maize-grower particularly was unsatisfactory. There was a big carry over from the previous season and prices were on a par with the cost of production. The need of efficient marketing organisation could not have been more strongly demonstrated than it was in connection with this crop. On the other hand, the existence of an established marketing organisation for wheat-growers—the Wheat Pool—on which farmers are directly represented, created a feeling of confidence in that industry that was not apparent in pre-pool days.

Experiment Work.

Wheat experiment work was carried on during the year with success. As the season was generally conducive to rust, certain selected strains were chosen for further propagation. Some of the more recently fixed strains show great promise. The system of wheat experimentation has, in view of the encouraging results from other plots, been extended to Inglewood, Pratten, Hermitage, Allora, Kaimkillenbun, Jandowae, Pittsworth, Southbrook, and Murgon.

Potatoes and Onions.

Not enough attention, says the report, is being given by Queensland farmers to the cultivation of English potatoes. In the aggregate farmers are losing heavily in their not supplying home requirements. Importations from other States, in view of our capacity to produce, in the main, good tubers, are altogether too large. The Department has made it a practice to introduce proved varieties from the South, test them in the field, and ensure that the better sorts are brought into cultivation. In the North a system of maintaining a continuity of seed supply between the Coastal and Tableland districts has been initiated. The necessity of importing Southern seed at heavy expense will thus be obviated. Onions is another crop to which farmers of this State do not give, apparently, enough attention, for large importations of this commodity are also necessary to meet the home demand.

The Fuel of the Future.

The necessity for creating sources of supply of power alcohol has directed attention to the possibilities of cassava, arrowroot, sweet potatoes, maize, and other suitable plants. Sufficient cuttings of cassava have been obtained from Java to plant 300 acres in the Mackay district, and arrangements have been made with the management of the Plane Creek Sugar Mill to treat the expected crops. A commercial crop of this nature should, as a supplement to other forms of production, be a strong factor in advancing agriculture north of the Tropic.

The Journal.

"'The Queensland Agricultural Journal,'" continues the report, "has proved an excellent medium for bringing before the farmer the results of agricultural research. As a useful journal of record, current technical and practical information, it maintains a high standard both in respect to matter and its presentation. Results of experiments and notes on current agricultural problems and topics are regular features of its pages. In healthy and progressive agricultural development experimental work is essential, but if its results are not conveyed to the farmer in readable and digestible form its usefulness is greatly reduced. In this form of agricultural extension work the Journal has succeeded, and generally its value as a vehicle of agricultural information is highly appreciated."

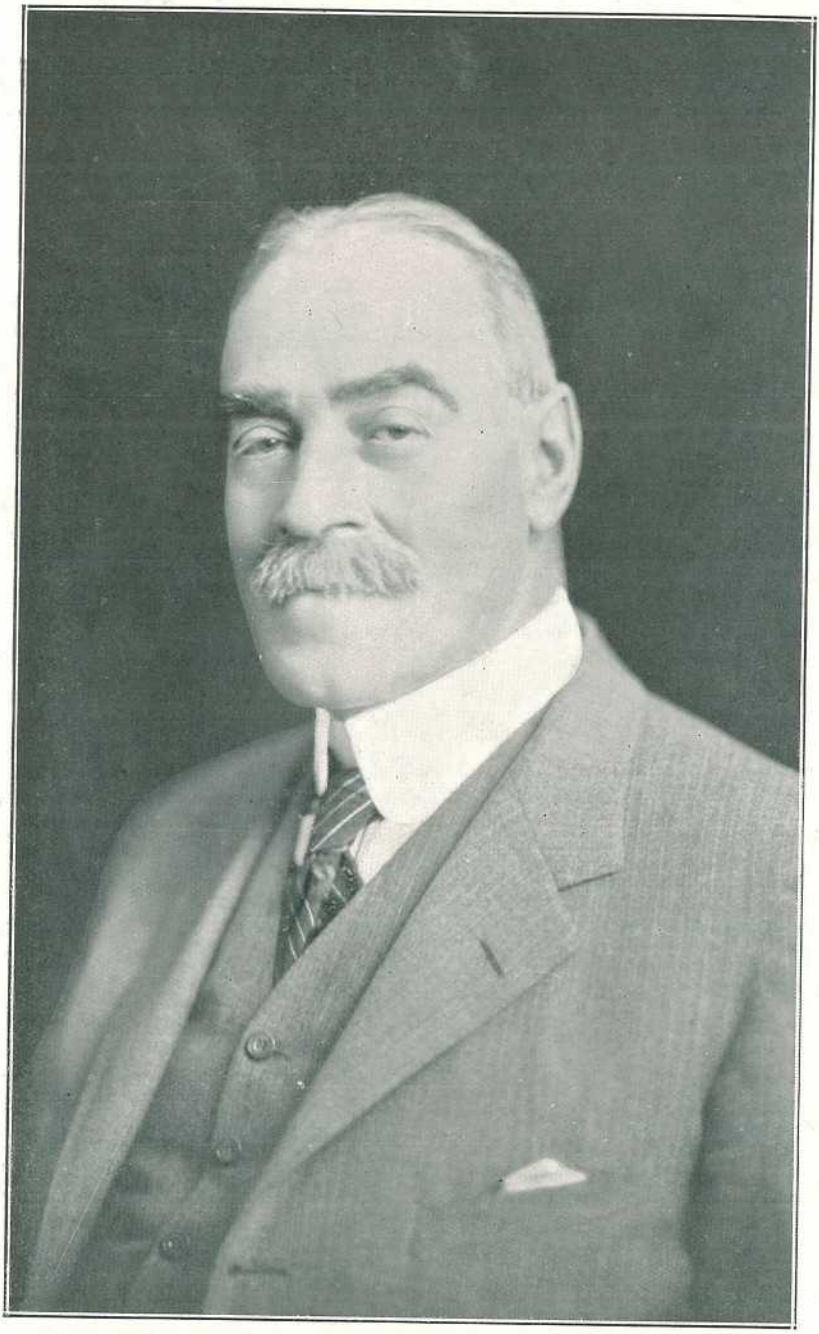

Plate 88.

The Right Honourable Sir Matthew Nathan, G.C.M.G., P.C., LL.D.,
Governor of Queensland, 1920–1925.

[*Special to the "Queensland Agricultural Journal."*]

GOVERNMENT HOUSE,
BRISBANE,

3rd September, 1925.

MESSAGE TO THE FARMERS OF QUEENSLAND.

A large part of the happiness I have had in Australia has been when in company with the farmers—at close on a hundred shows, on many a dairy farm from Atherton to Lismore, on sugar farms from Cairns to Tweed Heads, on fruit farms on the North Coast Line and in the Granite Belt, and on mixed farms on the Downs and dotted all over the Eastern districts of Queensland. I have learnt to understand the hardships of the farmers' life—its anxieties and its discouragements—and also its compensations. I have seen successes brought about by hard well-planned work and skilful modern methods and by love of an occupation which means close contact in the open air with the wholesome earth and the beasts and plants that live on it; and I have seen also failures due to the lack of these things as well as to ill-fortune, which was no man's fault. I have learnt here, as I learnt in Ireland, the great increase in the proportion of successes to failures that comes from co-operative methods, and I have further seen here the gain in the amenities of life that comes from the friendly association of farmers' wives and daughters for their common interests. I have observed the advantages as regards health and strength that men, women, and children who live on farms have over those who live in streets, and I have enjoyed the straight and sane views expressed in many talks I have had with farmers. I thank all those that I have come across for the cheery reception that they have always given to me, and I wish them and all the farmers of Queensland good seasons and good markets, bringing prosperity and happiness to them and to their families through a long future.

A GREAT GOVERNOR.

VALEDICTORY TO SIR MATTHEW NATHAN.

The completion of Sir Matthew Nathan's term as Governor of Queensland is regarded with a regret, both genuine and general, by the people of this State. So great a part has he filled in our social life, so deeply has he concerned himself with our everyday bread and butter problems, and so practically sympathetic has he been with our efforts to become articulate in art, literature, and the other things that make life worth while, that it had almost become a habit to think of him as a good and big Australian—one who would continue to exercise a fine influence on our social conditions and institutions, rather than one whose stay amongst us was limited to an all too short a term as the representative of the Imperial Government.—Ed.

OFFICIAL FAREWELL FUNCTION.

On 16th September, the eve of his departure from Brisbane, His Excellency was entertained by the Government at dinner at Parliament House.

SPEECH BY THE PREMIER.

The toast, "His Excellency the Governor," was proposed by the Premier (Hon. W. N. Gillies), who said that it seemed but yesterday when they listened to the Governor's first public utterances in this State on the day of his arrival. During the course of his speech he made reference to the extensive knowledge that his predecessors possessed regarding the important subject of agriculture, and he modestly expressed some misgivings on that point regarding himself. He (Mr. Gillies) was not a little disappointed at the time on hearing Sir Matthew's confession. It was not long, however, before he learned, in conversation and by speeches, that not only did the Governor appreciate the importance of agriculture and stock raising, but the advice tendered by him was of so sound and practical a nature as to indicate a close and lengthy study of the many aspects of agriculture and the problems of the man on the land. It was soon apparent that the Imperial Government had made a wise choice in selecting for the position of Governor of this State a gentleman so ripe with experience in the administrative and pro-consular spheres of the Imperial service, and so richly endowed with all the qualifications that were essentially required in such a high and important position.

Sir Matthew Nathan had now had an official career of some forty-five years—the first ten years of which he spent in military service, the next decade at the War Office, and the next ten years as Administrator of Crown Colonies; a further period of ten years was devoted to high public positions in the old country; and the last five years had been spent in Queensland. These last five years had not been the least fruitful and beneficial to the people.

"We have met, therefore," said Mr. Gillies, addressing His Excellency, "on the eve of your departure, to express in a few words our great admiration of your personal attributes, respect for your high intellectual attainments, and our sincere appreciation of the magnificent service you have rendered to the State of Queensland and to the British Empire during your five years' service as His Majesty's representative here. On all questions associated with the progress of the State, well-being, comfort, health, and happiness of the people, you have always tendered sound advice and given words of encouragement and inspiration. Your intellectual force of character has constituted you a guide, philosopher, and friend in every branch of our State-wide activities; your simple devotion to duty, your great personal charm, your kindly interest in the welfare of our citizens, and above all your

love for the children of the city, the town, and the bush, have implanted in the hearts of the people of this State a feeling of affection that will never be effaced."

Mr. Gillies added that the Governor's relations with his Ministerial advisers had always been harmonious and friendly. On the other hand, the matured and well-considered advice of His Excellency had always been available to the Government and the people of Queensland, and such advice had been tendered without obtrusion in any shape or form.

The Leader of the Opposition.

Supporting the toast, the leader of the Opposition (Mr. A. E. Moore) said that the occasion was a unique one, and the only one on which the Government and the Opposition could come together in complete agreement. They all deeply and sincerely regretted the departure of His Excellency, for they all recognised the wonderful and self-sacrificing work which he had done. Sir Matthew Nathan had travelled throughout the State to ascertain for himself how the people were living, and his words of encouragement and hope would long be remembered. Sir Matthew had the peculiar faculty of winnowing the grains of knowledge from the great amount of chaff brought before him on his travels, and he would be able to speak in England of the requirements of this State; in fact, the influence which he could wield on the other side would be greater than the influence which he had wielded here, and he (Mr. Moore) was sure that Sir Matthew Nathan would endeavour as much as was in his power to further the interests of this State.

Mr. Moore concluded by saying that he was not voicing a platitude when he said that the Governor had won the very sincere respect and admiration of the people of Queensland.

The Deputy Premier.

The Deputy Premier (Mr. W. McCormack) said that throughout his term of office Sir Matthew Nathan had understood his position perfectly, and had carried it out faithfully. But his chief claim to the people's affection had been his social activities. He would be long remembered, not as a good Governor, but as the man —Sir Matthew Nathan—who went from one end of the State to the other giving help and advice to the people of Queensland. He had endeavoured to lead the people to an appreciation of the beautiful and the good. He had endeavoured to divert them from the all-pervading materialism which had the world by the throat, and had pointed out that more attention should be given to art and education.

"Sir Matthew Nathan," said Mr. McCormack, "represents the true type of English gentleman, a man who stands for honour and integrity. These men are needed to-day. Australia needs people, and if His Excellency tells the people in England that Australia is an empty land of wonderful opportunity for men with a will to work and win he will have done the State great service."

The leader of the National party, Mr. Charles Taylor, M.L.A., said that the Governor's services to Queensland were appreciated from Cape York to the Tweed.

THE GOVERNOR'S REPLY.

His Excellency, on rising to respond to the toast in his honour, was cheered to the echo, and was unable to proceed with his speech until the tumult of acclamation had subsided. He (Sir Matthew Nathan) did not claim that his years of office had been filled with too strenuous work or burdened with any heavy responsibility. As Mr. Gillies had pointed out in public utterances, the official duties of the Governor were not arduous, and were within any ordinary capacity. Except on very rare occasions when it was for him to take the initiative in getting the decision of the people whether his advisers did or did not represent them (and no such occasion had, he was glad to say, occurred in his time) his official duties carried little responsibility except for the information he might give the King's Ministers at the centre of the Empire. Nor were the Governor's unofficial duties of a responsible nature. The extent to which they might be arduous depended entirely on the views he took of them. He held that they could not be effectively carried out unless he devoted

to them his whole time and energy. They required that he should get to know the conditions of all parts of the country and the interests of all sections of the people, and that he should devote the knowledge and influence so acquired to the improvement of those conditions and the promotion of those interests. That had been the aim of his travels, his inquiries, and such advice as he might have given when he had been asked to speak on a thousand or more public occasions, and when he had attended hundreds of meetings at which matters of town and country, of social well-being and philanthropic assistance, of educational development and cultural advancement, had been discussed. Whether activity in these directions had had any effect he frankly could not say, and must leave to others to judge.

The Work of the Department of Agriculture and Stock.

"I may have converted a few to the belief that immigration is necessary for the safety of the country and not necessarily inimical to the interests of its workers," continued His Excellency. "Advocacy at a hundred shows of raising average production from land and stock, through improved cultivation, conservation of fodder, herd testing and purer breeding, may have emphasised the recommendations in these directions of the Agricultural Department, whose assistance to me in informing myself in these matters I am glad now to acknowledge. I am glad also to think that that department is likely to extend the area of its research to those tropical parts of the country where there is now no cultivation, but where agricultural possibilities exist and the need for population is greatest. As regards another form of cultivation, I am gratified at leaving behind me a well-established Forestry Association which will keep the people at large interested in, and will not allow the Department of Lands to neglect, the duty of this generation to prevent splendid Queensland timbers becoming extinct and future generations being without the supply of that most important raw material—wood for building and other purposes. I would follow my mention of the Lands Department by an expression of gratification at my name having been, at the instance of the late Premier, associated with the splendid scheme by which 200,000 acres of irrigated land are eventually to be given to the country. While I regret that I have not seen the foundations laid of the great dam which is to hold back over 2,000,000 acre feet of water, I am glad at any rate to understand that work on them is very shortly to be put in hand.

Welfare of Country People.

"The opening of many buildings, mainly those for public services of one sort or another, has been among my formal duties, requiring no capacity and involving no responsibility but at the same time yielding much satisfaction. Particularly I have in mind the opening of a number of those maternity wards that constitute so conspicuous a claim of the Government on the gratitude of the country people. That provision has been a great work of the Home Office, and it only requires the Home Secretary to make a personal inspection of the bulk of the wards to remedy a few matters which will be brought to his notice or would come under his penetrating observation. I feel sure that on that occasion he will consider the need for some system of providing at the hospitals in the remoter parts of the State, for which the State has any responsibility, young medical officers of the highest qualifications and sufficient experience, of retaining them at these hospitals for a fixed number of years, and of ensuring them subsequent opportunities for a bigger practice under more favourable conditions.

"Continuing with regard to the long list of matters that have interested me, but which I may not say have been advanced by any action of mine, I cannot claim success for my advocacy of detailed study and experiment, both as regards design, materials, and location, to arrive at the best form of residence for the settler in the tropics unless the attention that is now being paid to the general question of design for cheap houses by the Town Planning Association is a result of that advocacy. I naturally rejoice to have been connected with that association that has made town planning a live matter at the critical time of the creation of Greater Brisbane.

The Queensland University.

"Passing from the material to the intellectual sphere, I would express once more my gratitude to the Government for having made me a member of the Senate of the University of Queensland, and to the Senate for having elected me to be its Chancellor and for conferring on me later a degree which will make my association with the University a permanent one and enable me to represent it, and I hope assist it, when on the other side. It is the custom to call the University the coping stone of the educational system of the State. I look on it rather as the foundation. It creates knowledge by research and sets the standard of knowledge for the schools. To assist the Senate in these high purposes there should be, in my opinion, a permanent Vice-Chancellor having no other duties to perform than to think out projects of research and schemes of instruction. It is not necessary to add that he should be the best man obtainable in the State, with full knowledge of the State's educational system and of high intellectual qualifications. Mr. Gillies knows my views as to this, but will, I am sure, pardon me for making reference to them on this occasion that he has so kindly afforded me. He will also forgive my expressing disappointment at not having witnessed the beginning of the construction of new University buildings on the site provided by the legislation of three years ago. Of course these will be costly, but it is more costly still to reduce the efficiency of the University by cramped housing preventing its growth. It certainly is most regrettable that our Queensland boys and girls should have to go to Sydney for a medical degree. I am glad to think that a Faculty of Law has been established in my time, and that one of Agriculture will shortly be added. It pleases me also to realise that the value of the Women's College of the University, which makes possible to women whose homes are in the country the best education that the State can offer, has become better known and more appreciated in these last years.

Barrier Reef Investigation.

"One movement started in my time, with which the University has been closely associated, owes considerable assistance to the Chief Secretary's and to the Treasurer's Departments of the Queensland Government, as well as to other Universities of Australia and to certain private persons—I refer to the investigation of the Great Barrier Reef. There are funds to enable this work in which Australian, British, and American scientists are taking keen interest to go on for another two or three years. I had been in hopes that some generous citizen or citizens would make a donation of the £20,000 necessary to endow a Chair of Marine Biology which would lead to a similar study here of the life of the Western Pacific as is being carried on by the Scripps Institute in California as regards the eastern part of the ocean. I am looking forward to visiting presently that institute on my way home, and subsequently to enhancing the interest in the problems of our Great Barrier Reef that is being taken by scientific institutions in Great Britain.

Technical Education.

"I can lay no claim to have assisted though I have been greatly interested in the extension of Queensland technical education in these last years. The Government of its own initiative has taken over and improved some of the technical colleges and created a number of rural schools, teaching certain technical subjects to boys and girls going on to the land. I was greatly impressed by seeing a week ago on the veranda of what was little better than a bush hut, on the Binjour Plateau, between Gayndah and Mundubbera, a class of girls receiving free instruction in useful dressmaking and millinery. It is the constant effort of the Government to give the bush children the educational advantages of those that live in the great cities, and though this will never be completely possible much is being done. I have been told and I readily believe that the Queensland system of education is the best in Australia. There remains to be initiated that most important of all educational advances which we have heard is in contemplation—viz., the raising of the general school leaving age to sixteen. This will be a difficult matter to work out, especially as regards the exemptions that will be necessary, but our Department of Public Instruction is equal to the task.

Australian Literature.

"I wish that Department would take steps to see that the State got a better return for its expenditure on encouraging adult reading. A large proportion of the 220 Schools of Arts libraries, housing 425,000 volumes, are not doing what might be expected of them—viz., supplying that demand for reading matter which the activities of the Bush Book Club show to exist. Apart from a general improvement in the supervision and work of these libraries, there is one feature that has been introduced at my instance in some of them and I should like to see common to all, and that is the setting apart of prominent shelves to contain books on Australia or by Australian writers. Pride in the continent which is now theirs, in the deeds of those that have inhabited it for the last century and a-half, and in the literary work of writers who are fellow citizens, would be inculcated in this way. That we are in the early days of Australian history should make us also keen on preserving the history of those days while this is still possible, and I greatly hope that the gazetteer giving the origin of Queensland place names, on which it has been a pleasure to me to spend many night hours in the past years, may be pushed on to complete publication by those who have laboured with me in the matter and may lead to further collection of old-day records. For the Historical Society of Queensland which honoured me by making me its patron, the Queensland Branch of the Royal Geographical Society of Australasia of which I have attempted to be a not inactive president, for the Royal Society and the various other scientific bodies as well as for those having as their object the advancement of literature, art, music, and horticulture, with which I have now with all regret to sever my more active connection, I bespeak the continued interest of an enlightened Government, of municipal bodies which in other lands I know help in these matters, and of a people with whom I hope and believe intellectual enjoyment is becoming a greater element of recreation as time goes on.

Boy Scouts and Girl Guides.

"Reverting to the instruction of youth, I would say a final word with regard to two movements which concern themselves mainly and I believe effectively with the training of character—the Boy Scouts and the Girl Guides. I speak of them as the most important representatives of other bodies which have somewhat similar objects. They teach self-discipline, unselfishness, and the duty of helping others, and they teach also the boys and girls by play to become efficient in giving that help. The movements have not grown in the last five years to the extent I had hoped they would. With nearly 3,000 Boy Scouts there are about half and with nearly 1,000 Girl Guides about a third of the numbers I had looked forward to see this year, but the associations are very much stronger than they were in 1920, not only in numbers but also in the approach of members to the right spirit of scouting and guiding. They are, I am satisfied, doing good work for the State in the inculcation of good feeling among its citizens.

Country Women's Association.

"That also I hope will be one result of the rapidly growing Country Women's Association of Queensland. It is bringing women together with the sole qualification of their common womanhood, and the sole object of improving the conditions of life for women and children in the country. At their instance increased railway facilities for seaside visiting have been afforded, and additional educational provisions have been brought under consideration; through their efforts a chain of seaside homes from Townsville to Wynnum is being provided, rest homes for women coming in from the stations and farms are being created in many country towns, hospitals and other institutions all over the country by which women and children benefit are receiving financial and other assistance, and individual cases of distress are being quietly and effectively assisted. It is, however, from these useful activities bringing women of all occupations and positions into friendly co-operation, and thus adding to their friendliness among themselves and so to the unity of the community, that I look for the greatest effect from the Country Women's Association.

The Light of a New Day.

"In these days every movement tending to active thoughtfulness for others in the community and to unity of the whole is of moment. Conditions in the country at this time I am leaving it are such as to sadden any lover of it—to sadden but by no means to make despair. There is, I believe, better feeling in the land than recent outward manifestations have shown. Possibly the very large extent to which I have made use of the railways of the State and the fact that on a half dozen or more occasions I have met railway men at their invitation on other than their transport business, have made me feel that I know the men of this occupation better than those of most others. From the kindliness they have always manifested to me, who, after all, have been the head of the Government and the representative of law and order, and from the things I have heard and read of their general action, I am convinced that the vast majority as represented by their trade unions only desire to have what the community equally desire to give—the best conditions consistent with their not taking any more from the community's wealth than they supply to it. Of course it would be foolish to deny the existence of a minority in this and other industries, in this and in other countries—some perfectly honest and a few not ignorant—who believe that the economic basis of society is wrong and can only be altered by a war between classes. But war, I am sure, is the last thing that the splendid men I have met all over Queensland or the equally splendid women who influence them desire. Recognising that such a way would bring here, as it has brought elsewhere, the greatest misery to the greatest number, these men and women believe, as I believe, in every opportunity being taken to remove causes for ill-feeling, to assuage sectarian and political differences, and to amalgamate classes so that in the end all classes will be one. Presently this conviction will clothe itself with the force required to make it effective. Behind the dark cloud that has lowered over the land on the eve of my departure I foresee the light of a new day ready to burst forth—a day of differences lessened and of feeling bettered and consequently of greater peace and prosperity in Queensland and Australia."

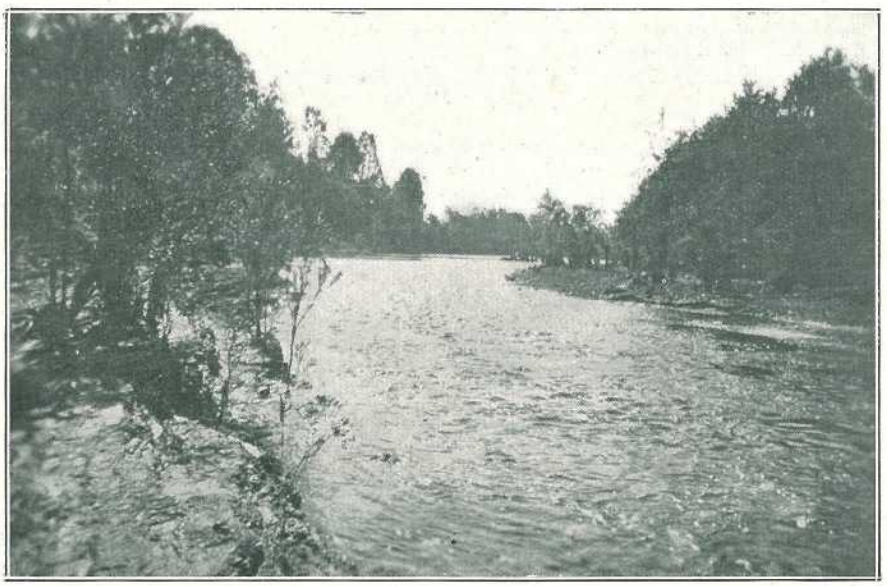

Photo.: O. A Jones.

Plate 89.—The Beauty of the Upper Brisbane.

Bureau of Sugar Experiment Stations.

INVESTIGATION OF PESTS AND DISEASES.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received from the Acting Entomologists at Meringa (Messrs. Burns and Mungomery) the following report dated 17th September, 1925:—

Notes on Cane Grubs and Beetles.

Although a few grubs of the greyback cockchafer (*Lepidoderma albohirtum* Waterhouse) have been ploughed up during the last month at Banna, most of these have assumed the quiescent state prior to pupation, and in the majority of cases noted elsewhere during this period, large numbers of pupae and beetles have been found in their underground chambers, or unearthed in the course of general farming operations.

Should soaking rains supervene in October and November, an early and large emergence and flight of beetles will take place, judging by the number of grubs which were present under the cane stools during the first part of this year. In this case farmers will then have a good opportunity of fumigating before the wet season commences, soils which are known to be grub-infested each year.

Army Worms Feeding on Cane and some of their Parasites.

The larvæ of two species of "Noctuid" moths, namely, *Cirphis unipuncta* Haw. and *Cirphis loreyi* Dup., are destructive to the leaves and young shoots of sugar-cane in Queensland; both of these species of moths belonging to the well-known "army worms." In addition to causing damage to cane in Queensland, *C. unipuncta* is found damaging cane leaves in Java, Mauritius, India, and the United States of America; and *C. loreyi* in India, Ceylon, Burma, Fiji, Java, and Mauritius. Besides attacking sugar-cane in other countries, the larvæ of both these *Cirphis* moths do extensive damage to corn, wheat, oats, rye, barley, and many other cereal and fodder grass crops.

The damage caused by the larvæ of these moths is confined to the leaves and young shoots of the cane plants, especially when the cane is from one to two feet high. When these pests occur plentifully in a cane field, it is only a matter of a few days before all the leaves and midribs, and even the stems themselves, are eaten down to the level of the ground.

These larvæ feed mostly at night, sheltering during the day in curled leaves, within the central whorl of the plants, and under clods of earth or débris surrounding the plants.

Cirphis unipuncta is generally regarded as being the more abundant of the two species; the other, *Cirphis loreyi*, being more local in districts where it occurs, and being comparatively late in certain seasons in comparison with its congener. Contrary to the usual course of events, *C. loreyi* appears to be the predominating species so far this season in Northern cane-fields, for out of large numbers of the larvæ of both these insects collected during the past month at Daradgee, Highleigh, Hambledon, and Gordonvale, the majority that emerged as perfect moths were *C. loreyi*.

The general appearance of the larvæ of these two moths is very similiar; when fully grown they measure 1¾ to 1½ inches in length, and individuals of the same species are extremely variable in colour. The colour of the larva of *C. loreyi* is ordinarily pale straw coloured, with dark brown longitudinal lines, whilst that of *C. unipuncta* is generally smoky brown or dark greenish-brown with black longitudinal irregular lines. The metamorphosis from larva to pupa takes place in the soil, about two or three inches below the surface. The period occupied in this condition is from two to three weeks according to the season of the year, development being much more rapid during the summer months. The moths themselves are quite distinct from each other. *C. unpuncta* if anything is the larger of the two species, and measures from 1⅔ to 1⅝ inches across the expanded wings. Its forewings are fawn coloured, sometimes suffused with grey or pink, and the hindwings are dark grey with the veins black. When viewed in certain lights the hindwings possess an opalescent tint. *C. loreyi* measures about 1½ inches across the open wings; its forewings are dark greyish-brown with small black spots, whilst the hindwings are hyaline white with a pink opalescence. A complete description of this species was given by Mr. E. Jarvis in 1920 (Bulletin No. 9 of this Experiment Station).

Five distinct parasites have been bred from the larval stage of these two species of *Cirphis*. The parasites—two species of *Tachinid* flies (undertermined) a small *Chalcid* wasp (undetermined) a small black *Braconid* wasp (undetermined), and a large species of *Ichneumon* wasp (*Henicospilus skeltoni*, Kir.)—exert considerable control over the natural increase of these two army worms. Representatives of the above parasites have been emerging at intervals during the past few weeks.

Beetle Borer Control and Liberation of Tachinid Flies.

Further liberations of tachinid flies (*Ceromasia sphenophori* Vill.) parasites of the beetle borer (*Rhabdocnemis obscurus* Boisd.) were made at Meerawa, Babinda, and South Johnstone. On the farms in the two former places where these flies were liberated, the borer infestation was moderate; however, it was found that the damage through the borer pest in the South Johnstone district was of a more serious nature.

The increase in this district during the last year is the result, chiefly, of the extensive fields of unpermitted cane which have been left to stand over from year to year. Canes in such fields, after a prolonged period of growth, invariably have a tendency to lie down, and later, the older sticks, under excessive moisture conditions, begin to rot. This state of affairs, coupled with injuries caused by rats, makes an excellent breeding ground for the beetle borer, and in places where its natural enemy, the tachinid fly, has not yet become established, the borer breeds unchecked and increases in enormous numbers.

In one instance, a field had accidently burnt out in the previous season, and owing to a fall in the density, and burning penalties making the harvesting unprofitable, portion of the burnt cane was allowed to remain on the fields in the hopes of getting a good ratoon crop in the following year. This practice proved to be abortive, for the burnt and fermenting sticks of cane not only attracted the borer beetles, but also provided very suitable food for their larvæ, which, on reaching the adult stage, reinfested the ratoons as soon as they began to make cane.

Another by no means unimportant factor in the borer control would be a more regular system of picking up the cane which often falls from the cane trucks in the course of transportation from the field to the mill. It can easily be understood how borer cane under such circumstances plays a big part in spreading the pest in clean areas bordering main tramlines. Of course we fully appreciate the difficulties that are to be met with in hauling cane over a long distance in scattered areas, and under such conditions some cane is bound to fall from the trucks; however, where badly infested cane is known to have fallen off, it should be gathered up immediately and sent to the mill for crushing or else burnt on the spot to help prevent the spread of the pest.

Farmers would be well advised to supervise personally the selection of plants, and not allow the responsibility to fall on employees, who very often recognise the borer as something that is to be with us for all time, and who take no pains to exclude it from the seed cane. Also the system much in vogue in this district, of taking whole lengths of canes, placing them in drills, and cutting the plans *in situ* with a cane knife while walking along the drill, is to be condemned, because thus a strict and proper inspection of plants is not practicable. It was found that areas where the tachinid flies were previously active, had, in some cases, been burnt off. On the other hand, these areas should be protected and isolated from fires which too often wipe out these friendly agents. It is encouraging to report that several empty puparia were found in borer cocoons in the field, and living specimens of the adults were actually bred out from puparia collected at South Johnstone, showing that these flies are established in various parts of the district. More flies will be liberated at later dates in parts where the borer depredations are heaviest.

Cane Leaf Mid-Rib Moth Borer.

This is a cane pest of minor importance, though evidence of its work may frequently be observed by the presence of reddish-coloured tunnellings in the interiors of the mid-ribs of cane leaves.

It is whilst in the larval stage that the damage is done by this species. The larvæ may be found by cutting open "tunnelled midribs." They are, when fully grown, a little over quarter of an inch long, light yellow in colour. The mandibles are brown. The transformation from larvæ to pupa takes place within the tunnels; the moth, when emerging, escaping through the epidermis of the midrib which has been previously partly eaten through and formed into an easily opened exit by the larva prior to pupation. The pupal period lasts about one month at this time of year.

The moth measures approximately § of an inch across the expanded wings, and is coloured as follows:—Forewings near body and tips of same, also whole of hindwings, grey; median area of forewings, golden-yellow marked with minute silvery

spots. Wings fringed with fine cilia or hairs, which, in the hindwings, are longer than the width of the wing itself at its widest part.

In breeding experiments at the Laboratory, one parasite so far has been bred from larvæ of *Cosmopteryx* in the form of a small *Braconid* wasp.

Fortunately, the damage caused by this species does not injure cane plants to such extent as to warrant control measures.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received the following report (22nd September, 1925) upon diseases and pests from Mr. W. Cottrell-Dormer :—

Gumming Disease.

As has already been mentioned in my last month's report the presence of Gumming disease in the Aloomba locality has been confirmed, and measures are being taken to prevent its spread to other parts. Careful inspections of all fields within about 1¼ miles of fields found to be actually infected have been continued, but no sign of the disease has been detected outside the area declared infected in my last report. The boundaries of this area, as then stated, were the main Babinda road from the Behana Creek Bridge to the crossing of the Mulgrave River at Aloomba on the west, the Mulgrave River on the north and east, and the Behana Creek on the south; however, since last reporting, the disease has been detected on two fields adjoining Behana Creek, so the latter should now be considered as being within the infected area. It must again be emphasised that this area should be regarded as a quarantined area, meaning that no plants *whatever* are to be taken from it to other localities. On Sunday, 23rd August, a meeting was held on a gum-infected farm where the situation was clearly put before the growers, and some instructions given in the detection of the disease; however, as only about thirty growers turned up to this meeting, more is needed to make the farmers realise that with proper precautions they stand a very fair chance of checking and possibly later eradicating this most serious disease of sugar-cane. A circular dealing with this disease and its control is, therefore, in accordance with instructions, in course of preparation, awaiting which, growers should bear in mind the following salient features of proposed measures of control:— (1) Plant only healthy cane. Growers who at any time have received plants from Aloomba, Herbert River, or any other gum-infected centre should at once notify the Officer in Charge at Meringa, so that their cane can be inspected before being used for plants, as I understand that the officer of this station who was instructed to assist growers in seed selection is now prepared to carry on with this work. (2) Plant only resistant varieties in the infected area; these varieties include Badila, B. 147, and Q. 813, and growers should remember that the word "resistant" is not synonymous with the word "immune," as a resistant cane will sometimes contract the disease to a light extent, and a cane which is resistant to gum in well-drained land will often prove very susceptible in badly-drained soil under very adverse conditions, whereas an immune cane will not contract the disease under any circumstances. (3) No cane whatever should be taken from the infected area to other parts, not even resistant canes, for the reason just explained, that a resistant cane will sometimes contract the disease to a slight extent. (4) Since B. 147 is very susceptible to Leaf Stripe disease, and this disease has not recently been seen in the district, the practice of introducing canes from other districts, without previous examination by someone competent in disease diagnosis, is very much to be discouraged on account of the danger of introducing fresh complications into the present situation at Aloomba.

Leaf Scald.

This disease would appear to be present mostly in the "wilting stage" just now, and as so many stools have been killed by grubs in most parts where the disease is present to any extent, it is sometimes difficult to gauge the damage actually caused by the disease. However, it can be safely said that rather severe damage has been suffered in some fields. The varieties most affected in these areas are Clarke's Seedling, Pompey, N.G. 24B, H. 109, and Badila. In the case of H.Q. 426, 7 R. 428, and H. 109, death to the stool, at this time of the year, seems to come very suddenly indeed, and very often the side shoots which are so generally characteristic of Leaf Scald are not formed at all, even at the base of the stool. The disease is also very prevalent in other localities, but since D. 1135 and Badila are the staple varieties there, the actual damage suffered is not so great. Leaf Scald was not observed at Hambledon and Sawmill Pocket, so that since H.Q. 426 and 7 R. 428 are both very popular varieties in these parts, every care should be taken by growers against its introduction.

FIELD REPORTS.

The Southern Field Assistant, Mr. J. C. Murray, reports under date 18th September, 1925:—

Barolin.

Cutting is proceeding smoothly. The cane is fairly heavy per acre, though the sugar content is not high. Good drainage on the farms would ensure a higher sugar content during the early cutting period.

Varieties doing well on the Barolin areas are H.Q. 285, E.K. 28, M. 1900 Seedling, H. 227, and Q. 1098. E.K. 28 (Java) is rapidly finding favour with the growers. It is a good stooling, free trashing cane, of fairly high sugar content, and is improving with acclimatisation.

Rubyana.

Cane is cutting well in this locality. The c.c.s. of D. 1135 is not as high as last year, although the H.Q. 285 is, if anything, a little better. Farmers are extending their areas of the latter cane. Other varieties doing well are Q. 970, H. 227, M. 1900 Seedling, Q. 813, E.K. 28, and Q. 1098. In fact the majority of the Queensland seedlings are improving.

The cane cut is not ratooning vigorously, particularly the M. 1900 Seedling. It was noticed in one paddock where the trash had been burned on and around the cut stools, that a fungus was attacking the cut surface of the cane and affecting the shoots.

Oakwood.

Harvesting here is in full swing. The cane is giving a fair tonnage per acre with a c.c.s. content ranging from 12 to 14.5. A number of farmers are busy with planting operations, and the use of fertiliser is fairly general. Growers find that complete fertiliser with a predominance of phosphoric acid gives the best results in the Oakwood soil, although few of the growers do much of that very important soil-building, the growing of leguminous crops for green manure.

Tantitha.

Cane crops here could be described as very heavy, particularly the M. 1900 Seedling and D. 1135. The sugar content of the latter cane is at present low. H.Q. 285, however, has given the growers very satisfactory returns. More of this cane is being planted. Other varieties doing well here are E.K. 28 and Q. 813. Growers are recommended to try the latter variety, experimentally at first, in place of D. 1135.

Bingera.

Cutting and hauling is in full swing in this district. M. 1900 Seedling and Black Innis are cutting well, although the growers are not recommended to plant the latter extensively. Black Innis is not resistant to disease and growers, with few exception, would be unwise to make this cane a staple variety.

Mullet Creek.

Long haulage in this district adds to the work of the growers. Good crops are being taken off this year, particularly from the scrub soils. This land may be generally classified as dark-grey sandy loam, red sandy loam, and red forest soil, typical of that which prevails in the Bundaberg district. Agricultural analyses show the soil generally to be low in humus and the three essential plant foods, potash, nitrogen, and phosphoric acid. Basaltic rocks are found in the substrata.

Varieties making a good showing are M. 1900, D. 1135, and Q. 813. Mosaic disease attack has lessened.

Gumming is widely distributed in the D.1135. Recommendations as to dealing with this disease were set out in last month's report. Some growers are under the impression that the causal agent of gumming has not been discovered. The disease is caused by bacteria (*Bacterium vascularum*), and can be eradicated if growers will follow the recommendations given by the Bureau.

The Northern Field Assistant (Mr. E. H. Osborn) reports (24th September, 1925):—

Cairns.

Weather conditions were showery. Total rainfall registered amounted to 72.14 inches. A very good crop of cane was being harvested, despite the losses from grubs and tonnage due to the backward state of late cut cane. Cutting cane after Christmas in the North is anything but conducive to good results, either from a miller's or grower's point of view.

In the Mulgrave area, Aloomba is light in tonnage, but this is more than compensated for by the excellent cane all through Highleigh, Riverstone, and along the river flats. Highleigh looked particularly green and had suffered very slightly from grub attack.

In the Hambledon area, Freshwater was not cutting such phenomenally heavy crops as last year, but against this the older land nearer the mill was yielding better crops than expected. What is gratifying to notice in the Cairns district generally is the improved cultivation that is being carried out, and any implement that promises efficient work is readily used.

A fair amount of planting has been carried out, but the strike generally has only been a medium one, probably on account of continuous wet in the early part of the year, and not enough sunshine, followed by a cold winter.

One of the best paddocks of young cane seen was some Badila at Green Hills. Nearby was a small plot of H.109 planted a little later. This had come through so slowly compared to the Badila that the expense of extra chipping would run into about another £3 per acre.

Mr. H. Freeman who is supervising the estate for the Colonial Sugar Refining Company, Limited, has just finished harvesting a 40-acre 15 months old crop of plant Badila, for a return of 45 tons per acre. This block had been green-manured only. Nearby, a block of second ratoons (N.G. 15) (fumigated) cut at the rate of 18 tons per acre, while check plots in the same paddock (unfumigated) were not worth cutting.

Varieties.—H.Q. 458 is becoming very popular in the Edge Hill area, some 60 odd tons of it having been sold for plants lately. Mr. G. T. Fleming has recently cut 48 tons per acre from a 10½ months old plant crop, after having manured with about 3 cwt. of mixed manure. His first ratoons, he considers, gave a return of about 50 tons per acre, but as they were a mixed lot, he cannot make a definite statement. This farm is so well cultivated that very good returns should always result.

H. 109.—A 15 months old crop of this cane at Green Hills looks green and healthy, and will probably cut a 35-ton crop.

B. 147 is gaining favour about the Mulgrave, for it generally gives a fair crop both for weight and density upon medium land.

H.Q. 426 (Clarke's Seedling) is developing so much Leaf Scald (and more lately in this area, Gum) that it is not as popular as formerly.

Green Goru (N.G. 24B) is so liable to Leaf Scald that it cannot be recommended. The following figures taken from one farm at Aloomba are interesting:—

Variety.	c.c.s.
H.Q. 426 (Clarke's Seedling)	17·2
Q. 813	16·4
Q. 813	13·8
E.K. 28	12·7
E.K. 1	12·3
H. 146	12·2
H. 109	12·1
M.Q. 1 (Mowbray Seedling)	10·7

It should be mentioned that all these varieties, with the exception of Q. 813 and H. 146, are affected with gum.

Pests.—Grubs are more in evidence than for several years, but it is probable that the total loss throughout the Cairns district will not be as severe as expected earlier in the year. On the low-lying cane areas rats have done more than their usual share of damage. Moth and weevil borers were noticed in several places, the loss from the former being more noticeable than generally at this time of the year.

Disease.—Leaf Scald did not seem to be nearly as prevalent in the district as formerly, and most growers are using great care in seed selection.

PRIMARY PRODUCTS POOLS.

MINISTER'S SPEECH ON AMENDING BILL.

When one considers the importance of developing our State along sound lines, one can readily be assured of the necessity of providing a suitable method of marketing our produce that will give the grower of that produce a decent livelihood in the State of which he is a citizen. . . .

A country's greatness depends on the energy and intelligence of its people, and it depends on the opportunities that are afforded the industrious worker to make a decent livelihood for his dependents. . . . .

No one desires to have any section of industry, agricultural or otherwise, carried on under a system that means sweating or underpayment of the men and women engaged in it.—*Hon. W. Forgan Smith.*

Following is the full text of the second reading speech by the Minister for Agriculture and Stock, Hon. W. Forgan Smith, taken from "Hansard," on the Primary Products Pools Act Amendment Bill:—

This is an amending Bill, the result of experience gained in the administration of the principal Act. The amendments are rendered necessary or desirable in the light of the experience we have gained since the inception of the measure. This legislation, while being of an experimental character in its inception, is of considerable advantage to the farming community, and, read in conjunction with other farms of agricultural legislation in this State, indicates that a genuine and definite desire has been evinced by the Legislature of Queensland to place the man on the land on a better footing than has been the case hitherto.

A Tribute to the Premier.

In that connection I take this opportunity of paying a tribute to my predecessor in this office, Mr. Gillies, who at all times utilised every endeavour to improve the conditions of the agriculturists in this State, and it is due very largely to his untiring energy that these measures which have been of advantage to the agriculturists have become law. The principle of pooling is one about which there can be little controversy, having regard to the best interests of agriculture in Queensland. There can be no doubt, of course, that, while we may be opposed on certain grounds from individual standpoints, when one considers the importance of agriculture to Queensland, and the importance of developing our State along sound lines, one can readily be assured of the necessity of providing a suitable method of marketing our produce that will give the grower of that produce a decent livelihood in the State of which he is a citizen. A country's greatness depends on the energy and intelligence of its people, and it depends on the opportunities that are afforded to the industrious worker to make a decent livelihood for himself and his dependants.

Business Methods and Farm Marketing.

The problem affecting agriculturists has been very well put by Mr. Herman Steen, in his work entitled, "Co-operative Marketing," in which he says—

> "The tremendous growth of co-operative marketing denotes an economic revolution of far-reaching consequences. It signalises the application of business methods to farm marketing, and the substitution of merchandising for the dumping that had characterised farm marketing since food products first entered the channels of commerce. Co-operative marketing rewards producers with improved prices and facilities in marketing, reduces materially the cost of marketing and distribution, and furnishes consumers with high-grade quality products often at lower prices; all this is amply demonstrated by the experience of leading American associations. Altogether it is the most hopeful existing movement for the permanence of American agriculture, and therefore of the nation."

Genesis of Pooling in Queensland.

During the war period in Australia efforts were made, and to a certain extent successfully, to pool available supplies of commodities with a view to protecting all the interests concerned, and, as a result of that success, this State has gone a great deal further than has been the case in any other country in the direction of providing

the legal machinery and the methods necessary for establishing pools for primary products. The interest that has been evinced in Australia indicates how successful the application of the principle has been. At the recent Conference of Ministers for Agriculture, at which there were present officers of the various agricultural departments throughout the Commonwealth, a very keen interest was displayed in the different forms of legislative activity regarding agriculture in this State and the success that has been achieved by various methods of co-operative credit.

In Western Australia and other States I understand proposals are being put forward along the lines on which Queensland has already legislated. It is interesting to note that both in the New South Wales and Victorian Press, particularly with regard to fruitgrowing, resolutions have been carried by representative farming associations for the purpose of securing powers similar to those which exist in Queensland. In America, also, interest along the same lines has been evinced; and it is of importance to know that practically every country dependent upon agriculture and realising the importance of agricultural production is thinking along those lines.

Hon. W. FORGAN SMITH,
Minister for Agriculture and Stock.

In that connection I have a rather interesting quotation from an American paper dealing with a conference held in Maine on 1st July last of various State Governors in America—

> "Thomas G. McLeod, Governor of South Carolina, opened a discussion of farm problems with a speech on co-operative marketing. He advocated a selling organisation among the farmers, not to be maintained, but at least fostered by the State, so that agricultural products could be put on the market at a price ensuring a reasonable profit, instead of having them offered to the market by hundreds of thousands of small sellers in competition with each other.
>
> "Co-operative marketing, by which the farm produce would be placed on the market only as the demand kept the price at what was considered a reasonable level, Mr. McLeod believed to be of vital importance in that it would make farming profitable and check the undesirable drift of population to the urban centres."

A Definite, Sound Economic Policy.

Prior to the enactment of measures of this kind the farming industry was practically the only large and important industry which was carried on on an individualist basis. In many instances farmers are expected to grow products without any regard for the demand for those commodities, and in many cases without controlling in any way whatever the final disposal of their products. We lay it down as a definite and sound economic principle that nobody has the right to get anything cheap if its cheapness depends upon the underpayment of anyone engaged in its production. That is our definite policy, and I am satisfied that the people of Australia are generally of the opinion that no one desires to have any section of industry, agricultural or otherwise, carried out under a system which means such sweating or underpayment of the men and women engaged in it; and, if we are going to make the conditions of the man engaged in agricultural production something more important than a subject for after-dinner speeches, then steps along the lines of this measure must be taken. The Hon. Henry C. Wallace, Secretary for Agriculture in the United States, put it in this way—

> "The farmer is the only large producer who produces without informing himself as to future demands; who sells at the price the buyer is willing to pay; who does not condition his products carefully for market; who dumps them in large quantities on the market soon after harvest, and who therefore pays high charges of all sorts to other people to do what he ought to do himself."

Farmers' Power under the Pools Act.

Under the Primary Products Pools Act and other pooling legislation of this Government machinery is placed in the hands of the farmer which will enable him to overcome the difficulties and organise in such a way as to improve his status and his position generally. Of course, I realise that in any community certain difficulties have to be overcome. There is the attitude of the man who takes the view that he should not be subject to any control, co-operative or otherwise; that he should be allowed to carry on his industry in his own way without regard to his fellows engaged in that or any other industry. That might be put forward as another specious argument against compulsory co-operative marketing; but we must realise that in any civilised community liberty is conditional on the liberty or the best interests of the people. Under our organised society men often have to give up what may be considered or may be defined as individual liberty with a view to sharing with the rest of the community that greater liberty which brings benefits to all. That is precisely the position in compulsory co-operative marketing. If the Australian agriculturist is to be put on a satisfactory footing, such marketing is essential; and my advice to the farmers of Queensland and of Australia generally is to get into the organisations provided for them under this and other Acts, take full advantage of them and loyally stick to their fellows, and so improve their position, paying little or no heed to interested parties who seek to break up their organisations with a view to maintaining that control which has been so profitable to them in the past, but which has resulted in disaster to the farmer as a class. By means of pooling, primary producers can organise their industry and so prevent waste, such as gluts, and eliminate unnecessary charges, and as a result reap a benefit for all parties concerned.

Stabilisation a First Advantage.

One of the first advantages of a pool is stabilisation. I contend that the stabilisation of the supply and price of a commodity is desirable in the interests of the community. Market fluctuations in the price or supply of a commodity are of little or no advantage to anyone in the community, and are detrimental to the interests both of the producer and consumer. What we should aim at is continuity of policy, and the stabilisation of markets and prices, ensuring to the producer a fair return for his labour and to the consumer an economic price based on the cost of production.

Principles of Co-operative Marketing.

There are certain principles of co-operative marketing which may be set out—

1. Co-operative marketing seeks to control the movement of commodities to market, thus substituting orderly marketing for after-harvest dumping;
2. It improves the quality of products through grading and processing, thus broadening the outlet;
3. It develops new markets through advertising and salesmanship;
4. It collects all available data bearing on future demand and advises its members so that they may individually adjust their production;
5. It reduces the usual high charges for marketing service by doing part or all of that work itself for its members at cost.

Every productive industry at the present time, therefore, is highly organised, and it is arrant hypocrisy for leader writers in daily papers like the "Telegraph" or any other paper to condemn organised production on the part of the farmers.

The Case Against and the Answer.

I noticed recently an article condemning the principle of pooling as proposed by this Government and by the organised farmers of Queensland. The attitude taken up was that the farmers had no right to organise in this way, and that it was detrimental to the public interests that those powers should be given. If the article meant anything, that was what it conveyed. At the present time every other industry is organised. The law of supply and demand is very largely controlled by means of combinations and understandings between those engaged in the various industries. Therefore I say it is the height of hypocrisy on the part of any one to object to the principles that we are laying down in this and other agricultural measures which are designed to confer the advantages of scientific organisation and control of marketing. Under the principal Act the following procedure is necessary to create a pool:—

1. Application by those interested is made to the Minister for a pool;
2. Notice of intention to create a pool is advertised;
3. It is within the right of any fifty producers interested to demand, within thirty days, a referendum;
4. If no demand for a referendum is received, the pool is constituted;
5. If a vote is demanded, voting-papers are sent to all producers concerned.

Under this Bill it is proposed to alter the percentage required for the approval of a pool. At present, if more than 25 per cent. of the producers who vote are opposed to a pool, then that pool cannot be formed. We have had experience of pools being prevented by a very small margin indeed, and under this measure it is proposed to alter the percentage basis from 75 per cent. to 66⅔ per cent., the reason for that change being that we as a Government and the agriculturists as organised bodies consider that 75 per cent. is too high a majority to require for the creation of a pool.

Pool Polls—Provision for Two-thirds Majority.

Some people have advocated that a simple majority of those voting should be sufficient, but on full consideration of the whole position I think it is desirable to place the percentage at the figure I have indicated. One must realise that, if there is very strong opposition among producers of a commodity to a pool, then the operations of that form of activity are likely to be circumscribed and unsuccessful. It is desirable that at least two-thirds should be in favour of the proposal, and by that means substantial support can be given to the proposal and continuity of policy secured. At the same time as the referendum on the pool is taken voting will also take place on the election of members for the pool board. The point was raised by the leader of the Opposition at the initiation stages of the Bill as to who shall be the voters. I replied by way of interjection that the producers of the commodity will be the voters under this Bill and under the consolidated Act. All those engaged in producing the commodity which it is proposed to pool will have a vote in saying whether there shall be such a pool.

The Dairy Farmers' Position.

The point has also been raised in connection with the butter pool as to whether the dairy farmers or the co-operative butter factories shall be the voters. The reply to that is that, in my opinion, both the dairy farmers concerned and the factories should be the constituents for such a pool. That is the provision and the power that is being taken under this Bill. In addition to that principle, in the existing law when a pool board is formed the Council of Agriculture recommend the chairman and appoint a representative to the pool board.

Reorganisation of Council of Agriculture.

It is necessary at this juncture to take into consideration with this measure the Primary Producers' Organisation Acts Amendment Bill which is on the business-paper, and it will then be understood that this Bill as well as that Bill provides for the reorganisation of the Council of Agriculture on a commodity basis. Commodity boards will be formed under section 3 of the principal Act, and they will function entirely in the industry covered by that organisation, the idea being to give complete control and autonomy to each industry organised on a commodity basis. Such a commodity board will from its members elect one representative to the Council of Agriculture, and they also will be given the power to elect their own chairman. That is to say,

from the elected members of the commodity board they will elect their own chairman and will also elect one of their representatives to the Council of Agriculture, which will then form a kind of executive representing the agricultural interests of the whole State. As a result of that, instead of the Council of Agriculture appointing a representative to these commodity boards, which, as I have pointed out, would be quite unnecessary, having regard to the method of reorganisation outlined, it is proposed to give the Minister power to elect a representative to those commodity boards which may be engaged in trading. The question has been raised in that connection as to how far we intend to go, and it will be necessary in Committee for me to move an amendment on that clause, setting out exactly what the intentions of the Government are in regard thereto. Commodity boards will be established which need not of necessity be trading boards. That is to say, in the constitution of a commodity board it may be provided that they shall have definite functions altogether apart from marketing. Their function will be then to organise their section of the agricultural industry and carry on activities in the interests of their members, but if a pool of that commodity is not formed, then there is little or no use in the Government appointing a representative to such a commodity board. Our representatives will be confined to those boards which have trading functions.

Government Representation.

Where a pool has been formed for any commodity, such as butter, cheese, eggs, maize, or anything else, the Secretary for Agriculture will be given the power to appoint a representative to that pool board to represent the public interests. I consider that desirable from the public point of view, as it gives stability to the principle of pooling itself, and is calculated to strengthen public favour in regard thereto.

It has been argued inferentially by certain people who have not considered the question fully, that the boards should be composed of primary producers, and that there should be no other persons on them than representatives of those engaged in the industry. The reply to that is that the public interests must be represented at all times. Where power is given by the State to effect practically a monopoly of a commodity, it is of advantage to have the public represented on such boards to ensure that the public interests are safeguarded. That is the justification for the Government having a representative on a pool board. We must remember that we are virtually the only country in the world giving the producers the machinery necessary to build up the complete and definite control of their commodity.

Continuity of Policy.

By the appointment of a representative of the public, nominated by the Secretary for Agriculture, a continuity of policy is ensured, and confidence is given to the public mind that the activities of these pool boards will always have due regard to the public interests. I have discussed this matter with a number of leading representatives of our industries who are now on pool boards, and representatives of producers' organisations, and they are in agreement with me as to the desirability of such action. In addition to that, it is the intention of the department to appoint to such boards a representative who will be able to help producers in carrying on their various forms of activity. A man will be appointed who has a knowledge of marketing conditions, and his services and advice will at all times be available to the producers. I was pointing out, when I was interrupted by certain hon. members, that I had discussed these matters with representatives of the different interests concerned, and they agree that it is desirable, having regard to all the interests concerned, to have such a representative, and it is the intention of the Department of Agriculture to appoint as their representative on these pool boards a gentleman who will be of advantage to those boards, and who will place his knowledge and experience at their disposal.

Proposed Property in Commodities.

There is another provision of the Bill which deals with the product becoming the property of the board. That is a fairly important provision, and I consider it absolutely necessary for the successful conduct of pools that such authority and power be given. It can be readily recognised that no pool is likely to be successful unless it controls the whole of the product which forms the basis of the pool. If it is possible for persons having representatives in other States to make the commodity so pooled the subject of an interstate contract, the principles of the pool can be defeated, and the efforts of those engaged in the industry rendered null and void. One only needs to mention that point to make the position clearly understood to anyone who has studied the principle. It is proposed under this measure, when a pool is formed, to give power to it to acquire property in the pool. That, of course, will be subject to the voters concerned. In other words the farmers who form the pool will have power, if they so desire, to give the pool board property in the commodity. When

such power is given, the pool board becomes the sole authority that can enter into any contract whatsoever for the disposal of the commodity. That renders the pool water-tight, and gives the growers concerned complete control of the commodity which is pooled in this way.

Levies.

Another provision in the Bill is that dealing with levies. A commodity board or a pool board will have power to levy to carry on its functions and provide for its necessary administrative costs. In addition to that, it will be the authority that pays to the Council of Agriculture its proportion of the costs of carrying on that organisation. At the present time both the Council of Agriculture and the commodity boards have the power to levy, each for different purposes. Under the alterations proposed in this measure provision is made for the Council of Agriculture issuing a precept on a commodity board for its share of the costs of the Council of Agriculture, and the board will be the sole levying authority. When a commodity board is established, it will make a levy sufficient to pay its own administrative costs and its share of the costs of carrying on the functions of the Council of Agriculture. In addition to that, provision is made whereby funds can be built up for various purposes. It may be—it undoubtedly is in the minds of certain pool boards—that they will consider it desirable to go in for certain forms of insurance—carrying their own insurance risks, for example, against hail. If they so desire, they can go in for that form of activity. A board may make a levy with a view to building up the necessary reserves to continue as a trading board for any special object considered desirable by the pool board and approved by the Minister. A levy for such special purpose is made the subject of a vote by the growers concerned. That is to say, if a pool board desires to build up reserves to have an insurance fund of its members, or any other special purpose that may be of advantage to the producers, that can be done, but it will be subject to the right of the growers demanding and having a vote on the principle.

The Farmers' Right to High-Living Standards.

Briefly stated, those are the principles of the Bill now before the House. I am satisfied that when the amendments are taken in conjunction with the principal Act, and that Act is used properly by the primary producers of this State, it will do much to develop agriculture in Queensland, help to establish the primary producer on an economic footing, and give him that standard of living which he has a right to expect and demand in a free community.

WHY TIMBER ROTS.

The destruction of wood by decay is due to low forms of plant life known as fungi, which use as food certain substances of the wood. These fungi consist for the most part of fine thread-like filaments which penetrate the wood-cells, disintegrating the wood substance and leaving behind the powdery residue so characteristic of decayed wood. In places the filaments grow out to the surface of the wood to form compact bodies, the fungus frequently found growing on the trunks of both living and dead trees. These are an indication of advanced decay, and function as spore-producers, spores corresponding to the seeds of the higher orders of plant life; like these latter, they are distributed principally by the wind. Certain conditions of air, moisture, temperature, and food are necessary for their germination and the subsequent growth of the fungi. According to the control exercised over these factors, either by the nature of the wood itself or by the conditions under which it is used, will the natural durability be affected.

As the sap-wood of all trees contains a large amount of protoplasm, starch, and other essential plant-foods, it exhibits poor durability, seldom lasting long when in contact with the ground, though the natural durability of heart-wood varies with the timber. Posts cut from immature and fast-growing trees generally exhibit little resistance to decay.

Timber felled in autumn and winter (points out a writer in the "Journal" of the New Zealand Department of Agriculture) does not dry out as rapidly as that felled in the warmer months, and has thus less tendency to splits and cracks, which afford an opening for insects and fungi. Insects are noticeably absent at this time of the year, and by late spring the wood will have dried sufficiently to resist the attack of these pests.

Decay is most active near the ground-line. It extends deeper in loose and sandy soils than in clayey ones, in which latter the air supply is not so good. Post tops, joints in framed timbers, and other points where water collects also exhibit serious decay. In the presence of excessive moisture, however, decay cannot proceed, as illustrated by timber recovered from swamps in which it has been buried for hundreds of years.

STORAGE OF LEMONS—SOUTHERN EXPERIMENTS.*

Facts of interest to lemon-growers are disclosed in a report of experiments carried out last year with main-crop lemons by the Gosford District Citrus Packing House in conjunction with the Department of Agriculture.

A number of methods of storing were tried in previous experiments, but only two were persisted in—namely (1) in paper-lined cases, and (2) in unlined cases. The fruit was clipped during May, June, and July, the greatest care being exercised to avoid damage in gathering, and at all subsequent times. It was clipped leaving as little stalk as possible, two cuts usually being necessary—one to sever the fruit from the tree, and a second one to clip the stalk quite close to the button of the fruit. It was found that faster and more careful work could be done this way than in trying to sever and finish in one cut from the tree. The bulk of the fruit was green or only slightly coloured when clipped, and ranged from 2½ to 2¾ in.

The lemons were grown within a mile of the sea and stored in the same humid climate. They comprised all classes of fruit from different orchards; and to avoid damage to the tender rind of the fruit were subjected to a toughening process after clipping by being held in cases at the orchard for a number of days (up to seven) before being removed for storage. In some instances the fruit was stacked in cases and left out in the orchard, and apparently without damage. The place of storage was underneath a weatherboard house, built on piles standing about 7 ft. out of the ground.

To afford protection from drying winds bagging was stretched around some of the piles, forming an enclosure in which the fruit was placed; the object being, if possible, to maintain a high relative humidity, and a reasonably low temperature. With the same object in view, as the weather became warmer in the spring, bags were placed over and around the cases.

A Minimum of Handling.

The fruit was put down in May, June, and July, and the test concluded at the end of October, some of the fruit being in store, therefore, over five months. Once in store, as little handling as possible took place. The cases were examined periodically, and decayed fruit removed, but no general overhauling of the fruit was permitted. Decay can usually be traced by the smell, and only boxes in which decay was known to exist received particular attention. It was noted that a few decayed fruits were found within, say, fourteen days after clipping, after which a long period elapsed before any further decay was found. This early decay was, no doubt, the result of injuries received during clipping, thorn pricks, &c. Practically all decay was the result of an injury, blue mould commencing at the point of injury, and eventually invading the whole of the fruit. Certain specimens developed spots, which proved to be the initial stages of black spot. "This is interesting," remarks the report, "in view of the fact that these lemons were in store at least three months before the disease became evident, which suggests that this disease enters the fruit long before it makes its appearance on the surface of the rind."

The Results.

Eighty-two cases of lemons were put down, out of which seventy-five cases of packed fruit were placed on the market; the total loss, therefore, was approximately seven cases. No actual count was made of the loss from decay, but it is safe to assume, according to the report, that the bulk of this loss was the result of shrinkage of the fruit. Of the seventy-five cases marketed, one case was packed from fruit put down in May, exhibited at the Gosford Citrus Show on 23rd August, 1924, and sold two days later. Twenty-two cases were marketed on 18th September. This lot were stored in unlined cases, and had to be marketed to save loss. They lost their attractive colour and began to wither through heat and drying atmosphere, and would soon have lost all commercial value. The balance of fifty-two cases were placed on the market on the 4th November, 1924. This fruit had been stored in paper-lined cases, and was a fair average sample of stored lemons. The colour was good, the rind tough without being withered, the stalks were green, and had in most instances calloused over the cut edges, and were firmly attached to the fruit. It was considered, however, that the fruit had reached the limit of the period of keeping in store.

* From "Agricultural and Pastoral Notes," New South Wales Department of Agriculture.

Temperature and Humidity.

Though good results were obtained by storing under the conditions described, it was considered that better results would have been achieved if means had existed of regulating temperatures and humidities. During the winter months, no special arrangements were needed to maintain these conditions, but once the warm weather and drying winds of spring set in temperature and humidity fluctuated considerably. To note these fluctuations, a dry and wet bulb thermometer was installed, and during the months of August, September, and October readings were taken three times a day —at 8 a.m., 1.30 and 8 p.m. Unfortunately, the readings from the dry and wet bulb thermometer gave very little definite information in regard to the temperatures and humidities at which to hold the fruit, owing to the fact that there were no means of holding temperatures, &c., to any particular readings; but from the experiments referred to, as well as from other lemon-storing tests, states the report, it is evident that high relative humidities and fairly low temperatures are necessary to hold lemons over long periods. As a working basis, it is suggested that the temperature be held below 70 deg. Fahr., and the relative humidity maintained at between 80 and 85 per cent.

Summary.

The results are summarised as follows:—

Lemons may be successfully held in such a storeroom as described over a period of several months.

Better results have been secured by storing in paper-lined cases than in unlined cases.

Very careful handling is always necessary in all operations.

The number of handlings should be reduced to a minimum. Once the fruit is put in store handling is necessary only to remove decayed fruit.

Green fruit when clipped produces a better cured lemon than tree-ripe fruit.

These tests have shown that tree-ripe lemons do not keep as well as green lemons. Tree-ripe lemons become too dark in colour after a short time in store, and should not be put down in any commercial effort of storage.

A toughening period of about seven days should be allowed the fruit, so as to avoid damage, before it is removed any distance from the orchard, prior to going into store.

Fairly low temperatures and high relative humidity are necessary in the storeroom. Temperature at or below 70 deg. Fahr. and relative humidity at from 80 to 85 per cent. is suggested.

While ventilation is necessary in the storeroom, drying winds that reach the fruit are fatal.

STAGGER WEED—POISONOUS TO STOCK.

The Stock Inspector at Warwick (Mr. T. H. Shepherd) writes:—

"Under separate cover I am forwarding you a sample of the so-called 'Stagger Weed.' At the present time losses are occurring in my district of both cattle and sheep. The symptoms are precisely like 'Zamia' poisoning, but there is no Zamia in my district. Owners are of the opinion that the losses are due to this 'Stagger Weed.'"

The matter was referred to the Government Botanist (Mr. C. T. White, F.L.S.), who replied—

"The weed forwarded by Inspector Shepherd as 'Stagger Weed' is *Lamium amplexicaule*. Feeding experiments with this plant have shown definitely that it is capable of producing 'staggers' in stock. An account of feeding experiments with this weed was published in the "Agricultural Gazette" of New South Wales for May, 1921, by Dodd and Henry. In conclusion, these writers stated—

> 'So long as animals remain on lamium feed, the condition continues; but if removed and placed on other feed, even in an affected locality, recovery is rapid. There is some evidence that the rapidity of this recovery varies directly with the length of time that the annal has been affected. When recovery takes place it is complete, and no ill effects whatever can be seen to remain.'

"I might mention that *Lamium amplexicaule* is not the plant most commonly known in Australia as 'Stagger Weed,' which is *Stachys arvensis*, a very similar weed closely allied to the Lamium and, like it, capable of causing staggers in stock."

THE FECUNDITY OF MORMONIELLA AND SOME PROBLEMS IN PARTHENOGENESIS.

By G. H. HARDY, Research Fellow, Queensland University.*

About a year ago, in a short paper, I summarised the conclusions arising from certain experiments dealing with the hymenopteous parasites of blowflies and two species of *Chalcididae* were referred to in that address. One of these wasps, *Mormoniella,* has been followed up with the object of determining how many eggs are laid by the female. The experiments gave averages of 182, 156, 222, and over 400, and not less than 35 puparia succumbed to the attack of each female parent parasite and yielded this progeny. All these numbers were in excess of those previously considered attainable and, moreover, the conditions under which these earlier experiments were conducted were such as to cause excessive losses occasioned by the overloading of puparia with eggs and by puparia of unsuitable age being used.

Up to that time, the ideas expressed upon this subject of progeny were summed up by Johnston and Tiegs in 1921 as follows:—"Observations by Girault and Sanders and by Froggatt and McCarthy showed that on an average one female may deposit 113 eggs, but, unfortunately, she distributes them only amongst 17 to 20 pupae (on an average), so that her destructive action is strictly limited."

Judging from my own experiments, it seemed that the number of eggs deposited by each female should not be less than five times the number given by previous authors, and if my estimate be correct, the value of *Mormoniella* might be enhanced fivefold.

The parasite lays its minute eggs in the comparatively large puparia of blowflies and to find and count these eggs is impracticable, so the only chance of verifying this estimate of the progeny is to rear for the adults. Already, as indicated in my previous address, there seemed to be sufficient knowledge gained to enable practically all the eggs deposited to be reared to maturity. Not only was the host of suitable age needed, but care had to be taken that not too many eggs were deposited in any one puparium.

In a subsequent test carried out on these lines, from one female, instead of about 113 parasites being reared from about 20 puparia, as was originally thought would be the case, no less than 550 parasites emerged from 86 puparia. Although this conformed with recent expectations, nevertheless, as will be indicated later, I now doubt if it has reached even the approximate maximum progeny obtainable.

Johnston and Tiegs further recorded:—"Unfertilised females also oviposit quite readily, the offspring being entirely males." This case of parthenogenesis I have also experienced and can vouch for, but there was no information available to indicate why this should be so, nor yet to show what bearing the phenomenon might have upon a subsequent generation. On this account, whilst breeding from a paired *Mormoniella,* an experiment was conducted by treating a virgin specimen under identical conditions.

The parthenogenetically produced progeny reached only 288 parasites, which number is thirteen in excess of half that reared from the paired specimen, whilst 57 puparia yielded these parasites against 86 being effectively parasitised by the fertilised female, thus the parthenogenetically producing parasites are two-thirds as efficient as the others.

It is a very simple explanation that I would read into the results of this comparative test. The known proportion of the sexes is considered to be approximately equal, one sex not exceeding 5 per cent. in number above the other. This suggests that the males only were reared parthenogenetically, the male eggs being fertile, the female eggs requiring the male sperm to germinate them. If this assumption be correct, it will have a far-reaching effect upon methods to be adopted in the breeding of blowfly parasites on a large scale, and it will affect future experiments dealing with the fecundity of *Mormoniella* in a like manner.

The sexes were together at the beginning of the experiments so far conducted, except in that parthenogenetic case, referred to above, where no males were used; and whilst the female lives as long as forty days, the males died within a few days and were not replaced. In consequence of this, the females may have exhausted their sperm-cells received from the males during the earlier portion of their egg-laying activities, and being without sperm-cells during the latter period would render the female eggs then deposited infertile. Hence there may have been considerable loss of female eggs during the latter portion of every experiment, indicating that as many as 200 more female eggs were deposited than there were adults reared.

If this interpretation of parthenogenesis in Chalcid wasps be proved, it may have a very important bearing on the question in relation to other insects, calling

* In an address before the Entomological Society, Brisbane, 16th September, 1925.

for a readjustment of certain views that are somewhat contentious though widely held. The phenomenon of parthenogenesis amongst hymenoptera is exhibited in several ways. There are a few insects such as certain saw-flies and gall-flies in which the male is unknown and it is suggested that these are perpetually parthenogenetic. Again, amongst insects that are known to reproduce in the ordinary way parthenogenesis may also occur, resulting usually in the production of only one sex, either females or males, the former called "thelotoky" the latter "arrhenotoky," whilst in those rarer cases where both sexes are so produced it is called "deuterotoky."

In gall-flies parthenogenesis may take the form of alteration of generations, the first generation of two sexes being followed by a generation of only females, this being followed again by both sexes and so on, thus "deuterotokous" parthenogenesis is established as part of the economy of the species.

In the honey-bee, unfertilised eggs are popularly credited with producing only drones. It has been assumed that the eggs are male till fertilised and then become female. Hence it is supposed that the sex is determined by the act of or the lack of fertilisation. On this account it has been confidently stated, and as confidently believed, that no male honey-bee has a father. These views are not necessarily favoured by the modern biologists, but it is very difficult once such ideas have taken hold, to force some better and sounder observations in their stead. The ideas expressed concerning the parthenogenesis of bees have fostered similar views with regard to that of other insects, and I think that some similar beliefs have been held in relation to the Chalcid parasites, but apparently they have not been expressed in print.

It seems possible that "arrhenotokous" parthenogenesis may have become part of the economy of blowfly parasites much in the same way as "deuterotokous" parthenogenesis is within certain gall-flies. It has yet to be proved that the female *Mormoniella* needs copulation with more than one male during her relatively long life of activity if all her female eggs are to be fertile. This polyandry, if it exists, would necessitate a larger proportion of males, which would naturally be induced with any insect having parthenogenesis resulting in a male progeny, so what at first sight appears to be an unnecessary overproduction of the male sex may really act as a counterbalance assuring a much larger female progeny in the following generation. In this way what has been considered a rather useless accomplishment may ultimately prove exceedingly advantageous if not vital to the wellbeing of the race possessing it.

The question now arises as to whether polyandry is necessary to procure the maximum progeny of *Mormoniella*, and, if so, it is reasonable to conclude that "arrhenotoky," being advantageous to any polyandrous race, has become a factor in the economy of *Mormoniella*.

POTATOES IN NORTH QUEENSLAND.

COMPARATIVE TRIAL ON TABLELAND AND COAST.

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

In the course of the past season, trials of ten varieties of potatoes were conducted on the farms of W. S. Allen, Tolga, and O. T. M. Hansen, Carbeen, Atherton Tableland, in the summer months, and on the farms of Pilcher Bros., Cape River, Pentland, and A. W. Hughes, Major's Creek, Woodstock, in the winter months.

Seed of ten varieties was procured from Victoria for the Tableland trials, and was planted there towards the end of September. Seed from these Tableland trials which were harvested in January and February were used for the trials at Pentland and Woodstock, which were planted towards the end of March and early April.

On the Tableland, the early part of the season was very favourable, but it is thought a greater return would have been secured had more rain fallen in December, during which period the tubers would be making maximum growth. This is evidenced in the greater percentage of small or unsaleable tubers, when compared with the other trials, on which the rainfall was very favourable to high yields. At Mr. Hansen's farm, predatory vermin did some damage to some of the varieties, while at Pilcher Bros.' farm a heavy frost towards the end of July probably lessened, slightly, the yield of one or two of the later maturing varieties.

All plots were sprayed with Burgundy mixture (8 lb. bluestone, 10 lb. washing soda, to 40 gallons water) as a preventive against fungus disease.

TABLE SHOWING COMPARATIVE YIELDS OF VARIETIES PER ACRE.

Farms—	W. S. Allen, Tolga.					O. T. M. Hansen, Carbeen.				
Varieties—	T.	C.	Q.	LB.	Small. %	T.	C.	Q.	LB.	Small. %
Up-to-date	4	18	0	24	15	5	6	0	8	9
Scottish Triumph	3	16	2	22	38	Failure			..	..
Coronation	3	10	2	24	25	4	4	1	24	19
Carmen No. 1	4	19	3	0	10	3	18	2	8	10
Carmen No. 3	4	11	1	20	11	6	4	2	16	9
Clark's Main Crop	4	14	1	4	16	1	17	1	8	37
Manistee	2	7	0	16	37	2	19	0	0	16
Victory	3	18	2	8	10	5	4	0	12	13
Early Rose	2	11	0	8	19	1	0	0	0	59
Sussex Red	Failure			..	..	2	19	0	0	24

TABLE SHOWING COMPARATIVE YIELDS OF VARIETIES PER ACRE—*continued.*

Farms—	Pilcher Bros., Pentland.					A. W. Hughes, Woodstock.				
Varieties—	T.	C.	Q.	LB.	Small. %	T.	C.	Q.	LB.	Small. %
Up-to-date	7	1	1	20	6	12	18	1	5	5
Scottish Triumph	6	8	1	26	6	11	4	3	26	7
Coronation	4	17	0	26	4	14	19	0	11	4
Carmen No. 1	3	7	3	2	12	8	10	0	17	5
Carmen No. 3	4	8	2	20	10	8	19	0	18	6
Clark's Main Crop	2	6	1	12	15	9	1	3	13	10
Manistee	2	15	3	26	11	8	2	3	23	4
Victory	3	12	2	20	8	5	17	3	22	6
Early Rose	1	11	2	14	19	2	5	3	19	14
Sussex Red	Failure			..	..	Failure			..	..

The result of the trials must be regarded as very satisfactory, the yields at Mr. Hughes's farm being exceptionally good.

An interesting and very satisfactory feature is the success attendant on the planting of Tableland seed on the coast. A difficulty experienced in the North is in procuring a satisfactory supply of seed at the times of planting on Tableland or coast. (Tableland may be taken as on altitudes of over 2,000 feet, and coast as under that height above sea level.) To secure the best results, the Tableland crop should be planted to receive the first of the monsoonal or wet season rains which commence usually in November or December. Seed for this time of planting is generally hard to secure or to keep in proper condition from July or August, when it is in fair supply in the South. In the volcanic soils in the forest areas, the porous loam is usually sufficiently dry to permit of planting in mid-August or September, when a certain amount of root growth will be made without any growth appearing above ground until a sufficiency of rain falls. There is a possibility in this connection of an isolated storm falling with insufficient following to mature the crop, and this has occurred once or twice there in the last eighteen years, but usually on these areas September and October are practically rainless, or when a storm occurs in October, useful rains follow. On soils other than the porous volcanic loams, it is calculated that too much moisture would be retained to allow of the practice being adopted, while on the scrub areas, the possibility of rain in these months is very much greater. Consequently, the best time for planting potato sets on the Tableland is in October on the drier volcanic soil, and after, or preferably shortly before, a good fall of rain on the other areas.

On the coastal areas or at altitudes below 2,000 feet, potatoes should not be planted before the heaviest of the wet season is over, usually in the midde of March.

From then on, until May, dependent on the liability of the area to frost, may be regarded as the most suitable times to plant to secure the best results. During

these months seed potatoes of good quality are practically unprocurable, most growers resorting to the selection of the small tubers from commercial lots brought from South. As a consequence, a mixture of varieties is usually the result, while fungus diseases are often introduced in such seed. With the Tableland crop maturing in late January or February, seed therefrom would be available for the coastal plantings, more especially if such seed was dug in the immature state—it is a well established fact that immature seed produces a heavier crop than mature seed, just as the cutting of younger growth of cane produces a heavier stool of cane than the cutting of older growth—while the coastal crop maturing in July and August would provide seed nicely shot for October or November plantings on the Tableland.

In the interchange of seed between Tableland and coast, and *vice versâ*, the difficulty experienced in procuring seed at the right time will be overcome and the North rendered more self-supporting in this direction.

Until sufficient areas are cropped on Tableland and coast to permit of large supplies of seed being available, prospective growers on coast and Tableland are advised to get in touch with a view to the exchange or supply of seed. In this direction the services of this Department at Townsville or Atherton are now available.

In the yields of the different varieties, "Up to Date," which has in previous trials given the best all-round result, again occupies a prominent place, and is recommended with the other white-skinned varieties "Carmen No. 1," "Carmen No. 3," and "Scottish Triumph" as worthy of the most attention at present. "Coronation," a blue-skinned variety, though cropping well this season, has not done so well in previous trials.

"Clark's Main Crop," "Victory," and "Manistee" will be given further trials in future Departmental plots.

"Early Rose" does not appear to be suitable for Northern conditions and is not advised as worth planting.

"Sussex Red" was affected with "Sore Eye" (*Bacteriosis*) and produced potatoes of ugly shape and of inferior quality.

The cooking quality, as well as size and shape of all varieties excepting the latter, was excellent. At the recent Exhibition of the National Association, at Brisbane, samples of the varieties from the plots at Messrs. Hughes and Pilcher's farms were exhibited in the Departmental Court, where they provoked much appreciative comment.

As a profitable crop for farmers in the North, the potato should make a strong appeal, since the prices realised up to the present have rarely been under £10 per ton, but most frequently well in excess of that amount.

With a well-drained friable soil possessing a fair humus content and a sufficiency of the elements of plant food, such as may be found in every district on the Tableland and coastal slopes, a very large proportion of North Queensland's requirements should be met.

Plantings should be made at the right times mentioned previously, while sets of about 2 oz. in weight or the size of a hen's egg being considered most suitable. Sets should only be cut when whole ones are in short supply, and then allowed to stand for at least half a day before planting.

As a precaution against disease, it is advantageous to steep the whole seed for from 1½ to 2 hours in a solution of 1 lb. formalin to 30 gallons water or in a solution made up at the rate of 1 oz. corrosive sublimate to 6 gallons water. The former, which is non-poisonous, is preferable to the latter, which is very poisonous but has some advantages. When potatoes are to be cut into sets they should be steeped a day or so before cutting and not after cutting.

Cultivation should be frequent in the growing crop, as in this lies half the secret of success, and kept well hilled up.

As an insurance against loss through the action of fungus diseases of the plant, the crop should be sprayed with Bordeaux or Burgundy mixtures in early and mid growths.

When harvesting, the tubers should not be exposed to the hot sun for any length of time, but taken to the barn and spread there for a few days to toughen the skin and dry out sufficiently to keep well during transit to market.

GRAPE FRUIT.

Possibilities of Trade with Britain.

The following interesting note on the Grape Fruit trade in the United Kingdom is taken from a recent report from the Agent-General in London (Hon. John Huxham) to the Premier (Hon. W. N. Gillies):—

Of late years the demand for Grape Fruit in this country has developed considerably, and as the climate of Queensland would appear to be eminently suitable for the cultivation of this fruit, some particulars regarding the trade may be of interest to our producers.

The following figures show the quantity of Grape Fruit imported into this country in the years 1920-23:—

——	1920.	1921.	1922.	1923.
	Cwt.	Cwt.	Cwt.	Cwt.
United States of America	8,013	11,202	19,181	28,191
Other Foreign Countries	660	3,082	900	2,761
Cape Colony	1,824	1,501	6,233	7,798
British West Indies	2,814	5,481	5,534	10,648
Other British Possessions	423	183	152	751
Total	13,734	21,449	32,000	50,149

The figures for 1924 are not yet available, but there is little doubt that they will show a corresponding increase.

The principal supplies come from Florida, California, Porto Rica, and South Africa. A small quantity is shipped from Jamaica.

The price realised for this fruit varies considerably according to the quantity on the market, the weather, and the time of year they arrive. This season they have varied from 15s. to 45s. per case, but from 20s. to 25s. per case may be considered a fair average. The best time for the fruit to arrive here is from May to August.

The fruit should be packed in a hard and sound condition, and, although it should not arrive here green, it is essential that there should be no sign of deterioration. The degree of maturity to which the fruit should be packed can only be arrived at accurately by experience and experiment.

Needless to say, everything depends upon the packing, and it is absolutely essential that the greatest care should be taken that the fruit presents an attractive appearance when offered for sale here.

The cases should be of the following outside dimensions:—

Length	2 feet 1¾ inches
Height	1 foot
Width	1 foot

Wood of ¾ inch thickness is used. When packed, and after being nailed down, they should have metal bands round each end and round the centre to prevent them breaking open. It is also desirable that they be divided by a centre partition of wood ¾ inch thick.*

Each fruit must be wrapped in paper (stamped with a distinguishng mark) and graded to size. Each case should contain fruit of the same size and packed in counts of from 45 to 120, the quantity contained in the case being clearly marked on the end in stencil plate. For example—

A. G. Q.

96

GRAPE FRUIT.

The most popular counts on this market are 70, 80, and 96.

It is understood that the temperature at which the fruit is usually carried is from 42 to 45 degrees.

* The case referred to is the standard export citrus case prescribed by the Department of Trade and Customs for oversea shipment, and is identical with the citrus case in general use in U.S.A.—Ed.

TABLELAND MAIZE.

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

The Atherton Tableland ranks as one of the large producing centres of maize in the State, while it has, with its rich soil and freedom from serious drought in the growing season, the enviable distinction of possessing the highest average yield per acre, over many years, of any district within the State, and of any equal area in the Commonwealth.

The following figures have been extracted from the published statistics of the Department of Agriculture and Stock for the years 1916 to 1923 inclusive, as the acreage under crop and average yield per acre for each year of the various districts in the State in which an area of 10,000 acres or more was put under crop.

TABLE OF YIELDS.

—	Atherton.			Nanango.		
	Acres.	Bushels.	Average per Acre.	Acres.	Bushels.	Average per Acre.
1916	18,636	937,805	50·28	20,492	189,174	9·23
1917	15,705	586,574	37·35	15,419	429,316	27·84
1918	13,468	408,312	30·32	11,609	355,329	30·61
1919	15,616	664,868	42·58	11,389	144,291	12·67
1920	15,479	667,497	43·12	13,601	120,948	8·89
1921	15,021	445,175	29·64	16,612	256,981	16·47
1922	10,770	381,873	35·46	15,233	294,468	19·33
1923	10,411	447,094	42·94	16,414	178,027	10·85

TABLE OF YIELDS—*continued.*

—	Warwick.			Wienholt.		
	Acres.	Bushels.	Average per Acre.	Area.	Bushels.	Average per Acre.
1916	12,103	184,577	15·25	16,066	118,975	7·41
1917	8,904	206,108	23·15	13,229	366,625	27·71
1918	12,290	387,621	31·54	11,931	387,129	32·45
1919	7,427	85,296	11·48	11,593	168,262	14·51
1920	6,452	69,739	10·81	11,306	74,328	6·57
1921	6,592	134,739	20·42	17,955	425,111	23·68
1922	11,259	293,260	26·605	16,973	328,593	19·36
1923	10,659	163,951	15·38	11,798	117,906	9·99

Note the high average yields of the tableland and the low average yields of other districts in the years 1916, 1919, 1920, and 1923, which were years of low rainfall.

While the average yield is so far in advance of other districts, it is by no means as high as it would be if greater attention was paid to the selection of seed, suitability of variety, and general cultural methods in connection with the crop.

In average quality, it cannot be denied that the Tableland maize is very much inferior to that of other producing centres, and though this will be to an extent improved by the cleaning processes it will now go through in the pooling system, an absolute first quality product will not be obtained until pure seed of a variety calculated to withstand the weather influence is generally sown by growers. The poor quality of the average sample at present produced is due to the varieties, or rather the mixture of varieties, for there is no pure variety grown, which are entirely unsuited for the climatic conditions prevalent over the greater part of the maize-producing areas.

The Tableland Climate.

The climatic conditions during that part of the year under which the crop is grown are peculiar to the Tableland, and do not occur in any other maize-growing district in Australia.

The planting season is synchronous with the advent of what is popularly known as the wet season. In the Tropics—the Tableland lies between the 17th and 18th degrees of latitude south of the Equator—there is no spring season as understood in the Temperate Zone, and, as a rule, insufficient rain falls to warrant the planting of the maize crop before the wet season sets in—usually in December, sometimes in November, and very rarely in October.

At this time, the soil, after the dry months from August, possesses its maximum temperature, which, with the moisture from the thunderstorms with which the wet season opens, produces a forcing set of conditions tending to create a quick growth of coarse stalk to a much greater height than is usual in the maize-growing districts further south.

While the first month or so of the wet season is characterised by more or less heavy thunderstorms, with diminishing intervals between, and bright hot days during which the necessary cultivation of the young crop is affected, the rains later, when the grain is forming, are more persistent and generally lighter, while in the ripening period of the grain and when it should be drying off prior to harvest, the days are dull and cloudy with a persistent drizzling rain or mist, so humidifying the atmosphere that evaporation of moisture from the ripened cobs, to permit of their being harvested, is delayed until the end of July or August, when the rain usually ceases. The humid conditions of the Tableland are due to its elevation of from 2,000 to 3,000 feet above sea level, and to its contiguity to the Ballenden-Ker range of mountains, where the peaks, the highest in Queensland, over 5,000 feet above sea level, attract the clouds and give Innisfail and Babinda, less than 20 miles in a direct line from the western, and very much less still from the eastern limits of the Atherton maize lands, the heaviest rainfalls in the State.

These climatic conditions result in a forced growth of plant with usually a single cob in which the core is large, coarse, and pithy, containing a maximum of moisture or sap which dries out with difficulty. The grain produced is of a more soft and starchy nature than is typical of many of the varieties as originally introduced.

Atherton Maize.

An inspection of an average crop growing on the Tableland would show that the stalks grow very tall, frequently over 12 or 13 feet high, and that the single cob is borne high up, often out of the reach of man of small stature; that the cobs do not readily turn down after maturity is reached, owing to their erect growth, too close to the stalk; that the type of husk covering is not good in that it allows the penetration of moisture and permits the grain on the cob to be infected in the field by weevils; that the grain is of no particular variety, but shows that it has been hybridised by one or other of the several Dent varieties that have been so persistently introduced by growers without a proper understanding of the matter; and that the number of barren stalks, that is, stalks which do not bear a cob, is strikingly large. With a view to preventing the stalks from falling or blowing down, in which the big cob so high up, coupled with the looseness of the soil, assists the wind, the practice of "turning down," *i.e.*, bending the upper part of the stalk down at a point a little below the cob, is generally followed over the greater part of the areas devoted to the crop. This practice, besides rendering the stalks less likely to heel over, is considered to render picking easier, while the cob in its new position is calculated to throw all rain off. It may be noted that when the crop is thus turned down, late growing weeds such as "goat weed," "milk thistles," &c., are given a better chance to grow, and are frequently seen growing above the cob in its new position, thus shading it and prolonging the time in which it would otherwise dry out, as well as tending to induce the formation of moulds in the cob or grain.

The barren stalks usually are not turned down and, by their numbers thus seen, afford a striking example of the want of proper care in the selection of seed.

During harvest, the husks are frequently found showing damage from the caterpillars of various moths, common to maize, which either bore holes through the husk into the grain or eat out the silks or top of the cob, in both cases allowing more or less water to enter with a consequent damage to the grain. This is evidenced by a moulding of a few grains at the point of entry, a saturation of the husk at the base of the cob where some of the grain may be sprouting, or the discolouration or partial damage of the grain, or even total destruction (dead grain)

by moulds or other fungi, in which latter case, although moisture may not be directly responsible, it may be regarded as accelerating the progress of the disease.

Many of the cobs, especially those of the Dent type, though apparently undamaged, will be found on being broken across to be affected with slight mould in the core and at the point of attachment of the grain to the core. Where a cob is found approaching in type the Yellow Dent or similar variety with a deep grain, although it may not be damaged by fungi, the grain will be light in weight and chaffy in appearance. The Tableland average sample of maize is usually deficient in lustre or brightness of colour, the amount of horny starch is lower than it should be, and it is light in weight since it is the rule more often than not to dump or ram the bags in order to make them weigh the requisite 160 lb.

The Problem of Diminishing Yields.

Complaint is made by many farmers that the average yields per acre on their farms is quickly diminishing. While it is probable that, on some of the areas on which maize has been the only crop grown for upwards of fifteen and twenty years, the returns would be lowered by the depletion of the necessary quantities of the elements of plant food through such continuous cropping with one crop without the use of fertilisers, this reason cannot be advanced for the diminished yields on other farms not so continuously cropped.

It is considered that the chief reason for such diminished yields lies in the lack of a suitable variety to withstand the extreme humidity, and in the present use of seed in which the vitality of the plant therefrom as instanced by the undue proportion of barren stalks in the fields, is insufficiently high.

Fertilising Experiments.

During the past season experiments with fertilisers were conducted on three farms on the Tableland using each farmer's own seed.

One trial was conducted on a farm in the scrub area that had been under cultivation for a period of about fifteen years, but on which during the preceding season a good deal of loss had been caused by Head Smut (*Sorosporium Reilianum*).

This fungus disease has not been common on the Tableland in past years, but was rather serious on several farms during the season 1923-1924. It can only be effectively controlled by the use of clean seed and by a rotation of crops to allow the spores of the fungus in the infected fields to die out, in the absence of a host on which to feed or reproduce. During the immediately past season the disease was less evident that in the preceding season.

The object of the experiment was to ascertain the influence of various fertiliser mixtures on yield, and at the same time to see if the fertilised plants by a more vigorous growth would show any increased resistance to the attack of the smut fungus.

Unfortunately, the proportion of barren plants was not taken, but the loss due to mouldy cobs discarded during harvest was 15 per cent., and to Head Smut 5 per cent., a total of 20 per cent., or one-fifth of the crop. The result per acre with the grain calculated to 14 per cent. of moisture content is as follows:—

Plot.	Superphosphate. Lbs. per Acre.	Sulphate of Potash. Lbs. per Acre.	Sulphate of Ammonia. Lbs. per Acre.	Lime Carbonate. Lbs. per Acre.	Yield per Acre. Cwt.	qrs.	lbs.
1	200	..	..	100	15	0	15
2	200	..	50	50	18	1	23
3	200	50	50	..	17	1	5
4	60	20	120	..	16	0	15
5	120	30	30	20	16	3	18
6	240	60	60	40	16	1	0
7	..	Control—	No manure	..	15	0	6
8	80	30	70	20	17	3	1
9	120	45	105	30	17	1	14
10	160	60	140	40	18	1	14

The results in yield do not point to a sufficient increase with any one fertiliser or mixture to pay for the application even if another 20 per cent. for loss due to smut and mould was added, while the effect of the fertiliser in smut control was a reduction of from 6 per cent. in plots 1, 5, and 7, to 5 per cent. in plots 2, 3, 4, 6, and 8, and to 4 per cent. in plots 9 and 10, pointing to the effect of the higher combinations of phosphoric oxide and nitrogen which was insufficient to be of value.

On this farm in the previous year, the grower asserted that he had harvested over 60 bushels to the acre from the major portion that he had under crop. With the small increase due to fertilisers it cannot be said the soil is wanting in fertility, but that in all probability if pure seed of a high-producing strain of a suitable variety had been used, a satisfactory yield would have been obtained without fertiliser application.

Another trial with fertilisers was conducted on a forest soil which had been placed under cultivation some forty years ago, and which had probably in that time produced some thirty crops of maize, while no fertiliser had ever been applied or crop ploughed under to keep up the humus content. While a series of fertilisers was applied on a portion during the past season, other portions were planted with leguminous crops to be ploughed under so that fertiliser applications thereon could be made in the ensuing season.

The plots were seeded on 29th January, which is regarded as too late usually to allow of good yields. The results show with the grain calculated to 14 per cent. moisture:—

Plot.	Superphosphate. Lb. per Acre.	Sulphate of Potash. Lb. per Acre.	Sulphate of Ammonia. Lb. per Acre.	Lime Carbonate. Lb. per Acre.	Yield. Cwt.	qr.	lb.
1	120	..	..	80	1	3	11
2	120	30	..	50	2	1	4
3	120	30	30	20	3	3	24
4	180	..	..	120	2	3	27
5	..	Control—	No fertiliser	..	2	2	6
6	180	30	..	90	3	0	9
7	180	30	30	60	4	3	10
8	180	45	45	30	4	2	19
9	240	60	60	40	5	1	21
10	..	Control—	No fertiliser	..	3	1	11

The records of unproductive plants and of those on which the cobs were discarded during the harvest as worthless owing to mouldy grain (there was no head smut on the area), were for each plot, which was one-tenth of the area:—

Plot.	Number of Plants on Plot.	Percentage Bearing no Cobs.	Percentage Bearing Mouldy Cobs.	Percentage of Weight of Core to Whole Cob.
1	484	50	28	19
2	484	49	35	23·5
3	484	38	31	25
4	484	44	28	26
5	484	45	34	25·5
6	484	43	26	24
7	484	45	34	23·5
8	484	24	35	23
9	484	19	30	25·5
10	484	42	25	24
Average	484	40	31	24

Attention is drawn to the weight of core, which averages nearly one-fourth of the weight of the whole cob.

Assuming that the seed used had been of equal viability to the average of that producing plants from which cobs were harvested, and that there had been no loss from moulds, the results would have been—

Plot.	Cwt.	qr.	lb.
1	5	1	24
2	6	2	25
3	9	0	24
4	7	1	25
5	7	0	10
6	5	3	19
7	13	1	21
8	9	2	3
9	9	2	5
10	7	2	12

In this table the result from No. 7 plot stands out above all others. In previous trials on forest lands during three consecutive years, it was demonstrated that on soil that had not been cropped for any great length of time, the application of 180 lb. of superphosphate per acre gave in each trial the most payable result. This result in No. 7 plot would seem to indicate that the same quantity would appear most profitable when nitrogen is added, for the longer cultivated soils in which the organic matter or humus content has become largely depleted. A third experiment with fertilisers was conducted on forest soil on the farm where the 180 lb. of superphosphate alluded to produced the most profitable result in each of the three years the experiment was repeated.

Phosphatic Manures.

The experiment this year was to compare the result from equal quantities of the different phosphatic manures available. The yields are calculated as per acre, the moisture content of the grain being corrected to 14 per cent.

	Tons.	cwt.	qr.	lb.	Bus.	lb.
Plot 1—180 lb. Superphosphate	1	3	2	8 or	47	8 per acre
Plot 2—180 lb. Basic Super.	1	3	3	4 or	47	32 per acre
Plot 3—Control no manure	1	5	2	8 or	51	8 per acre
Plot 4—180 lb. Nauru Island Phosphate	1	6	3	4 or	53	32 per acre
Plot 5—180 lb. Meatworks	1	7	2	12 or	55	12 per acre
Plot 6—Control no manure	1	2	0	0 or	44	0 per acre

From this trial it would appear that the citrate soluble phosphoric acid in the Nauru Island phosphate and meatworks is of more value than that which is water soluble in the ordinary superphosphate. The yield in Plot 3, where no fertiliser was applied, does not compare with that of Plot 6, also unmanured. The yield of the latter plot, however, is more in conformity with the control plot of previous years.

In this experiment the seed used approached the Flint type, the resultant grain being of good quality and bright colour. The percentage of mouldy cobs was almost negligible, while the weight of core was 13 per cent. of the gross weight of cob.

Summary.

To summarise the position, it will be admitted that, on the evidence adduced in the foregoing, the inferior quality of the Tableland grain is entirely due to the growth of a type of maize, which, of its nature, is not adapted to withstand the bad effects of the extremely humid atmosphere common to the Tableland during the period in which the crop is produced. The high percentage of plants which produce no grain offers conclusive evidence that the seed used has not been selected with sufficient care. Unproductive plants, though yielding no grain, will produce pollen, which, falling on the silks of productive plants, can be expected to transmit their weakness wholly or in part to the grain resulting from the impregnation. With this knowledge it is not to be wondered that yields would tend to become of lower average.

The first care in any endeavour to increase production and to raise the average quality of the grain should be to secure a variety to suit local conditions. Experience has proved that the Dent types are all unsatisfactory and that those of the Flint type will better resist the wet conditions, as far as the moulding of the grain is

concerned, and will provide a brighter and heavier sample that would be classed in any market as of prime quality. Obviously this variety must be kept pure, to do which the cropping of an area so isolated as to disallow pollination by another variety is indicated. With an area of this description seed in quantity could be supplied to plant other areas similarly isolated, when seed could be supplied to eventually plant the whole of the Tableland area.

On the first isolated area, particular attention could be paid to the improvement of the variety to better suit Tableland conditions and to build up a high producing strain, while at the same time more accurate information could be gained by the application of various mixtures of fertilisers, spacing tests, &c.

To improve the selected variety to suit Tableland conditions, careful attention would be paid to the type of husk covering, which should be such as to well protect the grain from the entry of moisture or damaging insects, and to the position in which the cob is borne on the stalk as well as to the angle it bears to the stalk, so that when mature the cobs will turn down naturally and allow the water from rain to run off at the tip, while with the lower position of the cob on the stalk there will be less liability of the stalks heeling over when a high wind blows. In the improvement of type of grain and yielding capacity, selections of cobs borne at a medium height on the stalk and at a satisfactory angle, showing grain of the desirable type in regular rows, completely filling the cob from base to extreme tip, would be chosen for ear to row tests.

In "ear to row" tests the same quantity of grain from each cob is sown in individual rows; just at the time of tasselling and before any pollen is matured, each alternate row is detasselled and any cobless stalks cut out of every row, the object being to ensure that the resultant grain on the detasselled stalks will be the product of two producing parents and thus of stronger vitality. During growth cobs on the detasselled rows of desirable husk covering and position on the stalk are marked. After each detasselled row has been harvested separately, selections are made from the marked cobs of the highest yielding rows for the new season's "ear to row" test, and the balance of the grain from these rows used to seed what is termed the stud plot, from which the seed will be available to sow the larger areas.

Thus each season should see an advance in the yielding capacity of the seed from the best ears in the "ear to row" tests which will be transmitted to the stud plot, and from there to the larger areas, until subsequently the whole of the Tableland crops will be produced from seed of this high-producing strain.

Any endeavour to propagate a pure variety without the necessary isolation will be largely doomed to failure, since, as pollen is frequently carried over half a mile and has so been noted on the Tableland where a breeze is usually blowing, that of the mongrel type now grown would render at least a part of the resultant seed impure.

Photo.: O. A. Jones.]

Plate 90.—Reflections.—On the Upper Brisbane, near Esk.

DAIRY FODDER PLOTS AT TOOGOOLAWAH.

A. E. GIBSON, Instructor in Agriculture.

For some years the Department of Agriculture has endeavoured to interest dairyman and stockowners generally in the matter of fodder provision for their herds during those periods whereby reason of the lack of succulence in the natural pastures, yields from their herds have been considerably lessened, and in some cases, even reduced within measurable distance of vanishing point.

The practice of arranging with interested farmers to carry out trials designed and supervised by officers of the Department, has met with a good deal of success. The results to date have clearly shown that by early and careful preparation, heavy returns are readily available of rich, succulent, milk-producing fodders, and that a continuity of this class of food can in normal seasons be kept up to tide milch cows over periods during which their productivity is affected by the gradual depression, induced in each animal's system, by being called upon to make use of rough grasses of low nutritive value, at a time when weather conditions were at their worst.

Ocular evidence has shown that improved milk supplies and a correspondingly improved return from the factory is inducement enough for other neighbouring farmers to profit by the example of the one who first adopted the system of growing crops regularly, for his dairy stock, actually on a farm an inexpensive method of maintaining an income.

In the present crop trials carried out on Mr. T. Coleman's property at Toogoolawah, no fertilisers of any kind were used. The plots were situated on well-prepared alluvial soil near Cressbrook Creek, which had been under cultivation for a number of years.

The plots were sown on 31st March, 1925, and were harvested for yield-computing purposes on 30th July, 1925, consequently each yield submitted represents four months' growth of fodder, and judged on this basis may be considered as highly satisfactory.

A more vigorous growth was noticeable in the case of Florence wheat and peas or tares and the Skinless barley with a similar mixture, both of which were well out in ear and rapidly maturing rye had made a dense growth in both instances, but only a few heads were to be seen, and probably a further three or four weeks would be required to bring it to a similar state of maturity to that obtained by the Florence wheat at date of harvesting. The following yields were recorded:—

	Tons.	cwt.	qr.	lb.
Florence wheat and peas	7	14	1	4
Cape barley and peas	9	11	1	0
Skinless barley and peas	10	15	1	12
Rye and peas	8	10	1	12
Algerian oats and peas	8	3	3	20
Canary seed and peas	11	8	0	24
Florence wheat and tares	7	4	2	16
Cape barley and tares	9	0	0	0
Skinless barley and tares	11	1	3	4
Rye and tares	12	13	3	20
Algerian oats and tares	10	15	1	12
Canary seed and tares	8	10	1	12

In view of the fact that some of the plots might be regarded as too immature for the purpose of obtaining the maximum yield, further weighings for comparative purposes were made on the 24th August, with the following results:—

	Tons.	cwt.	qr.	lb.
Algerian oats and peas	11	9	3	12
Rye and peas	8	13	2	8
Canary seed and peas	7	17	2	0
Algerian oats and tares	13	19	2	6
Rye and tares	9	9	2	16
Canary seed and tares	13	14	3	8

Plate 91.

Florence Wheat and Tares. Yield—7 tons 4 cwt. 2 qrs. 16 lb. per acre.

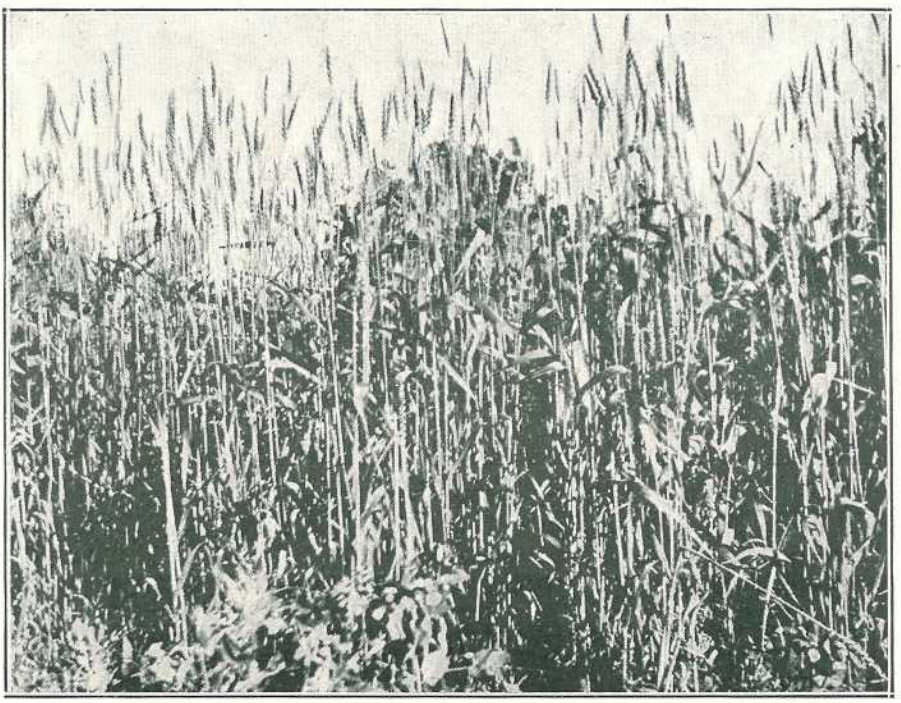

Plate 92.

Florence Wheat and Dun Field Peas. Yield—7 tons 14 cwt. 1 qr. 4 lb. per acre.

When selecting the fodders for the test, cognisance was taken of their respective periods of maturity so that a continuity in the supply of green fodder might be kept up. Obviously the grower by using judgment in the matter of arranging for succession sowings should readily be able to maintain his supplies, and in this way ensure a more regular state of productivity in his herd.

Observations made respecting the period of development of the different crops were as follows:—Florence wheat and Dun field peas were ready for use earlier than any other single crop or combination, followed by crops in the order named: Florence wheat and tares, Skinless barley and peas, Cape barley and peas, Skinless barley and tares, Cape barley and tares, Rye and peas, Rye and tares, Algerian oats and peas, Algerian barley and tares, Canary seed and peas, Canary seed and tares.

Observations made indicate that it is advisable when arranging for mixtures of crops to confine the sowing of peas to the early-maturing cereals. Florence wheat, Skinless and Cape barley, as the peas begin to lose weight as they approach maturity.

PLATE 93.

CAPE BARLEY (in shot blade stage) AND DUN FIELD PEAS.
Yield—9 tons 11 cwt. 1 qr. per acre.

Tares on the other hand have a longer growing period and retain their succulence better than the field peas, consequently they are more suitable for use with Algerian oats, Canary seed, and Rye.

To those dairymen who are interested in maintaining supplies to their respective factories throughout the winter period, the following quantities are recommended for use in connection with the above class of fodders.

Wheat 30 lb., Dun field peas or Black Tares 20 lb.
Barley 40 lb., Dun field peas or Black Tares 20 lb.
Rye 30 lb., Dun field peas or Black Tares 20 lb.
Oats 30 lb., Dun field peas or Black Tares 20 lb.
Canary seed 10 lb., Dun field peas or Black Tares 20 lb.

COFFEE-GROWING IN QUEENSLAND.*

(By the late T. A. BROMILEY, formerly Instructor in Coffee Culture.)

One of the multitude of economic crops Queensland has proved herself capable of producing to perfection is coffee. Years ago, under the guidance of an able instructor, M. H. Newport, it seemed likely that this crop would become one of our staple agricultural products. In the North a considerable aggregate area was planted; the trees bore abundantly; in some cases, it is averred, as much as 15 cwt. of beans per acre were garnered under favourable conditions and good cultivation.

The average for years was 10 cwt. per acre. Such results have been frequently obtained in the southern parts of the State, indeed surpassed. After nearly thirty years of cultivation of coffee in Queensland, the writer has never seen any form of disease attack the trees. Notwithstanding these most favourable conditions, the acreage under coffee declined. This falling off was the result of several causes. Perhaps the universal planting of sugar-cane, and consequent diversion of labour to the canefields, had much to do with it in some districts, as coffee ripens about the time canecutting commences.

This dearth of labour would be acutely felt in the larger areas, and, as these conditions could not be altered, many fields went out of cultivation, wholly or in part, in consequence.

Another deterrent factor, for the small grower, at any rate, was the lack of a marketing centre. Having, probably, no purchaser for his crop but the local storekeeper, who, in his turn, had only his restricted local market, could not but have a depressing effect, at least such conditions would not tend to the expansion of the coffee industry.

This state of affairs certainly obtained in the southern portion of Queensland.

The novelty of the crop to Queensland farmers, no doubt, led to many mistakes in the field and in the handling of the harvest.

Until a larger settled population occupies the central coast districts, scarcity of labour will continue near the canefields.

There are, however, whole tracts of country in both the Northern and Southern parts of the State far removed from the canefields, eminently suited to the production of coffee. It is quite possible that this difficulty of labour shortage for harvesting may be overcome by co-operation, but the cultivation of the crop at present cannot be undertaken on the large plantation system. It is, however, especially suited to the small grower, with several children to assist at picking time. The harvesting finished, the balance of the year's work upon an acre or two would be very light, and would take but a few days. The coffee tree is as easily grown as any other fruit tree, and with less trouble and expense than some, as, so far, it has shown no sign of disease, therefore spraying and washing are not necessary. No special cultivation is needed beyond such attention as a careful fruitgrower would give to his trees. The yield per tree averages higher than in some coffee-growing countries.

The labour of harvesting the crop—that is, the picking of the berries—is well within the power of juveniles of ten or twelve years of age. The shrub will grow well and bear abundantly in any moderately fertile land out of reach of severe frost and where there is an average yearly rainfall of, say, 38 inches. When the tree is established, it will stand spells of dry weather as well as any other crop we cultivate. Most newly opened scrub land, if undulating and naturally drained, is perfect for coffee, the yield abundant, and of high grade. But the shrub will accommodate itself to a greater range of soils and situations than some other fruit-bearing trees. The writer has seen it growing and cropping well on the sea-coast not more than a hundred yards from high water, and only 50 or 60 ft. above it, the soil being blady grass forest. In another district a few trees doing well in coarse, gritty, river drift. Of course, such soils and situations as these are not recommended, and are only mentioned to show the farmer, or others who would try coffee-growing, that the land they have will answer, subject to the conditions of freedom from frost and with a fair rainfall. Light frost, if not too long continued, will not hurt the tree.

It will thus be seen it is not a question of "Will coffee grow in Queensland?" nor of "Will it yield profitable crops?" Those questions have long since been answered in the affirmative.

Not only does it bear heavily and regularly, but its product has been classed in London as amongst the world's best.

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The Present Position.

Latest figures of imports into the Commonwealth show that 2,605,240 lb. of coffee came in from overseas. Queensland ought to capture the bulk of that trade. It can, and should be done. The state of our national finances demands that we send not one shilling away for what we can, with some assistance over several initial difficulties, produce at home. What is the nature of these difficulties? Can they be surmounted? They may be summed up under three heads. First, shortage of labour in some districts for harvest work. Second, need for a market at some central point where merchants and others might see that a first-class article can be produced in quantity in Queensland at a price, quality considered, almost, if not quite, as cheaply as from other parts of the world. The third obstacle is a minor one—unfamiliarty with the crop; still, it is an obstacle, but easily overcome.

With regard to the first, it is suggested that farmers and others following rural pursuits plant a patch as an auxiliary to their incomes. A few hundred trees, up to an acre or two, could be easily tended, and the remuneration, as will be shown later, very encouraging.

As a cover for poultry, a field of coffee has no equal. By the way, this feature might receive the attention of those engaged in poultry-raising in the warmer parts of the State. Light dressings from the fowl-yard would keep the trees in splendid health and ensure maximum yields. The shade of the trees would do the same for the fowls. Then co-operation in the treatment of the berries, that is the "pulping"—taking off the red outer skin by means of a small machine called a "pulper"—followed by fermenting, washing, and drying.

The second condition has received serious consideration. An effort might be made to meet it by establishing the system that was so successful in the Department of Agriculture and Stock in respect to cotton-ginning before the cotton industry had assumed its present proportions—namely, to make advances upon coffee in "parchment" consigned to the Under Secretary for further treatment—that is, "hulling" or "peeling"—removing the inner or "parchment" skin—grading, and marketing. By this means the grower would be relieved of the most difficult part of the work of preparing the beans for market; and, what is of paramount importance to the grower, his coffee would thus be placed under the immediate notice of bulk buyers. The amount of advance proposed is 7d. per lb. for properly prepared, clean parchment. Reckoning the yield per acre at 1,000 lb., a not-at-all-extravagant estimate, the gross return would be £29 3s. 4d. The finished beans should be worth not less than 1s. per lb., which would be £50; but from this sum must be deducted the loss of weight of parchment skin, about 18 per cent., and the cost of hulling, which two items together would aggregate about £13 10s. This deducted from £50 would, of course, leave the net amount of £36 10s. These calculations are only approximate. The trifling difficulty of unfamiliarity with coffee production by agriculturists may be removed by the appointment of a qualified instructor with practical experience of all branches of the business.

Conditions and Methods of Cultivation.

Coffee is a hardy shrub, but there are certain conditions which must be observed if it is to be cultivated for commercial purposes. First, there must be freedom from frost. Coffee will do its best at temperatures ranging from 60 deg. to 95 deg. Fahr., but will not suffer in the low 40 deg. Fahr. if not too long an exposure. It will also stand much higher temperatures than 95 deg. Fahr. if there are occasional falls of rain. This mention of rain is, of course, in consideration of crop. The tree will resist drought as well as any fruit tree grown in Queensland. Naturally, however, long spells of dry weather militate against the crop, as is the case with any other shrub or tree.

Strong, continuous winds are inimical to the plant, therefore the site selected for its growth should be determined to some extent by the direction and intensity of the prevailing winds of the district. In some areas, the S.E. winds are very trying, and it would be well to avoid exposure to such winds, if possible. In most districts of Southern Queensland, at any rate, north-east, north, and north-west aspects are good unless some unusual local feature exists.

Undulating land is better than flat land in that it, generally speaking, drains better—an important feature, for good drainage is absolutely necessary to the health of the tree. Where natural drainage is not good it must be made so artificially. Hillsides suit coffee well, but they are liable to wash in heavy rains, unless there are plenty of rocks and boulders, to which the tree does not object, and soil enough to get well rooted. Remembering this fact, many a piece of land, quite unsuitable to horse work, might be turned to profitable account.

Any fairly fertile land suits coffee. Red volcanic is among the best, but, as a rule, it is very porous and soon feels the effect of a dry spell of weather. When the trees have attained their fourth year of growth, however, they cover the ground so completely that evaporation from the soil is much mitigated and the roots have got down to the normal moisture level. Scrub lands, especially the foothills of scrub-covered volcanic ranges, are the best possible for coffee, provided, of course, that there is a fair rainfall, which is usual in such localities.

Not only does the plant accommodate itself to varying qualities of soil, doing well in most, but it as readily adapts itself to proximity to the sea, or long distances from it. But, from the writer's own observation, it succeeds best at distances of 1 mile to, say, 20 miles from the sea. Good crops, as previously remarked, have been taken from trees growing not many yards away from salt water, and only a few feet above it.

Having now reviewed very briefly the necessary conditions for the successful production of coffee, the next consideration is the obtaining of plants. This involves the procuring of seed and making of a nursery bed.

Site and Seed Bed.

For the bed, select a slightly sloping site. Dig the soil well to a depth of 12 in., removing all roots and stones, if such there be. Rake well and finish off smoothly. Dig a shallow trench on the highest side, a little above the bed to carry away excess of rain. Make the bed, or beds, 3 ft. wide so as to be able to reach conveniently from either side for weeding, if necessary. Paths between beds should be 18 in. wide to facilitate walking with a watering-pot if irrigation becomes necessary, as in most districts it will. The bed must be shaded in the following, or similar manner:—Procure a few forked "sticks" about 6 ft. 6 in. long to bottom of fork; erect these around the bed, leaving them about 5 ft. out of the ground. A few light, straight saplings placed in the forks connecting the whole will make a frame, upon which lay a few leafy branches. On them, again, place several light saplings to prevent the branches being carried away by the wind. This shade should extend to 18 inches outside the margin of the bed in every direction. It must be remembered that the cover is only to be partial. If leafy branches are used the leaves will probably begin to fall about the time the seeds will be showing through the soil; for that reason wattle branches answer well. The bed now being ready, proceed as follows:—

Line with a string, or mark with a straight stick, lines across the narrow way of the bed 3 in. apart. Dibble the seeds in to the depth of 1 in., following the lines and spacing them about 3 in. one from the other, along the mark. It is well to put in a little peg at the beginning and end of each line so that the seeds may not be disturbed if it is found needful to prick up the surface of the bed before the seeds germinate. It is perhaps needless to say this pricking-up must be very lightly done, and only between the lines, not near the seeds. The germination of the seed will take from four to six weeks, depending much upon the weather. During the whole of this time the bed *must be kept moist;* if rainy weather supervenes, then less artificial watering will be needed. The soil must not be drenched, but, to reiterate, it must be kept moist till the seeds appear above ground. A finely perforated rose should be used for sprinkling. A covering of some sort of short mulching laid on the bed to the depth of about half an inch would, in some measure, prevent the packing of the soil by watering. Chaffed blady-grass, being free from seeds, would do very well. But if shade and watering be attended to, mulching will not be necessary.

Planting.

The young plants will be ready for the field by the time they have attained a height of 9 or 10 in. This will be when they are about 9 months old. In practice this would mean the succeeding spring of the year. The distance apart of the plants in the field will vary a little according to the quality of soil. If the latter is only moderately fertile, 7 ft. by 7 ft. apart would be found about right. In good rich soil the plants should be 8 ft. by 8 ft. apart. In setting out the field for planting, lay off the base line, and set out the first line at right angles from it. Make the first hole for planting on the base, at the point of contact of the two lines. Now lay off the second line 8 ft. from the first line, but instead of holing on the base line, measure off 4 ft. from it along the second line. Proceed in this way till the last line is reached. The trees will then stand alternate to each other throughout the plot. The holes to receive the plants should be made 18 in. each way—that is, in length, breadth, and depth.

In removing the soil, place the top half to one side and the lower half on the other side. It would be well to break up the bottoms of the holes with a spade-bar

before filling in the soil that has been removed. In replacing the earth in the holes put in the surface stuff first; it is a good plan to rake in enough of the surrounding surface to fill up the hole, spreading the soil from the bottom of the hole where convenient. If the soil is good from top to bottom, then all can be restored to where it was removed from. The excavations should all be filled in, and the position the tree is to occupy marked by means of a stake or peg. If the plot to be planted is fairly level the lines may be easily spaced by means of three lining rods, and a correctly marked staff—8 ft. in the instance now being considered—to indicate the position for the plant. A stake must be placed where shown by the measuring staff. If this is carefully done the trees, when established, will show lines in several directions, and facility of working with horse tools, as long as that may be safely done, be secured.

The operation of planting may be said to be the most important work in connection with the establishment of a coffee field. Planting, badly performed, can never be remedied; therefore, great care should be exercised at every stop, and the recompense will be sure.

In removing the plants from the seed bed, be careful not to break the taproot if it can possibly be avoided. To reduce this risk to a minimum, carefully dig a trench in front of the first row of seedlings to a depth of 9 or 10 in.; it need not be wider than the spade can be worked in. Now insert the spade perfectly vertically in the mid-distance between this first row and the one next behind it. Pull the handle of the spade so as to cause the plants to lean somewhat forward. Release the spade and insert again the width of itself in advance, and so on, to the end of the line the narrow way of the bed. If the spade be now carefully passed under the plants at the bottom of the trench, 9 or 10 in. down, and the plants pressed forward with the right hand on to the spade, they can be lifted with ease and the least possible risk of damage. Place the plants in a basket, or box, or, better than either, in a light barrow for transport to the field. Keep them covered from the sun with a sack. Keep as much soil as possible about the roots when removing them from the seed bed.

From the centre of each place intended for a plant remove as much soil as will easily accommodate it without cramping its roots. In particular, see that the taproot is kept perfectly straight. Hold the plant in position with one hand; with the other, draw in sufficient loose soil to fill to the surface, taking care to fill in well about the laterals, which must be kept as nearly as possible to the "lay" they assumed in the seed bed. Holding the plant firmly, now pour round it enough water to settle the soil among the roots. Do not allow the plant to sink lower (as it would have a tendency to do under the watering) than a couple of inches below the general level of the surrounding surface. Do not use the boot to press the soil about the plant; the grouting in with the water will have settled the earth better than any foot pressure could. Shade the plants from the mid-day sun till they "take hold." A broad shingle or two thrust into the soil on the northern side, with an inclination over the plant, will do very well, but, if shingles cannot be procured, leafy branches may be used. When the young trees have attained a height of 12 in. they must be staked to prevent their being blown over by strong winds. The coffee plant does not make many surface roots till three or four years old; consequently, they are likely to suffer severely by being blown about, especially in the gales often accompanying our summer rains. In well-sheltered positions staking may, perhaps, not be necessary, but in most localities recourse must be had to stakes. As they may have to stand for a year or two they should be of timber that does not quickly rot. Split hardwood is the best, of course, but there are other timbers which would answer the purpose, no doubt. Knowing the object to be attained, the planter will select suitable stuff. The stakes, if of hardwood, should be 1½ in. by 1½ in., and about 3 ft. 6 in. long, and be driven a foot into the ground. Some planters use but one support, by which the tree may be saved from being blown down, but certainly does not prevent it being lashed about, and, possibly, seriously injured. Two stakes driven firmly in, one on each side of the tree at a distance of, say, 10 in. from the stem, and placed in such a position as will sustain the tree against the prevailing winds, is by far the best method. Manila or coir lashing may be used for tying up; any soft, strong material will do. These lashings will need examining at intervals to see that the knots at the stems have not unduly tightened nor worked loose, and to replace any that may have broken either from strain or decay. Another plan which worked admirably, but needed care, was to take two or three turns of ti-tree bark around the stem, then take a length of No. 16 gauge galvanised wire, enough to reach from one of the stakes to the tree and back again to the stake; add to this length, enough wire to allow of tying. Double the wire in the middle, but not closely. Pass the bight round the stem of the tree. Twist the two sides of the wire together, but only just tight enough to dent the ti-tree bark with which the tree is shielded. Finally, secure the wire to the stake in a manner that it will not slip. Proceed in the same way on the other side of the tree and the job is done.

In twisting the strands of wire, see that they engage each other, not one strand straight and the other coiled around it. If this work is properly done it will last as long as stakes are needed, but the tyings must be examined occasionally and loosed if they have become tight. There should be at least half an inch in thickness of bark round the tree. Keep the wire bands about two-thirds the height of the tree from the ground.

Pruning.

When the trees have grown to 4 ft. 6 in. or 5 ft. in height, they must be "topped" or headed in. Perhaps the best height is 4½ ft. Cut down to within 1 in. of the first pair of primaries below 4 ft. 6 in. After pruning off the head, there will appear several suckers, perhaps half a dozen, shooting out from the first, second, and, perhaps, the third pair of primary branches. These must be rubbed out, or plucked out, as they appear. Sometimes this suckering will go right down to the bottom of the stem; all must be plucked off. One object of topping is to strengthen the lower limbs and fill in the tree. Coffee left to itself would grow tall and spindly, the lower branches would die out, and the top be clothed with a few green leaves on slender whip-like branches. Heading-in prevents this undesirable condition, and throws the energy of the tree into the development of its lower parts, giving it spread of branches, thus shading the ground, and, of course, producing the crop where it can be easily gathered.

The matter of pruning, how and when to do it, is a question upon which there seem to be many opinions by coffee-growers in coffee-producing countries. So far as Queensland is concerned, the writer's long experience with the crop has convinced him that much pruning should be avoided; indeed, the less the better. But Queensland's rich soils and congenial climate encourage such an exuberance of growth in coffee that a certain amount of training becomes necessary to keep it in shape for profitable handling.

The first and perhaps the most important step in pruning is to open the centre of the tree. This is done by removing all branches from the primaries growing within 6 or 7 in. of the stem. By this means a sort of cylindrical space is made into which sunlight can penetrate, and through which the air can circulate. This is not only good for the health of the tree, but flowering is induced well inwards on the branches, and picking of the crop is much facilitated. Opening the middle of the tree to light and air sometimes causes a few branches to shoot directly backwards; needless to say these must be pulled out, also any branches growing vertically upwards or downwards. It happens at times, particularly when the tree is young, and in vigorous growth, an errant branch will take a course right across the adjacent limbs. They are usually very thin, and the flowering notches far apart; pull them out as soon as discovered, as they only crowd the tree, draw sap from some other limb where it had better be allowed to flow, and they hamper the tree for picking.

On a primary there will sometimes develop a sort of notch or excrescence out of which dozens of shoots will come, and form what is called a "crow's nest," an appropriate name. Cut out the primary immediately at the back of the "nest." From the nearest eye to the stump will grow two or more shoots; remove all but one. With care this can be trained to assume the position that was occupied by the severed branch. If the tips of any of the primaries die, as they sometimes do, from overbearing, or from spells of drought when heavily laden with fruit, cut back to where the branch is green—that is, not dried up. Break out, or cut out, any dead wood as it makes. This, however, is not likely to appear till after some years of bearing, if the tree is growing under favourable conditions, and has had fair attention.

The foregoing directions for pruning, it is thought, will be sufficient for general purposes, but the observant grower may find occasion for a more free use of the knife, but, as has been said, pruning should be kept to a minimum.

Cultivation.

The cultivation of coffee is in some respects different from that of any other variety of fruit. Until the tree is nearing its third year, light scarifying may be practised, keeping the implement outside the reach of the limbs. Nearing the fourth year, surface roots begin to occupy the ground; to wound these is to seriously injure the tree. Light chipping with the hoe is best, but on no account should a cutting tool enter the ground under the shade of the branches. If the trees have been looked after their own shade will prevent much weed growth, but if weeds have got under the branches, pull them out by hand. Weeds chipped from between the trees may be pushed under the branches, using care not to contort the latter. If the grower will examine the ground under his four-year-old trees he will find it "choke full" of fine roots. These are the fruit-producing agents, to injure which is to, more or less,

reduce the size of berry and quantity of crop, and, eventually undermine the constitution of the trees.

In ordinary cases coffee flowers in Southern Queensland from mid-October to the first week in December; this may vary considerably with the character of the season. If good-growing weather, flowering may commence as early as the beginning of October and continue till the middle of November. If the season has been dry, flowers may not show till mid-December, and then only partially, but such late flowering does not often occur. Coffee makes the best of a small amount of moisture.

Harvesting.

In the localities mentioned, the berries begin to ripen in late May or early in June, and, usually, picking is finished by mid-September. Picking, however, is not continuous during this period. The early ripening, being small, is off in about a fortnight; then there is a spell of two to three weeks before pickers need go into the field again. This, the second picking, is the heaviest of the season, the weight brought in being equal to three-quarters of the season's crop. If picking has been delayed from any cause such as wet weather or shortage of pickers, there will be no break in field operations till the last of the crop is housed, which will be, in normal seasons, about the latter half of September. Under unfavourable conditions, such as a delayed start, or drought conditions, the last of the crop may not be got in before mid-December, but this very rarely happens.

Pickers are provided with bags or pockets tied around the waist and suspended from the shoulders by bands. These bags are best made of stout sail cloth about 10 in. wide and 8 in. deep. Make the back of the bag—*i.e.*, that part touching the body—3 in. deeper than the front, turn down a hem of 1 in., through this hem place a thin piece of wood reaching across the cloth but protruding from the ends of the hem, and fasten the pocket to the lath by means of a couple of tacks driven in at the extremities. This prevents the bag wrinkling up. Sew in a gore at each side, about 1½ in. wide at the top. Such a pocket holds 5 or 6 lb. when full, quite heavy enough for convenience. Empty kerosene tins fitted with cross-handles are very suitable for carrying the berries in to any place where there is a larger receptacle to be wheeled in to pulping house, or may be carried in by the packers to the place of weighing. Such a tin, full length, holds, when full, 28 to 30 lb. of berries, according to the season. The berries are ready for picking when they assume a bright red or purple tint. As soon as the beans in the berry move one upon the other when pressed firmly between the thumb and finger, picking may commence. The bright red berries are known by growers as "cherry," from their resemblance to that fruit.

Preparation of Crop for Market.

This "cherry" skin or covering has to be removed by means of a machine of simple construction called a pulper. There are various contrivances used for the purpose. A fairly effective method for small quantities is to pass the "cherry" between two wooden rollers geared together near enough to squeeze out the beans without crushing them. Under the rollers, place half a barrel nearly filled with water, place a sieve of half-inch mesh on a couple of laths resting on the edge of the tub or barrel. If water is fed with the cherry it helps the separation of the beans from the skins or "pulp." It will be needful to shake the sieve frequently. As all the beans may not have fallen through the mesh, throw the skins aside to be passed through water in another barrel. The beans will descend to the bottom by gravitation; the floating pulp may be thrown away. This method would never do where many hundredweights daily have to be worked, and is only mentioned for those with only a few trees, or for trial where there is no machine within reach. The two principal systems adopted are the disc and the breast-pulpers. The former is an iron disc revolving vertically. This disc is covered on one or both sides with copper, upon which are embossed rounded protuberances of various shapes; in some machines rounded, in others oval, and in still others, crescent-shaped. These elevations are close together and raised about one-eighth of an inch. The cherry is placed in a hopper from which it is guided by a cast-iron chop on one or both sides, placed near enough to the disc to crush the berries, but far enough off to allow the skin to pass between it and the chop. The cleaned-out beans escape in another direction. The "breast" pulper is a cylinder or drum 12 in. face and about the same in diameter. This drum is covered with copper, perforated something like an arrowroot grater, or with similar-shaped knobs to the disc pulper. The drum is mounted on a strong frame; in the front of it, and resting on the frame, to which it is fastened with bolts, is a bar of iron presenting a square face to the drum of about 1½ in. The opposite side of the bar is chamfered away, leaving the thin edge on top. This thin edge is perfectly level and kept sharp. When pulping is proceeding, this lower chop is placed near the face of the drum, so close as to allow the skin to pass, only, say, not further away than one-sixteenth of an inch at most; generally a little less

will do. If the distance between the chop and the cylinder is too great, the beans would be liable to be damaged. Above this chop is fastened a second chop, or "breast" bar, the lower edge of which is placed about three-eighths of an inch above the sharpened edge of the lower chop, its width is usually 4 or 4½ in., the face against the drum, square, and closest at the lower edge, close enough to ensure the crushing of berries passing between it and the drum. A hopper is fixed above the drum, into which the "cherry" is placed. A chute is provided to convey the berries to the open space between the upper edge of the top chop and the drum; the latter, revolving, draws the berries downwards, the beans passing out from between the chops and the skin passing down behind the lower chop and along a chute to the back of the machine. The beans fall into a perforated sieve, the holes being large enough to pass the beans but to retain any unpulped beans and skin which must be returned to the hopper to go through the machine with fresh "cherry." For good, clean work, pulping should be done on the day of picking, or next day at latest. Water must also be freely used with the berries in pulping to facilitate the separation of the beans from the pulp, &c. Between the outer red skin and the inner "parchment" is a quantity of viscid matter which must now be got rid of, or the coffee will not dry properly. It would be sure to become mouldy and spoiled for sale. To remove this viscid substance, the beans must pass through a fermenting process, which is accomplished in the following manner:—

The beans, fresh from the pulper, are placed in a receptacle such as a wooden tank, box, or barrel. After twenty-four hours or so, acetous fermentation should have converted the viscid substance into a vinegary sort of fluid, easily washed away from the coffee. The time needed for this change, however, will vary with temperatures. If the weather is cold, the writer has found the addition of a little warm water, and covering the vats with a few sacks, advantageous. To ascertain when the coffee is ready for washing out, dip out a quart or so from one of the vats and wash it well with clean water; if, after so washing, it is found to feel "gritty," having lost all feeling of slipperiness, it may be washed out. The cleansing should be continued till the water comes off quite clear. Remove all floating beans and skins, if any, by means of a skimmer, or they may be rushed over the end of the washing tank, or vat, into an empty vessel placed to receive them. After washing, the coffee must be placed in trays having bottoms of small-mesh woven galvanised wire, or perforated zinc, and sides of 3-in. wide pine battens. Stands for the trays may be made by driving stakes firmly into the ground at suitable distances apart, perfectly in line, and quite level, one with the other, on the tops. The lines should be in pairs, placed sufficiently far apart to carry the trays, allowing for 2 or 3 in. projection at each end of the trays for convenience of lifting. Nail a 3-in. batten to the stakes, edge up, along the top of any convenient length, say, 15 ft. This can be repeated, of course, to accommodate any number of trays. A shed or cover of some sort should be near the stands under which to place the coffee at night or in case of rain.

During the process of drying, the coffee should not lie deeper than 1 in. to 1½ in. on the trays; if there is no stint of the latter, and there is drying room enough, it would be better to spread the beans down to less than 1 in. in depth. To ascertain when the coffee is dry enough to be taken into the store, try a bean or two by pressure of the thumb nail, or between the front teeth. If either make an indentation, it is not quite ready for housing. After a little experience, the stage of dryness may be judged by the colour, which should be an even, slaty blue, but the thumb nail and teeth first, the other will come by practice. It sometimes happens, through unsuitable weather, and shortage of trays, that the coffee must be taken in. This may be safely done if the beans have shrunken from the parchment skin, and are spread thinly on the storeroom floor, and turned over daily till an opportunity offers of completing the drying in the sun.

It usually takes six or seven consecutive days of sunshine to thoroughly dry the coffee, during which time it must be frequently turned not less than three or four times daily. This ensures even drying, and will gain fully a day in the time of its exposure; it also secures other desirable ends.

The next and final stages in the preparation of the beans for the market is "hulling" or peeling—that is, the removing of the "parchment" and "silver" skins. This latter is a fine tissue lying betwen the parchment and the bean. There are several ways of accomplishing this removal of the covering of the beans. One way is to bruise or crush it off under a revolving roller fitted in a basin very similar to a mortar mill. Care is taken that the roller, or wheel, does not come into immediate contact with the bottom of the trough or basin. Another machine for the purpose, and the one in general use, is constructed much on the principle of an "Enterprise" meat mincer, a tapering spirally corrugated cone revolving in a similarly tapering and corrugated cylinder. The coffee is fed into this cylinder and forced forward to its smaller end. Much pressure and friction is exerted. A spring or weighted valve is fitted at the exit, through which the hulled and polished beans

pass. A fan blows away the chaff. The beans are then passed through a grading machine fitted with a series of sieves. It is here graded into sizes, the pea-berry separated from the "flats" and any broken beans removed. This operation finished, the coffee is bagged, and is ready for market. Hulling, grading, and especially the difficulty of getting the coffee beans into a market where they may be placed before buyers of quantities, have acted as deterrents to the progress of coffee cultivation.

It is not claimed that all has been said about coffee-growing that can be said. The writer's aim has been to avoid redundancy, and yet make plain as possible what was considered essential to assist and guide the would-be coffee-grower. Nothing has been put forward that has not been tested during nearly thirty years' experience in Queensland. Naturally, there will be differences in details in different localities—meteorological conditions, quality of soil, situation of plantation, &c.; but general principles of cultivation are the same pretty well all over the State.

It must also be borne in mind that what has been written has been intended for the small grower; hence no elaborate calculations as to the cost of establishing a big estate have been given. For one reason, it would not be advisable to open up extensively for coffee unless an adequate supply of suitable labour could be depended upon for picking. A small farmer could easily add 2 or 3 acres of coffee to his cultivation with the help of several juveniles for the harvesting only, and, as stated, it is with the especial object of assisting such men that these notes are presented. At the same time, anyone in a position to do so, and wishing to go into coffee-growing extensively, may depend upon the accuracy of its details, with the added value to Queenslanders that the information imparted has been accumulated in Queensland.

YORKSHIRE PIGS.

(With Special Reference to an Overseas Shipment of Large Yorkshires.)

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

There are three distinct types of Yorkshire Pigs (or White Pigs, as they are commonly called), known respectively as the Large Yorkshire or Large White, the Middle or Medium Yorkshire or White, and the Small Yorkshire. Of these, we have in Australia a fairly large number of the Middle York type, one or two very small studs of Large Yorks, and none of the Small Yorkshires at all now. The reason why the Small Yorkshire failed to prove profitable here—and they were given a very fair test years ago—was because they were too small and chubby, too lethargic, fat, and soft for Australian conditions, they could not stand up to our comparatively warm climatic conditions, and they were not prolific or active enough for the rougher conditions in many of our dairying districts. They are essentially of the "Poodle," the "Pet Doggie" type, and are suited alone to the better conditions in the Old Land when in the hands of folks of means, who can provide for their extra comfort, irrespective of whether they are commercially profitable or not. Even there they have failed to retain their popularity, and one seldom hears of a Small Yorkshire pig now.

The Middle Yorkshire has had an excellent reputation for many years, particularly in Victoria, in the south-western portions of New South Wales, and in South Australia, but to a much lesser extent in the far West, in New South Wales generally, and in Queensland; though it must be admitted (even if reluctantly) that they have not held pride of place here in recent years, during which the Berkshire has become increasingly popular and the Tamworth and Poland-China have forged ahead in quite a remarkable manner. In Queensland in particular we find that they have failed to keep pace with the times in so far as their reputation goes, and while the number of breeders and exhibitors at our principal shows in Berkshires, Tamworths, Poland-Chinas, Duroc Jerseys, and, more recently still, in the Gloucester Old Spot, has increased very considerably, we have but one or two exhibitors of Middle Yorkshires and no Large Yorkshires at all.

Nevertheless, it must be said in favour of the Middle White that, given reasonable conditions, careful handling, and sufficient protection from the effects of severe weather, they have proved to be a type of very considerable value in the industry.

It is a strange thing, yet it is nevertheless true, that while the Large Yorkshire has forged ahead overseas and, as this report will show, are selling like "hot cakes," they have not become a popular pig here at all, and it is doubtful if one could find one hundred head of Large Yorkshires in the whole of Australia, and we have a pig population now of well over one million head. This also is not because there is anything decidedly wrong with this large type. It is solely because they do not

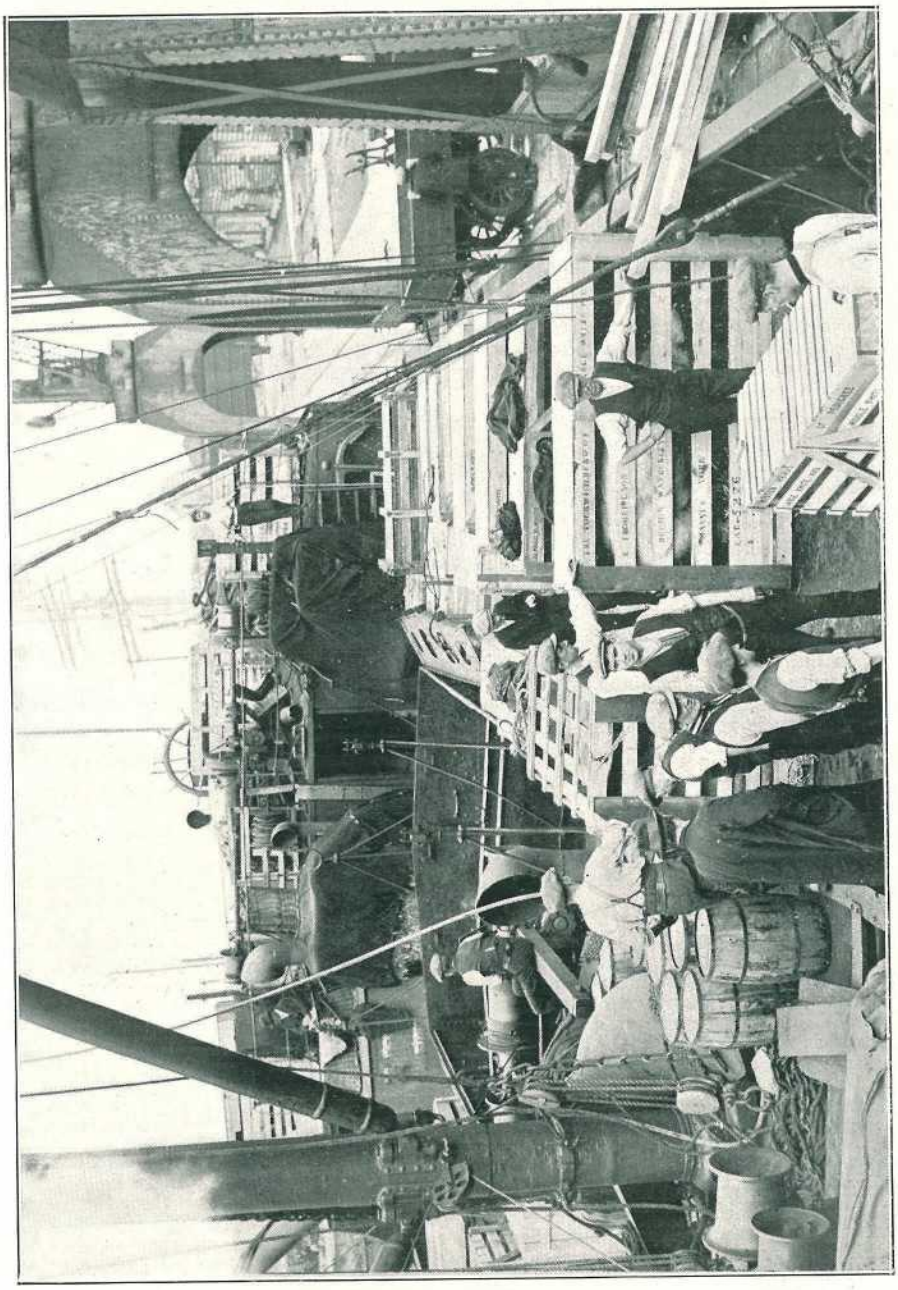

Plate 94.—Part of the Consignment of 200 Pedigree Large White Pigs, Purchased by the Russian Government from Members of the National Pig Breeders' Association, has been Shipped from London to Leningrad per the s. s. "Loos."

Very high prices were paid for the pigs, one 18 months old boar realising £250 and another £150.

suit our conditions, our markets requiring very early maturing, light to medium weight, and fleshy well-streaked pork and bacon pigs, while the demand for larger type pigs for crossbreeding purposes with Berkshires and other medium breeds is being successfully met by the hardier Tamworth, of which we have some very excellent specimens in this country. There is indeed little or no hope for the Large Yorkshire here, for as competitors they would also have to face the British Large Black (and the enthusiasts of this type are pushing their favourites into many new districts), the Gloucester Old Spot, quite recently introduced, and, as it were, now well in on the ground floor but with a rather severe uphill fight ahead to gain prominence in our show rings and saleyards, and, perhaps, the Duroc Jersey. The special object of this article, however, is not to argue one way or another in regard to the Yorkshire types. It is to give prominence to a remarkable shipment of Large Yorkshires from England to Russia, particulars of which, as supplied by Mr. Alec. Hobson, Secretary of the National Pig Breeders' Association of England, are as follows:—

"On a recent Saturday the s.s. "Loos" left London Docks for Leningrad, Russia, with no fewer than 140 Large White pigs on board, including an eighteen-months-old boar that cost 250 guineas, and several others purchased for more than 100 guineas each. More are to follow, so that ere this (October, 1925) some 200 of England's choicest pedigree boars and sows—all Large Whites—will have left England's shores to improve the standard of the Russian pig, thus indicating once again the popularity of and world-wide demand for this old-established breed, for surely it is a very old but very true saying that England is the stud farm of the world.

"The pigs comprising these shipments have been selected from quite a large number of breeders, the largest individual selections being made from Messrs. Chivers and Sons, of Histon, who supplied six boars and twenty-five sows, and from Alfred N. White, of Spalding, who supplied twelve each boars and sows. Each pig shipped was accompanied by a pedigree export certificate issued and verified by the National Pig Breeders' Association. The value of such certificates to the new owners has to be realised to be appreciated. They will doubtless be framed, and who knows that in years to come if and when the Russian pig industry is on an equally sound footing to the Danish, these self-same certificates will be referred to as the genesis of their herd books."

"It is common knowledge," says Mr. Hobson, "that in Denmark, when the Danes, in building up their bacon industry, recognised that the essential to success was to produce the right animal, they decided after careful investigation to import the Large White as the most suitable pig for their purpose." Mr. Hobson wonders whether history is repeating itself in the case of the Russian shipments.

To Queenslanders this illustration will be of the greatest interest, though, as already stated, up to the present the Large White has not proved suitable for our conditions.

A SIMPLE METHOD OF MAKING CONCRETE POSTS.

Thus a correspondent to the "New Zealand Journal of Agriculture":—

"In your February issue there is an article on making concrete posts for farm work, in which the writer gives particulars for making the boxes, &c. Another method, which perhaps does not make such a neat post, but which answers very well, is as follows:—Select a spot of old pasture with a good, firm sole of grass and solid subsoil. With a very sharp spade dig out a trench the size of the post required. If the ground is firm the sides will stand all right without boards or support.

"Then line the trench with stout tarred paper, old clean sacking, or other material to keep the concrete from the soil. Mix the concrete as directed, and put in the reinforcements as necessary. Before putting in the concrete, I lay two or three pieces of No. 8 wire across the trench, and bend them to the sides as close as possible, leaving about 18 in. of wire projecting above the trench on each side. After the posts are made, cover with a wet sack or straw, or any waste material, to keep the sun and frost away, and leave for a month or more to mature. When the posts are ready the wires are brought together, twisted, and a crowbar or the like passed underneath. A couple of men can then lift the post out into a dray or cart. By leaving the posts in the ground they are kept damp and do not dry too fast in the sun or wind."

Concrete posts are neat, efficient, and durable, being unaffected by white ants or rot, and probably also by bush fires, though their first cost makes their use uneconomical in districts where wooden posts are still easily obtainable. Concrete gate posts have decided advantages over wooden ones. Unsightly cracks do not appear in them, nor do they require painting regularly to keep them in good order.

MARKETING PIGS IN QUEENSLAND.—V.

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

The marketing of his products is claiming much closer attention from the man on the land, and in this series Mr. Shelton describes how the farmers' pigs are handled at the selling end. In previous instalments several marketing systems with which Queenslanders are familiar were reviewed, and in the fifth article are many points of equal interest to the wide-awake pig-raiser.—Ed.

Weighing and Paying.

Bacon pigs, as well as porkers, are purchased largely in this State and are paid for on a basis representing their estimated dressed weight—this in the case of pigs purchased by the several proprietary interests—and on an actual dressed weight basis in the case of pigs going forward direct to the co-operative factories.

In the former the pigs are actually weighed "over the scales" at country railway stations and sale yards, by buyers representing these proprietary firms, who, after thus ascertaining the live weight of each animal, makes a deduction on a sliding scale varying from 25 to 32 or 33 per cent.—as representing shrinkage and offal—and pays for the pigs on the thus estimated dressed factory weight, while in the case of the co-operative factories the pigs are "received" and trucked by an official loading agent or representative and are not paid for until they are slaughtered, dressed, cooled, and actually weighed at the factory, the weight including head, tongue, kidney fat, and feet as attached to the body.

Each week the factories supply their buyers, representatives, or official loading agents with the weekly schedule of weights and prices which are current at that particular time, and it is on the basis of these weights and prices that the pigs are accepted and paid for.

At the moment (21st September, 1925) the Queensland Co-operative Bacon Association Ltd., at Murrarie, are paying for bacon pigs on the following schedule:—

Prime baconers, dressed weight, 95 lb. to 125 lb., 8¼d. per lb.; 126 lb. to 135 lb., 7½d. per lb.; 136 lb. to 145 lb., 6½d. per lb.; 146 lb. to 160 lb., 5½d. per lb.; 86 lb. to 94 lb., 7½d. per lb. Pigs other than prime according to quality.

Porkers, 6¾d. per lb.; sows for small goods (prime), 4d. per lb. Prices for others according to quality. Stags, 1d. per lb.

Boars, large or small, not received and stags must be emasculated at least three months before forwarding to factory.

These weights and prices may and probably do vary slightly with the different companies, but they are representative of the scheme of buying, though in this case the pigs are paid for on an actual dressed weight basis and are not usually weighed at all by the companies' officials prior to slaughter.

Nevertheless, the point of particular interest to the pig raiser is that the pigs are, in each instance, paid for on a "weight" basis, the actual price paid also varying, of course, with the quality of the animal, though many argue that insufficient attention is paid to quality and type.

Another Point of Interest.

Now another point of interest is that the bulk of our farmers have no conveniences for weighing their pigs, consequently there is considerable misunderstanding and endless discontent. One farmer informed me recently that he had been "robbed" by the pig-buyer on scores of consignments; another complained that farmers had little or no idea of weights or of the factories' requirements, for he said one lot of prime baconers he sent in were reported upon and paid for as being too fat and heavy. So to be sure of it he made certain that the next lot were sent in on the light side, with equally disastrous results, for they were not fat enough and were less than "eighties."

Suppliers to co-operative factories are here and there agitating to have scales installed at their trucking yards, while in many instances farmers who have the benefit of scales at the yards have little or no confidence in the buyers, are suspicious, and still think they are losing heavily. Conditions were much like this years ago in

our butchers' and grocers' shops, but this feeling has almost entirely disappeared nowadays, when one sees attractive, open-faced, and well-regulated scales on almost every counter.

So a great deal of the misunderstanding and discontent among pig-raisers could be avoided if farmers will install scales on their farms, by means of which they could weigh their own pigs at regular intervals, as well as immediately prior to despatch, thus becoming better acquainted with the actual weights of their animals at different periods. Local Producers' Associations might take this matter up and arrange for the co-operative purchase of scales, which could be located at convenient spots for the purpose. Some simple system of deduction by means of which they could at least be able to run fairly close to factory weights could be adopted, though it must always be remembered that pigs shrink or lose weight somewhat in transit, this shrinkage being heavier in the case of pigs travelling a long distance, as well as in the case of pigs that have been slop or milk fed and have not been properly "topped up" on grain, so that due allowance would at all times have to be made for a variation in weight from farm to factory. This is why the proprietary interests have adopted a sliding scale of deductions, for their experience has demonstrated that lighter-weight slop or purely milk-fed pigs lose much more in transit and slaughter than heavier grain-fed pigs, though unless carefully handled the latter may also suffer through being paid for at a lower price, owing to being overfat and too heavy.

A fairly accurate basis can be arrived at in Queensland by deducting 30 per cent. from the actual live weight, and a very simple system of doing this is figured out as follows:—

For pigs weighing 160 lb. live weight, multiply live weight by the figure seven and cross out first figure from right, thus:—

160 lb. actual live weight
7

1120 = 112 lb. estimated dressed weight, or 30 per cent. less than actual live weight.

This is the simplest form of arithmetic and should not puzzle any farmer, while being fairly accurate as a guide.

Bacon Pig Weight-grading Machine—A New Invention.

To at least make an attempt to overcome these losses and heartburnings and to place in the hands of the farmer a reliable machine at a reasonable price, there has recently been marketed a contrivance, a patent for which has been officially applied for, known as "Forster's Weight-grading Machine."

The machine itself is constructed on the principal of a farm slide, to which a horse could be attached to move the machine about as required. The illustrations show the details clearly and will enable readers to study the principle of the machine.

Fig. 1 shows the outline of the framework and the handle-bar which connects to movable gear, by means of which the pig crate (see Fig. 2) is raised when it is desired to connect same to the set of clock-face scales shown in Figs. 3, 4, and 5. The connection between crate and scales is movable, so that if the pig insists in squatting in one corner of the crate and not equalising the balance, the adjustment of this connection overcomes the trouble and enables weighing to proceed just as if the pig were in the centre of the crate.

Fig. 6 shows the machine with the sliding door at end of crate, ready for action. The door at the other end is also movable, so that, after weighing, the pig simply walks out of the crate and leaves the way open for the next pig to walk in. A small ramp has since been added to the machine to allow the pig to walk up the short incline from the ground into the crate.

The machine complete weighs approximately 3 cwt., and full instructions regarding its use, the various details of construction, and price may be obtained on application direct to Mr. Forster at his city address. The measurements overall are as follows:—Width 3 feet, height 5 feet 6 inches, and weight approximately 3 cwt.

The machine was in use at the Nambour Show in July, and again at the Royal National Show, Brisbane, in August, and was of much value for the purpose of weighing various pigs. It is a necessity on any well-conducted pig farm, and the price should not be the only consideration when considering its purchase, for one would soon lose more than its nominal value in a few consignments of over or under weight market pigs.

PLATE 95 (Fig. 1).
Forster's Weight-grading Machine for Bacon or Pork Pigs, showing Construction of Framework.

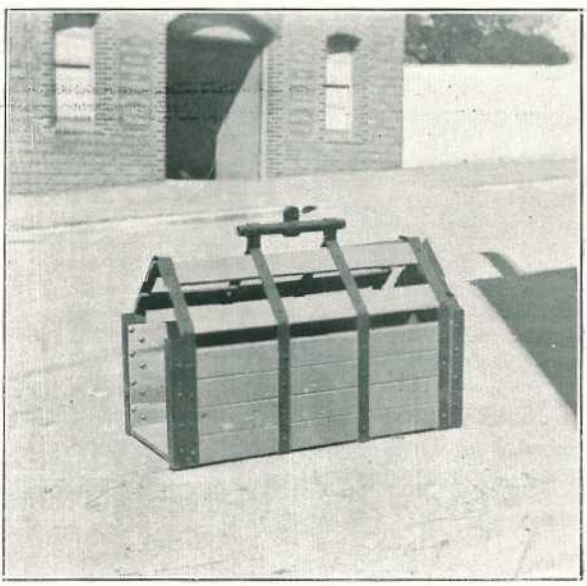

PLATE 96 (Fig. 2).
Forster's Weight-grading Machine, showing Pig Crate having movable doors at each end and slatted floor to prevent Pig slipping when entering or leaving.

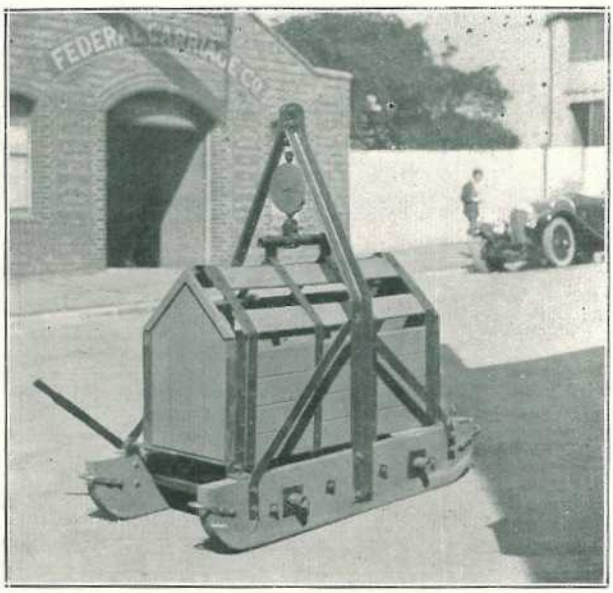

PLATE 97 (Fig. 3).

Showing the Crate connected with the Spring Balance Open Face Scales. Note also the doors closed at each end of Crate.

PLATE 98 (Fig. 4).

Reverse view of Fig. 3.

PLATE 99 (Fig. 5).
The machine complete, ready for use.

PLATE 100 (Fig. 6).
Another view, showing machine ready for use and crate open ready to receive pig.

PARALYSIS OF THE HINDQUARTERS IN PIGS.

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

In the course of recent tours both in the Northern and Central Divisions as well as in Southern Queensland, and also during a lengthy experience in New South Wales, Mr. Shelton has noticed a considerable number of pigs suffering from the trouble most frequently spoken of as Paralysis of the Hindquarters. This disease is also, on occasions, erroneously referred to as Staggers and Rickets, while other terms used to indicate a similar condition are, Down in the Back, Kidney Worms, or Paralysis. Mr. Shelton's notes on the subject are of unusual interest.—Ed.

Numerous inquiries have been made as to the cause of this all too common and very peculiar disease, if such it might be called. The subject has been referred to previously in these columns, but being of such a serious nature warrants repetition, especially as quite recently several very helpful communications have been received from correspondents overseas having special reference to the subject matter.

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.

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 occur, the long bones are very deficient in calcium and phosphorous, 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 phosphorous 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, Pennslyvania, 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 phosphorous accompanied by proper vitamin-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 phosphorous; 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 greenstuff 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 mimeographs 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), phosphorous (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 grade 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, and 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 tablespoonfuls 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 "Stephanuus 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 a feed of 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 liming and clean up several times in the year.

Paralysis from Heavy Sucking.

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 was made in the November (1924) issue of the "Queensland Agricultural Journal" 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, June, 1924), 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 Seddon 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 it 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 supply meat meal—a protein supplement of much value. 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 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 the 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 burners. 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.

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 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 thrifty, vigorous pigs. In this regard it is necessary 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.

In the Departmental pamphlet, "Pig Raising in Queensland," brief reference is made to the disease Paralysis, and the following excerpts will prove of interest:—

Paralysis in pigs is brought about by several causes, viz., rheumatism, worms in the kidneys and surrounding parts, or by over-feeding young pigs on an exclusive diet of corn and water.

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 vitamins 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 frame work and vigour. Cases of this kind are common, we believe, and they strangly 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 phosphorous. Experiments have shows 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 phosphorous 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

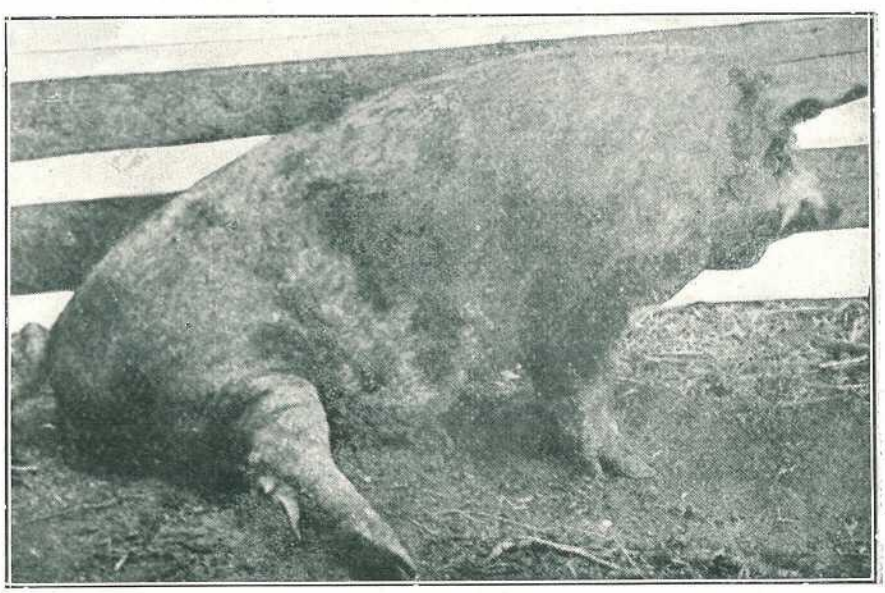

Plate 101 (Fig. 1).

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.

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 appears 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.

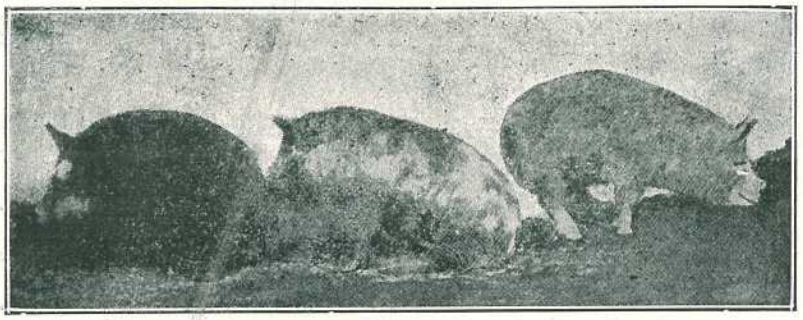

Plate 102 (Fig. 2).

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

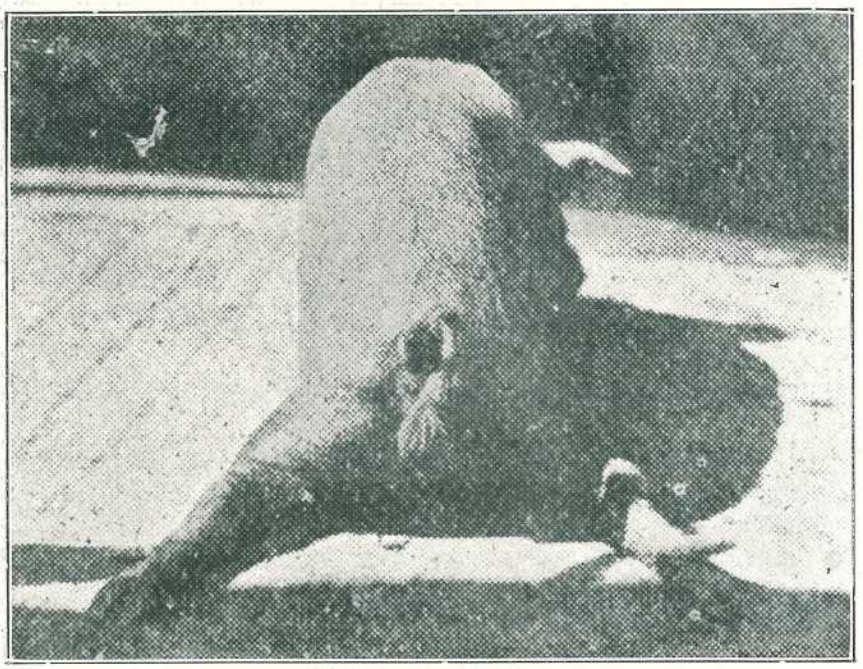

Plate 103 (Fig. 3).
Symptoms of posterior paralysis (breaking down in the back).

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.

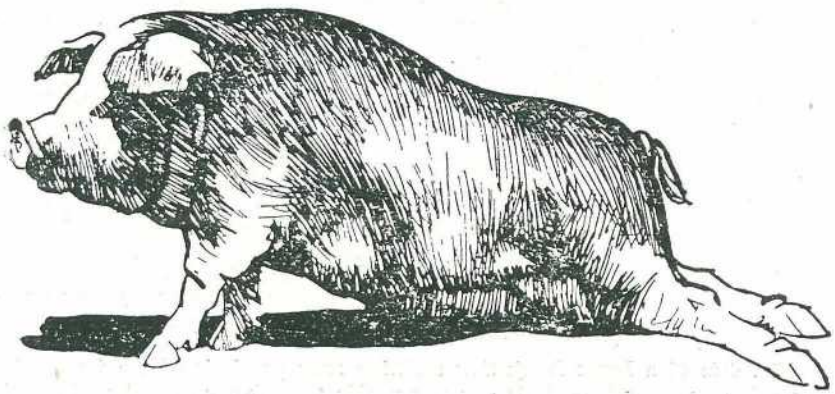

PLATE 104 (Fig. 4).

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.

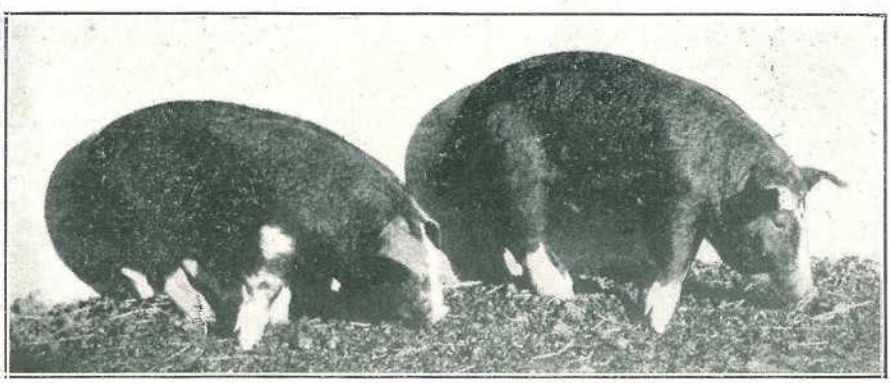

PLATE 105 (Fig. 5).—PIGS SUFFERING FROM SEVERE CASES OF RICKETS.

These pigs received a ration of white corn and skim milk, without pasture. Note the paralyzed 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.

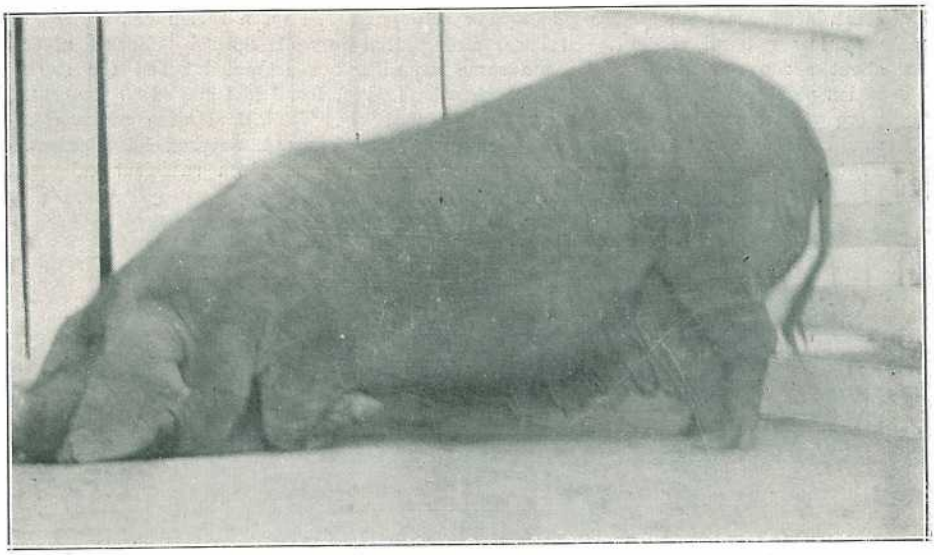

PLATE 106 (Fig. 6).

Fig. 6 is of a Large Black Sow suffering from paralysis of the forequarters, the result of rheumatism. This sow was unable to walk for several weeks during treatment, but she eventually recovered but was not used for breeding purposes again. Her trouble was evidently a constitutional one, as she did not suffer from injuries and was carefully fed and housed at all times.

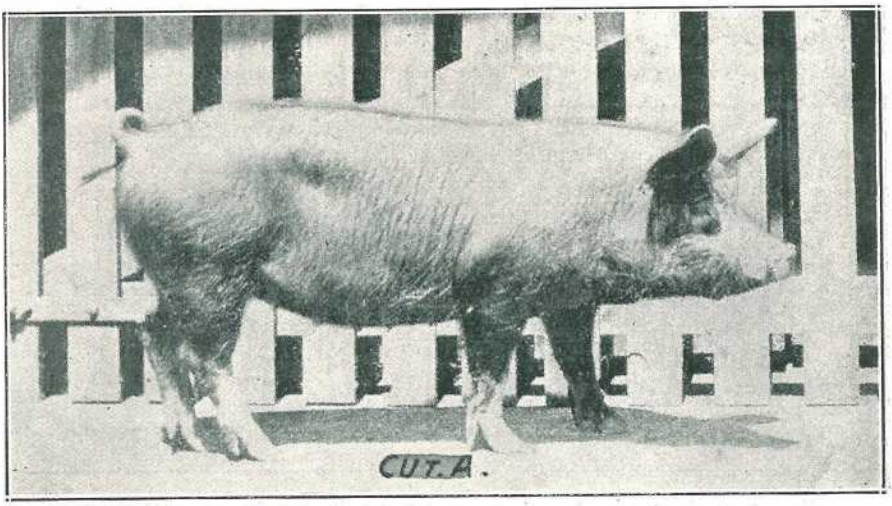

PLATE 107 (Fig. 7).

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 comparatively low.

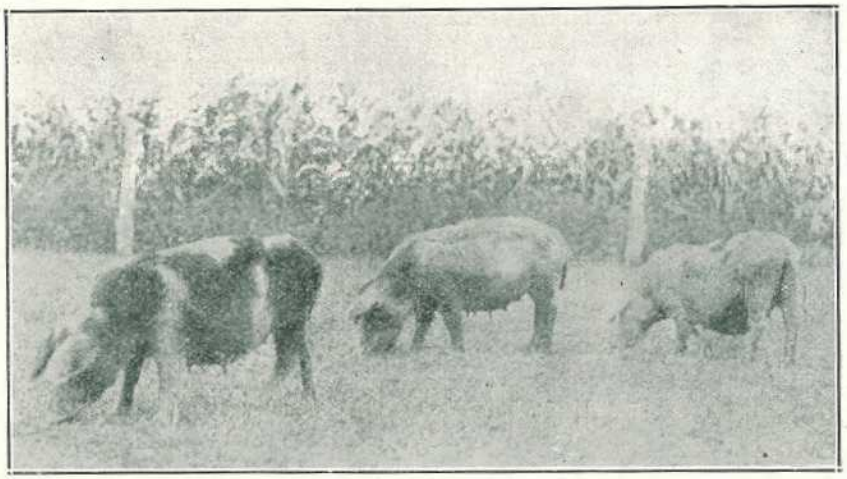

Plate 108 (Fig. 8).

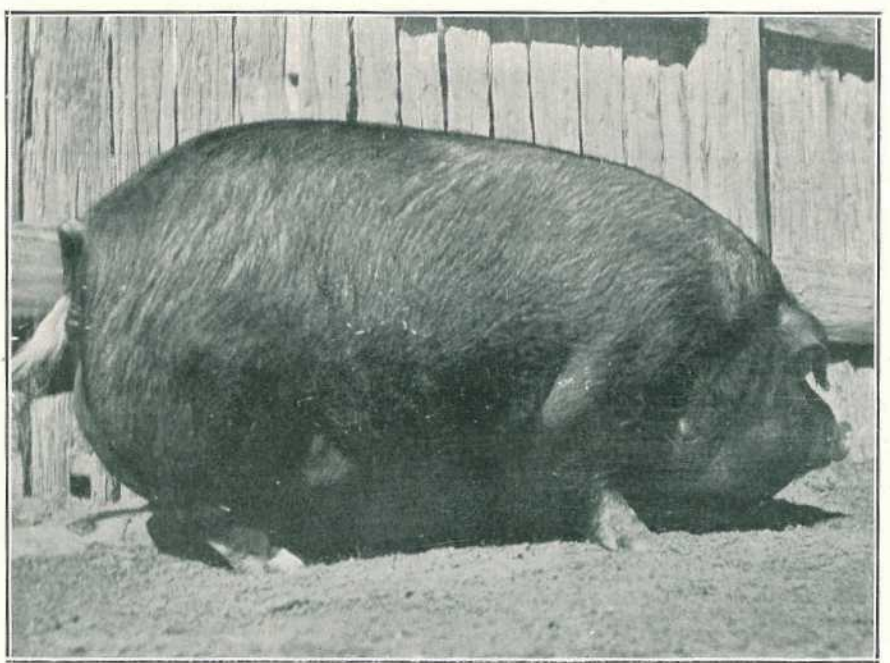

Plate 109 (Fig 9).

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.

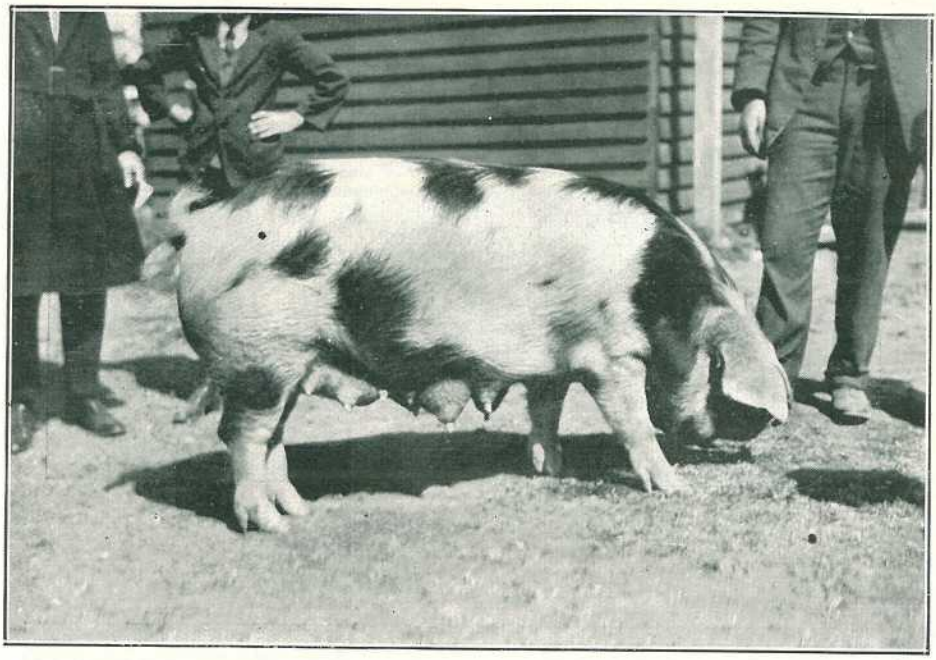

Plate 110 (Fig. 10).

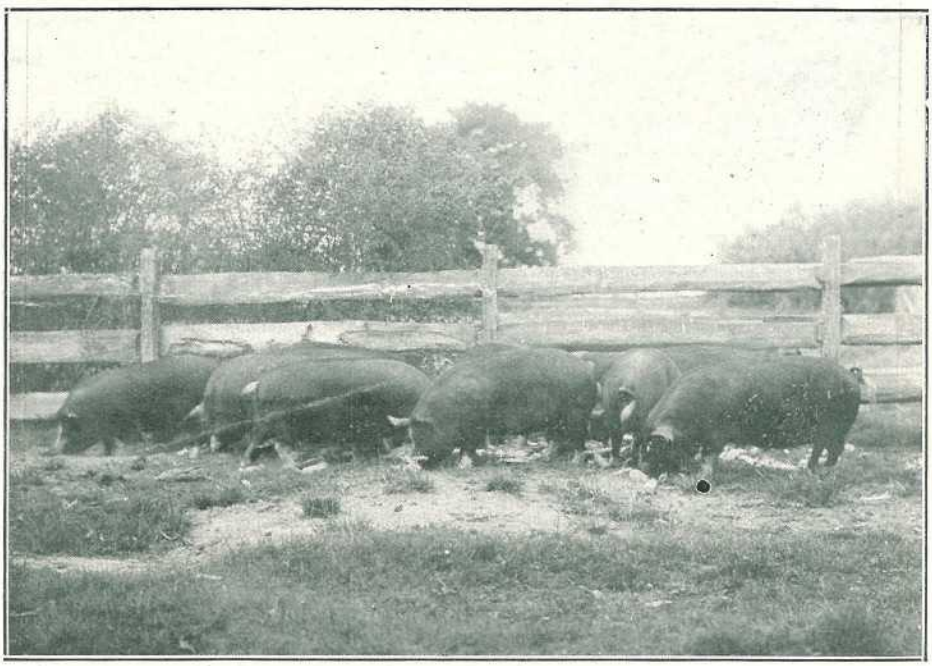

Plate 111 (Fig. 11).—A Group of Selected Berkshire Brood Sows.
Sows of this description always realise good values in normal seasons, and are worth special care.

Fig. 10 is a prize winning Gloucester Old Spot sow at the Brisbane Show, 1925. 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.

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.

COTTON VALUES.

The Minister for Agriculture (Hon. W. Forgan Smith) in the course of a recent Press statement on the proposed guaranteed prices for cotton for the 1925-26 season, mentioned that the Commonwealth Government made the proposal to the several State Governments concerned that payment should be made on length of staple as well as on grade. Following are the staple lengths proposed:—

Staple I.—One inch (1 in.) in length downwards.

Staple II.—Full inch (1 in.) to inch and one-eighth ($1\frac{1}{8}$ in.).

Staple III.—Good inch and one-eighth ($1\frac{1}{8}$ in.) upwards.

The grades are:—

Grade.	Corresponding Universal Lint Standards.	Staple I.	Staple II.	Staple III.
A ..	Middling fair Strict good middling Good middling	$3\frac{1}{2}$d.	$4\frac{1}{2}$d.	5d.
B ..	Good middling Strict middling Middling	3d.	4d.	$4\frac{3}{4}$d.
C ..	Middling Strict low middling Low middling	$2\frac{3}{4}$d.	$3\frac{3}{4}$d.	$4\frac{1}{4}$d.
D ..	Low middling Strict good ordinary Good ordinary	$2\frac{1}{2}$d.	$3\frac{1}{2}$d.	4d.
	Immature Cotton—			
X ..	Equivalent to good middling spot ..	3d.	4d.	$4\frac{3}{4}$d.
XX ..	Equivalent to middling spot ..	$2\frac{3}{4}$d.	$3\frac{3}{4}$d.	$4\frac{1}{4}$d.
XXX ..	Equivalent to good ordinary ..	$2\frac{1}{2}$d.	$3\frac{1}{2}$d.	4d.

To these proposals the Queensland Government has advised the Commonwealth of its acquiescence.

Further mention was made by the Commonwealth of the growers' request for a bounty, and as has been previously announced through the Press, the Queensland State Government was prepared to support the appeal. In addition, it was pointed out that the Minister had already expressed his willingness, in the event of the bounty being given by the Federal Government, to relinquish the control of the cotton industry generally, and only to exercise control to the same degree as applies to agricultural industries generally.

SEGREGATED COTTON GROWING.

The subjoined extract from the "New York Journal of Commerce" of recent date shows how seriously the United States Department of Agriculture considers the necessity of growing "community basis" cotton, and emphasises the advantage that Queensland has gained by starting off on such a basis. Differences in conditions governing the cotton industry in the United States and Australia must, however, be borne in mind when considering any relationship of the American plan to our own particular cotton interests. There, of course, the industry is firmly established in several States, and the cotton belt covers enormous territory with immense crop acreages.

"Washington, 2nd August.

"A programme of activity with the States looking to the adoption of a single variety of cotton in each of the cotton-growing communities of the South is being mapped out by the Bureau of Agricultural Economics of the Department of Agriculture. This calls for a study at the outset, in co-operation with the various State institutions and extension services, of production in the States and to this end it is planned that six communities in each State undertake the assembling of 1,000 samples of cotton representative of the crop that passed through each such market during the season.

"Each of the samples will be marked as to variety, date of sale, price, and buyer's description. In each State the samples will be assembled at a central point and classed by representatives of the New Orleans Board of Cotton Examiners. Department of Agriculture officials declare that from these samples and data accompanying them it will be possible to obtain a great deal of information which may later be used in a campaign to extend production of cotton on a community basis, and to show the advisability of each community adopting a single superior variety of cotton and delaying the planting thereof until the season is sufficiently advanced to insure proper growth of the crop, rather than individuals planting early, thereby incubating boll weevils which infest the crops of others.

"It is contemplated that this study will lead to the encouragement of co-operative marketing, it being considered possible that the data will show the advisability of selling cotton through the co-operatives in order to obtain the premium which is paid for the better quality of cotton. The comparison of the price basis in the several communities should show in concrete terms the advantages of the one-variety community practice. The price paid for specific varieties when used in conjunction with data on their productivity, general outturn, and such other information as can be supplied by the experiment stations, would be useful in the establishment of these varieties in the different communities. The information on handling methods, such as excessive sampling, tare, irregularity, &c., would be useful in evolving concrete problems for subsequent studies. The data, together with the observations of those conducting the study, would be useful in arriving at the most advantageous form of community organisation for production, gin ownership, and marketing.

" 'It would be the purpose of this study to find out the facts as they exist as a basis for improvement in conditions,' declared H. T. Crosby, of the Division of Cotton Marketing, Bureau of Agricultural Economics. 'The plan of operation is to secure actual samples from typical bales, taking in each case a memorandum of the date, variety, buyer's grade, place of sale, and the price paid to the producer for the bale. The hope of the department would be that the results would tend toward single-variety production in the communities.' "

LEAF SPOT ON BANANAS.

In order to prevent any misconception or any undue anxiety regarding the presence of the leaf spot on banana plants that made its appearance in many parts of coastal Queensland towards the end of last summer and continued to extend during autumn, the following information regarding the outbreak is offered for the benefit of banana growers:—

The leaf spot is caused by a microscopic fungus closely related to the shot-hole fungus of stone fruits, the spores of which are carried by wind and, under favourable conditions of heat and moisture, germinate when they come into contact with a banana leaf. The spots characteristic of the trouble then make their appearance. They increase in size, the leaf-tissue is ruptured, and finally the whole leaf is affected and dies. The oldest leaves are the first to be attacked and in severe cases every leaf is destroyed, and nothing but the bare pseudo stem of the plant is left with the bunch entirely unprotected. Where the fruit is well developed there is little

loss as it can be marketed, but when the bunch is immature the fruit will not develop and is valueless. Sometimes the bunch falls right out.

Where the pseudo stem has not produced all its leaves the damage is not usually so acute, as the plant may recover and throw a bunch which will not, however, carry fruit of the best quality, but smaller fruit of marketable size. The trouble is of a purely seasonal nature and may not reappear for some time, for at present it is dormant and may continue to be so until conditions are more favourable for its development. Plants that were badly affected are now producing new leaves that show no sign of the trouble. At the same time growers are strongly advised to keep a very careful watch for any reappearance and to take precautions for preventing it again becoming a menace to the banana industry.

The precautions to be taken are of a preventive not a curative nature, and are similar to those in use in the case of diseases, such as Irish Blight of potatoes or Downy Mildew of the grape, with the exception that the fungicide used is to be applied in the form of a dust instead of a spray, as the latter is not practical in most of our banana plantations.

The application of a copper lime dust by means of a dust gun is recommended, the work to be carried out in the early morning or evening when there is no wind and preferably when the leaves are moist with dew. The dust should be applied as soon as the first traces of spot are seen, and should be repeated when necessary so that the young leaves may be protected when they make their appearance. Copper lime dust and dust guns will shortly be obtainable in Brisbane.—A. H. Benson, Director of Fruit Culture.

MILK AS FOOD FOR FARM ANIMALS.

Since milk is nature's food for animals, it has been assumed that milk contains all the elements combined in the right proportions necessary for the perfect growth of the young. Experiments have shown, writes E. T. Halnan (Animal Nutrition Institute, Cambridge University), that this assumption needs modification, particularly when milk designed for one particular species of animal is utilised as food for another species.

It has been demonstrated, for instance, that the milk of cows fed under winter-stall conditions is often deficient in those vitamines considered essential to growth. Moreover, calves fed on milk to the exclusion of other foods will eventually die. Milk is also deficient in one important element—*i.e.*, iron. The reason why the young animal grows successfully during the suckling period is that at birth a sufficient store of material rich in iron is present in the liver to supply its requirements during the suckling period. The deleterious effect of the absence of iron in the milk is consequently only shown when this reserve store is exhausted.

Analyses of milks of different species show very wide variation among the species, owing to the fact that the composition of the milk of each species is especially adapted for the efficient growth of that species during the normal suckling period. There is considerable variation in percentage compositon, both with regard to protein and fat. The sugar and ash also show considerable variation. A very interesting point also reveals itself when the figures are compared with the time taken for each species to double its weight, low ash and protein percentages being associated with the slowest growth rate, and *vice versâ*. Moreover, when the ash is analysed it is found that the relative proportions of ash constituents present agree fairly closely with the relative proportions present in the carcass of the young animal, with the exception of iron, as noted above. Since these relative proportions vary with each species, it is not easy to substitute the milk of one species with another; since even though the milk be treated so that the relative percentages of protein, fat, sugar, and ash are obtained, the balance of ash constituents will be different.

But though milk is not, after all, the perfect food that one had thought, and though milk of one species may be quite unsuited to another species, it is, nevertheless, desirable as a food. Milk is a food which is highly assimilable by stock, is easily handled, is very digestible, and contains proteins of high quality—*i.e.*, proteins which contain all the elements for tissue building. In the case of very young stock, therefore, its use is always justified even though its use may prove expensive, since the animal will be given a good start in life at the critical period of its career. A check in the early period of life is difficult and expensive to correct at a later stage, so that money saved by economical feeding at an early stage may be lost later in the endeavour to correct the stunted growth. On the other hand, the feeding of adult stock on milk is wasteful, although it is an advantage to feed by-products of milk, butter, and cheese if a cheap source of supply is available.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

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

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Aug.	No. of Years' Records.	Aug., 1925.	Aug., 1924.		Aug.	No. of Years' Records.	Aug., 1925.	Aug., 1924.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	0·83	24	1·73	0·93	Nambour	1·96	29	4·22	1·74
Cairns	1·80	43	1·92	3·16	Nanango	1·42	43	2·44	1·00
Cardwell	1·32	52	0·85	1·94	Rockhampton ...	1·02	38	1·41	0·71
Cooktown	1·35	49	1·73	1·40	Woodford ...	1·83	38	3·18	1·19
Herberton	0·68	38	0·75	1·09					
Ingham	1·55	33	1·94	5·60	*Darling Downs.*				
Innisfail	5·24	44	4·87	5·32					
Mossman	1·59	17	0·58	6·57	Dalby	1·24	55	3·32	1·77
Townsville	0·53	54	1·75	2·68	Emu Vale ...	1·21	29	2·98	1·85
					Jimbour	1·26	37	2·93	0·88
Central Coast.					Miles	1·18	40	3·66	0·76
					Stanthorpe ...	1·82	52	4·01	1·86
Ayr	0·65	38	0·85	4·07	Toowoomba ...	1·75	53	3·08	1·39
Bowen	0·71	54	0·83	0·90	Warwick	1·55	60	3·79	1·72
Charters Towers ...	0·61	43	1·06	3.71					
Mackay	1·05	54	4·66	0·56					
Proserpine	1·45	22	2·93	3·36					
St. Lawrence ...	0 90	54	1·55	0·66	*Maranoa.*				
					Roma	1·00	51	2·05	3·80
South Coast.									
					State Farms, &c.				
Biggenden	1·14	26	1·48	0·65					
Bundaberg	1·36	42	1·02	0·50					
Brisbane	2·12	74	3·14	1·35	Bungeworgorai ...	1·08	11	1·38	3·91
Childers	1·30	30	1·21	1·48	Gatton College ...	1·20	26	...	1·75
Crohamhurst ...	2·32	30	5·54	1·86	Gindie	0·82	26	...	0·70
Esk	1·56	38	3·15	1·91	Hermitage ...	1·39	19	3·26	1·99
Gayndah	1·23	54	1·21	1·27	Kairi	1·02	10	...	1·13
Gympie	1·82	55	1·63	1·29	Sugar Experiment Station, Mackay	0·93	28	3·93	0·46
Caboolture	1·59	38	3·19	1·06					
Kilkivan	1·53	46	1·34	0·81	Warren	0·95	11	1·46	0·44
Maryborough ...	1·75	53	1·40	1·62					

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

GEORGE G. BOND,
Divisional Meteorologist.

RAISINS AS A TONIC.

The raisin-growers of America report having discovered a new use for raisins. They are found to be effective as an afternoon bracer to take away "that sleepy feeling." It is reported that a number of large business corporations are now serving a small package to their entire office force as a mid-afternoon bracer. One of the best-known newspaper offices in Canada has arranged for small packages of raisins to be passed among the employees each afternoon, and every employee, from the printer's devil to the president, takes ten minutes to refresh himself with a handful of appetising and healthful raisins. The practice might well be adopted in Queensland.

EGG-LAYING COMPETITIONS.

MOUNT GRAVATT.

In August 5,771 eggs were laid, being an average of 21·4 eggs per bird, a gain of 2·7 eggs per bird over July. The weather was very changeable. No deaths occurred, and the general health of the birds was good. Individual scores :—

SECTION 1.

White Leghorns.

Name.	A.	B.	C.	D.	E.	F.	Total.
W. and G. W. Hindes	111	105	106	107	109	117	655
W. E. Woodward	111	108	114	88	107	85	613
John J. McLachlan	94	112	106	91	108	73	584
Mrs. R. E. Hodge	99	98	93	117	80	95	582
Eclipse Poultry Farm	115	103	89	98	98	65	568
J. Harrington	80	87	95	108	96	99	565
B. Driver	105	79	75	101	99	106	565
E. J. Stilton	91	95	98	106	107	51	543
M. F. Marsden	85	92	84	77	96	105	539
Jas. Hutton	88	87	107	66	86	96	530
R. C. J. Turner	93	87	93	101	59	91	524
S. L. Grenier	111	102	110	46	71	80	520
H. Fraser	52	97	102	97	91	71	510
Jas. Earl	82	100	60	93	76	93	504
W. Wakefield	100	107	71	89	81	53	501
N. F. Newberry	55	81	106	92	78	76	488
Geo. Marks	58	94	78	72	102	76	480
L. Bird	100	73	68	66	113	54	474
J. E. G. Purnell	90	59	89	101	80	46	465
E. Anderson	37	74	67	77	102	106	463
H. P. Clarke	66	98	63	77	63	95	462
G. W. Cox	65	64	97	92	83	59	460
T. H. Craig	64	92	76	76	67	83	458
Mrs. C. E. Lindley	71	53	73	97	78	78	450
A. S. Walters	86	78	63	78	43	98	446
Mrs. H. P. Clarke	56	95	76	71	96	51	445
Chris. A. Goos	100	46	69	85	53	86	439
T. W. Honeywell	64	1	95	77	85	67	389
W. D. Melrose	94	89	32	2	83	15	315

SECTION 2.

Black Orpingtons (except where stated).

Name.	A.	B.	C.	D.	E.	F.	Total.
Eclipse Poultry Farm	106	92	108	111	102	104	623
H. Cutcliffe	130	85	96	83	110	101	605
E. W. Ward	101	95	101	100	104	91	592
Jas. Potter	119	88	89	87	98	108	589
Geo. E. Rodgers	86	110	108	78	102	79	563
Mrs. A. E. Gallagher	97	92	104	62	86	109	550
W. and G. W. Hindes	125	64	75	60	90	124	533
Carinya Poultry Farm	98	97	48	75	103	83	504
Thos. Hindley	116	67	95	62	95	53	488
J. Pryde (R. I. Reds)	74	81	58	98	79	90	480
R. Burns	89	69	76	88	77	58	457
C. Dennis	82	75	105	83	46	65	456
W. D. Melrose	16	78	98	107	96	58	453
E. Walters	48	56	81	81	98	75	439
Jas. Hutton	79	68	83	63	33	68	394
E. C. Stead	13	49	58	64	47	48	279

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

Single Test Egg-Laying Competition—Scores to 31st August, 1925.

White Leghorns.

Pen No.	Name.	Aug.	Total.
52	R. B. Howard ..	26	114
42	D. H. Dipple ..	24	113
40	R. C. Cole	22	106
41	D. H. Dipple ..	23	106
8	H. S. Wagner ..	19	102
39	R. C. Cole	26	102
9	A. C. Horne ..	20	101
50	C. A. Keen	21	99
33	H. J. Manning ..	23	94
21	G. E. Rogers ..	25	93
29	J. H. Jones ..	17	91
28	J. W. Short ..	23	90
27	J. W. Short ..	22	89
19	H. Dibbs	21	87
32	J. Newport ..	18	86
49	S. A. Keen	16	84
11	Jas. Hutton ..	20	82
60	M. Murphy ..	16	82
38	P. J. Fallon ..	20	81
35	R. C. J. Turner ..	22	80
54	E. W. Howe ..	19	80
30	J. H. Jones ..	21	79
51	R. B. Howard ..	22	79
46	M. J. Frawley ..	5	75
56	J. F. Dahlheimer ..	21	75
1	Jas. Taylor ..	17	73
26	W. G. Harper ..	21	73
61	J. Goggins	19	72
48	G. Stilton	18	69
59	M. Murphy ..	20	68
62	J. Goggins	15	68

Pen No.	Name.	Aug.	Total.
2	Jas. Taylor	20	67
3	E. Parker	21	65
17	W. D. Williams ..	14	65
45	M. J. Frawley ..	13	64
13	J. E. King ..	22	63
44	S. B. V. Sharkey ..	5	63
20	H. Dibbs	21	62
22	G. E. Rogers ..	7	60
37	P. J. Fallon ..	19	59
10	A. C. Horne ..	20	53
4	E. Parker	17	49
25	W. G. Harper ..	20	49
6	G. Maurer	19	48
5	G. Maurer	25	47
12	Jas. Hutton ..	15	43
55	J. F. Dahlheimer ..	12	43
43	S. B. V. Sharkey ..	A7	7
53	E. W. Howe ..	*24	101
58	S. Chapman ..	*22	94
57	S. Chapman ..	*24	93
23	Everlay P. Farm ..	*20	89
7	H. S. Wagner ..	*22	85
14	J. E. King ..	*19	85
36	R. C. J. Turner ..	*22	56
24	Everlay P. Farm ..	*24	55
15	W. Grant	*23	53
16	W. Grant	*16	50
47	G. Stilton	*14	44
18	W. D. Williams ..	*16	34
34	H. J. Manning ..	*17	29
31	J. Newport	*15	15

Other Varieties.

71	H. Dibbs (Lang.) ..	26	105
75	— Badcock (R.I.R.)	23	84
64	S. Chapman (B.L.)	20	83
65	Mrs. K. O'Connor (B.L.)	20	63
69	— Badcock (Lang.)	23	61
73	A. W. Le Pla (R.I.R.)	6	61
72	H. Dibbs (Lang.)	22	52
68	E. Parker (B.L.)	21	47
70	— Badcock (Lang.)	24	45
74	A. W. Le Pla (R.I.R.)	11	43
67	E. Parker (B.L.)	17	34
81	V. Brand (B.L.) ..	14	33

80	Everlay P. Farm (W'dotte) ..	*23	89
77	L. Maund (Col. W'dotte) ..	*18	80
82	V. Brand (B.L.) ..	*25	79
66	Mrs. K. O'Connor (B.L.)	*22	69
83	S. Chapman (B.L.)	*14	65
79	Everlay P. Farm (W. W'dotte) ..	*8	64
78	L. Maund (Col. W'dotte) ..	*15	55
76	— Badcock (R.I.R.)	*21	53

Black Orpingtons.

120	Jas. Hutton ..	28	125
117	T. Hindley ..	29	120
89	A. W. Le Pla ..	25	116
105	L. Maund	26	115
128	J. W. Short ..	23	113

99	A. R. Petty ..	28	109
121	E. W. Brock ..	25	108
132	G. E. Rogers ..	27	107
131	G. E. Rogers ..	29	107
107	C. Graham	19	100

* Signifies bird laying under-weight eggs.

A Original bird died and has been replaced.

N.U.P.B.A. TOOWOOMBA SUB-BRANCH—*continued.*

BLACK ORPINGTONS—*continued.*

Pen No.	Name.	Aug.	Total.
119	Jas. Hutton ..	20	100
106	L. Maund	24	99
100	A. R. Petty ..	24	94
97	V. J. Rye	19	94
98	V. J. Rye	23	90
96	R. Burns	28	87
114	D. W. Williams ..	22	85
118	T. Hindley ..	27	84
111	E. Walters	17	82
126	H. B. Stephens ..	25	81
85	— Kelly	23	81
88	J. Head	24	80
109	S. McBean	23	78
102	T. J. Carr	18	77
90	A. W. Le Pla ..	20	77
112	E. Walters	13	74
108	C. Graham	10	73
95	R. Burns	B2	71
86	— Kelly	22	67
123	P. Hopkins ..	12	66
113	D. W. Williams ..	19	66
84	W. R. Wilson ..	19	62
103	W. S. Adams ..	24	59
83	W. R. Wilson ..	27	58
115	Everlay P. Farm ..	21	53
92	K. Macfarlane ..	21	53
122	E. W. Brock ..	13	50
110	S. McBean	25	47
125	H. B. Stephens ..	6	42
87	J. Head	12	38
130	R. Neil	*19	119
116	Everlay P. Farm ..	*22	107
127	J. W. Short ..	*24	103
124	P. Hopkins ..	*14	78
129	R. Neil	*11	59
91	K. Macfarlane ..	*17	59
94	T. C. Ollier ..	*23	56
104	W. S. Adams ..	*21	47
93	T. C. Ollier	*15	42
101	T. J. Carr	*11	41

* Signifies bird laying under-weight eggs.

B Died during month.

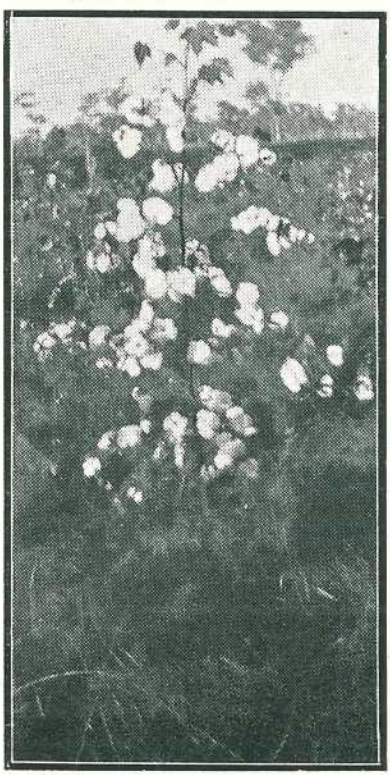

Photo.: N. A. R. Pollock.]

PLATE 112.—COTTON IN NORTH QUEENSLAND—DURANGO ANNUAL.

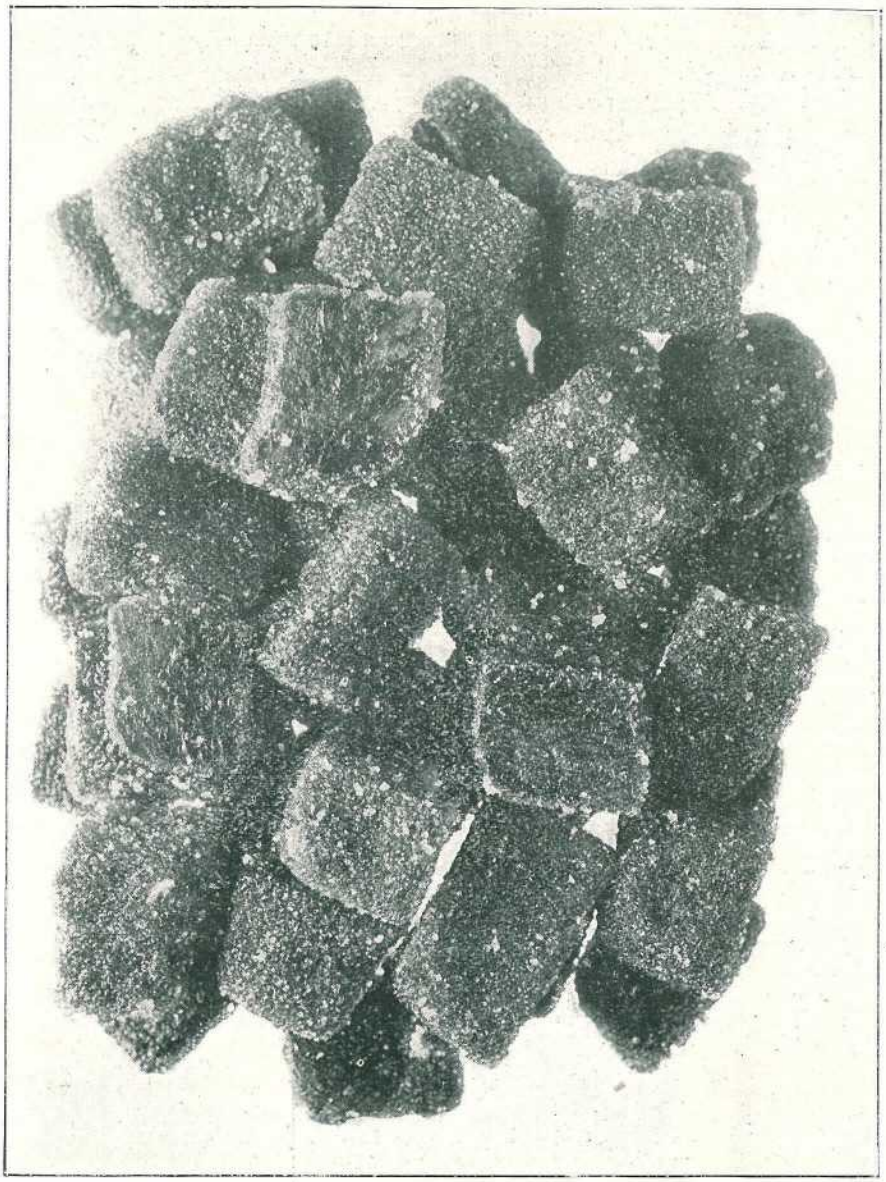

PLATE 113.—A DELICIOUS CONFECTION. SAMPLE FROM BULK OF QUEENSLAND PINEAPPLE TREATED BY AN ENTERPRISING FIRM OF MAUFACTURING CONFECTIONERS AT ADELAIDE.

This method of marketing our Pineapples has great possibilities and deserves all the encouragement growers can give it.

PLATE 114.—OXLEY BACON FACTORY. FOGGITT, JONES, LIMITED, FINE MODERN WORKS ON THE BANKS OF OXLEY CREEK, NEAR BRISBANE, PARTLY DESTROYED BY FIRE RECENTLY.

The whole plant was threatened, but through the fine team work of the employees the outbreak, caused by the fusing of the electric wires, was confined to the Curing Room in which, however, great damage was done. A remarkable recovery was made, and within a week the Factory was again in full operation.

THE CLYDESDALE HORSE.

Queensland Association of Breeders.

The popularity of this famous horse in Queensland was fully demonstrated at the recent Royal National Exhibition, where the displays of Clydesdales, especially in the younger classes, were equal to anything ever seen on the ground.

So keen was the enthusiasm and interest of breeders that a meeting of those interested was convened and held in the National Association Rooms on Thursday evening, 13th August, 1925, for the purpose of discussing the future of the Clydesdale in Queensland.

Among the large number present were Messrs. Jas. Sprott, A. McGowan, Gavin Elliot, J. K. Graham, H. G. Stokes, A. Duncan, W. J. McKee, W. Frood, G. Weier, H. Embrey, J. W. Lowis, F. Harm, O. A. Zischke, Jas. Montgomery, A. Tyson, T. J. Turkington, H. S. Hunter, F. Hamilton, and J. F. Hayes.

Mr. Jas. Sprott was voted to the chair, and in opening the meeting explained the reasons for which they had been called together, and read abstracts from the Clydesdale Stud Book of Great Britain and Ireland. He congratulated exhibitors on the fine display they had made, and the fine attendance that evening was a happy augury for an active organisation to protect the interests of Clydesdale breeders in Queensland.

The matter of linking with the Commonwealth Clydesdale Horse Society was discussed at great length, and it was decided that, although it was the wish of those present to form such a branch in Queensland, the time was not opportune. It was eventually decided to form an association in Queensland to be known as "The Clydesdale Society of Queensland," and officers listed as follows were elected:—President, Mr. Ernest Baynes; vice-presidents, Messrs. A. McGowan and H. C. Quodling; treasurer, Mr. H. S. Hunter; secretary, Mr. J. F. Hayes.

The membership fee was fixed at £3 3s., with an annual subscription of £1 1s., payable in advance. Most of those present enrolled as members.

A subcommittee, consisting of Messrs. Ernest Baynes, A. McGowan, H. C. Quodling, Jas. Sprott, G. Elliot, J. K. Graham, and J. F. Hayes was appointed to frame a constitution and rules for the society.

The Objects of the New Association.

1. Maintenance, unimpaired, of the purity of the breed of horses known as Clydesdale horses, and to promote the breeding of these horses free from hereditary unsoundness as far as practically possible.

2. Collection, verification, and preservation of pedigrees and records of the Clydesdale.

3. Promotion of the general interests of Clydesdale breeders and owners.

4. Investigation, should occasion arise, of suspicious and doubtful pedigrees of Clydesdales, and other possibly alleged misrepresentations relating to them.

5. Arbitration upon, investigation, and settlement of disputes and questions relating to the Clydesdale breed.

6. Affiliation with the Commonwealth Clydesdale Horse Society.

The matter of going fully through the records and pedigrees submitted and the report thereon was left to the secretary, and he was instructed to make every effort possible to trace the pedigrees of sires as asked for, and to prepare pedigrees in proper tabulated form to be resubmitted for consideration as soon as possible.

In order to further increase the interest in the society, it is planned to arrange visits to as many country centres as possible, in order to establish direct touch with breeders.

Applications for registration are now being received, and all letters addressed to the Secretary, The Clydesdale Society of Queensland, care Royal National Association, Courier Buildings, Brisbane, will be promptly attended to, and all possible assistance and information given.

[*Notes on the Clydesdale, which should be of value and interest to owners and breeders, will be a regular feature of the Journal, commencing with the November issue.—Ed.*]

General Notes.

Hamilton Cold Stores.

In the course of a recent Press statement, the Minister for Agriculture (the Hon. W. Forgan Smith) said that the seasonal prospects of agriculture generally were extremely bright and there was every promise of a bountiful season. The recent well-distributed rainfall had greatly benefited the growing wheat, and, to a large measure, has ensured a good harvest. The production of butter and cheese also gave promise of being up to the highest level, and representatives of the Queensland Co-operative Butter Manufacturers' Association had made inquiry from the Department of Agriculture as to the date of the opening of the Hamilton Cold Stores for the intake and storage of dairy products. They were advised that the stores were in readiness to cope with the storage of butter and cheese, and operations would begin immediately it is necessary.

At present, the quantity of butter arriving in Brisbane for storage does not exceed 4,000 boxes per week, and there is ample storage accommodation at the Roma Street Cold Stores. It would not be sound economy to commence operations at Hamilton until the complement of butter coming forward is much greater than at present, unless, of course, the existing storage facilities were inadequate. There is just now no urgent necessity for placing the stores in commission.

Lost to the Farm—The Problem of the Rural Exodus.

The increasing city-ward drift of our rural population is a subject of such seriousness as to have been very anxiously discussed in recent years, and many and various have been the explanations of the trouble.. In an effort at diagnosis in a recent "Agricultural Bureau Record," New South Wales, Dr. H. L. Kesteven presents some opinions which should give many farmers thought. An analysis of the drift as indicated by the Government Statistician's figures is followed by these words:—

"Two great factors will determine the movement of individuals: (1) The need of an opportunity to make a living, and (2) the desire for better conditions. At present these factors are working to the relative reduction of rural populations. The operation of the first factor is probably entirely through want of sufficiently rapid land settlement, coupled with the adoption of labour-saving devices in agriculture. The Government Statistician points out that in 1921 it took 10,000 less persons to cultivate the same area that was cultivated in 1911. The increase in rural population has lagged because there was a lagging in the opportunities to make a living on the land.

"This is not the whole explanation. Every reader knows of vacant farms, and of farms undermanned, while sons from the undermanned farms and next door to the vacant farms are now working on the trams, in the mines, or the steel works, or at some other job in the cities or mining towns. Why? Two questions are here contained in one: Why did those sons go away, and why are there none from a city ready to jump into these country jobs?"

Why Do the Boys Go Away?

"Why do the sons go away?" Dr. Kesteven continues. "Mainly, I believe, because of discontent. This arises from causes real and causes imaginary. In the city when a lad leaves school, at whatever age that may be, he begins to make money for himself. He takes a job on wages. It is very rarely that he helps dad in return for his keep and clothes and a little pocket money. In the country it is the usual thing for the son to plough, milk, thresh, and harvest for dad. Dad is usually of a saving disposition, and does not encourage his son in extravagance by giving him much pocket money.

"That is one real cause—now for another. Too many farmers fail to realise that it is possible and very necessary to make the home pleasant. Half the cost of a corn crusher would install all the comforts of a city home so glibly advertised in the 'to lets'—'gas and water laid on, all modern conveniences.' Yet what do we find? The kitchen has a slab floor or none; the tank tap so close to the ground that you can only just get the milk-pail under it; the copper stands in a tripod, the wash-tubs on logs out by the well, and the lamps are narrow-wick kerosene lamps. The cows and horses feed right up to the door, and there is no trace of a home garden. Half or all the rooms are unlined, and none of them have ceilings."

A Vital Cause of Discontent.

"Take the same man into a city on half his earnings as a farmer, and he expects, and gets, all the city conveniences, or rather his wife and daughters do. How can a home be a contented one if the womenfolk are to work and live amid such uncomfortable and depressing surroundings? It is only the cheerful woman who can make the happy home. Can we expect our womenfolk to be cheerful if neglected in this manner? It is sheer neglect, for nearly every farmer could build himself and his family a pleasant home."

These, in the opinion of the writer, are the two great causes of discontent—failure to pay the boys their own earnings, and neglect of home comforts. But country-dwellers, he urges, are far too much impressed by the continual "boosting" of the city's delights; taking all things into consideration, the country-dweller is the better off for the things that are really worth while. The essentials for the production of a compensating current from city to country are set down as, first, more liberal land settlement conditions, and secondly, a cessation of the universal habit of discussing the disabilities of country residents, the bettering of which is in the country-dweller's own hands.

Royal Society of Queensland.

The last ordinary monthly meeting of the Royal Society of Queensland was held in the Geology Lecture Theatre of the University on Monday, 31st August, 1925.

Mr. C. T. White, F.L.S., exhibited specimens of *Bursaria incana*, Lindl., showing variation in foliage.

Mr. H. A. Longman, F.L.S., exhibited specimens of the "Magnificent Spider," *Dicrostichus magnificus*, artificially liberated from a cocoon in which the sexes were distinctly differentiated. The bulbous sexual appendages of the males could be distinguished by the naked eye. In the females the abdomen is larger and is more prominently marked with greenish-yellow spots and the cephalo-thorax is not nearly so dark as in the males. In these spiderlings there is no sign of the two prominent supero-lateral tubercles of the adult. The exhibitor stated that these tiny spiderlings, after ballooning, hid on the underside of leaves, and although they were unable to spin a web they caught tiny moths.

Mr. D. A. Herbert, M.Sc., read a paper entitled "Movement of *Mimosa pudica* as affected by Anæsthetics and Other Substances." The author points out that the term anæsthesia implies a suspension of sensitivity, and in this respect cannot be applied to the action of anæsthetics on *Mimosa pudica*, the power of movement being lost only when the plant is permanently injured. The effect of lipoid solvents on movement was shown to be similar to that of such anæsthetics as ether and chloroform, but enzyme poisons destroyed the power of response only after prolonged treatment. Alcohol, a mild anæsthetic, prevents movement by coagulation of protoplasm. Incidental to the main topic, new facts concerning the nature of conduction and of response are reported.

Carrots a Useful Crop.

The carrot is one of the most easily grown vegetables, but is not cultivated in this State to the extent that it deserves.

Almost any soil can be brought into a fit condition to grow this crop, but a deep, sandy loam is best. A fine tilth should be produced, and care must be exercised in the manuring. Farmyard manure should not be incorporated with the surface soil just prior to planting, but a plot may be selected which had been well manured for some previous crop. Artificial fertilisers will prove beneficial, especially on poor soils. A mixture of superphosphate or bonedust and sulphate of potash, in the proportions of four parts of the former to one of the latter, should give satisfactory results when applied at the rate of 2 or 3 cwt. per acre, but the quantity required depends, of course, on the richness of the soil. Artificial manures, in conjunction with a plentiful supply of water, result in early maturity and crispness—the latter being a most important factor.

The soil should be deeply tilled to allow of the full development of the roots, and early preparation of the land is recommended. The rows can be sown fairly close—usually from 12 to 15 inches apart. This permits of the use of hand wheel hoes for cultivating. The seed can be sown either by hand or by means of a hand seed-drill, planting to a depth of about half an inch. Fresh seed should be used, and may be mixed with sand to allow of a uniform sowing—the needs have a tendency to stick together on account of being slightly hooked. After sowing the seed should be firmed in, and then the soil loosened on the surface. If the germination is good it will be necessary to thin the plants slightly to prevent wedging, and as the roots develop the larger ones should be removed as soon as they become large enough for use. By this means the usefulness of the bed is also

increased. A spring sowing should provide carrots fit for use from a few months after planting right on throughout the winter. The spring sowings are the most satisfactory, as the plants become properly established before the hot weather is experienced. Sowing can, however, be carried out during the summer months, and with proper care and attention to watering and cultivation, good crops may be obtained. Four pounds of seed are required to sow an acre.

The harvesting is a simple matter where the soil is of a light texture, the crop being very easily pulled out of the ground. But should the soil be at all compact or hardened, or the carrots very long, it will be necessary to loosen the soil with a fork or by ploughing a furrow alongside the row. The crop is usually marketed in bunch form, but may be sold loose by the bag. For the best returns it is advisable to wash the roots before selling.

For the earliest crop, and on shallow soils, the shorthorn type (Early Horn or Early Nantes) is preferred; for main crop, and on deep soils, the longer varieties are best suited, namely, Intermediate, Altringham, Danvers, and Manchester Table.

During the cool months the roots may be stored by pitting in sand, something after the method of storing potatoes in pits. It is usual to cut off the top growth before heaping.

Teaching Dad.

Dad used to say old-fashioned pigs were good enough for him, Why pay a lot of extra dough to get a name thrown in? He bought a saw-toothed razor-back with flattened, turned-up toes; With all the curl out of his tail, and with a Roman nose. This pig was built for climbing trees, could outrun all the steers; His hide looked like a picket fence, his knees were wearing thin; His front legs bent together close to keep his lungs tucked in. His front and hing legs didn't match; he slanted like a roof; His ham looked like a frying pan that ended with a hoof; His hair was coarse and thin and long, where lice hatched, lived, and died; They had to work themselves to death at cutting through his hide. Well, he ate corn and fed the lice but managed to keep thin, So father said he'd fatten him and then we'd cart him in. He fed him corn out on the ground—he got what wasn't wasted, Dad used so much expensive feed the silver must have tasted. About the time the corn gave out we found he'd changed his diet; Where all Mum's chickens used to be, was feathers now and quiet. That settled things for Mum and Dad—she sued him for divorce; Dad sold the pig for court expense and took to drink, of course. The butcher tried to kill that pig with only just an axe; At last they used a Mills' bomb, if what they say are facts. They made him into sausage meat, and sold it in our town; The butcher lost his happy home—the people burned it down. About this time the pig instructor organised a club, To get us kids to raise a pig that wasn't just a scrub. He taught us how to feed it, too, and made us dip and spray, He said unless you used your head you couldn't make pigs pay. We boys were game for anything and gave the thing a try, We vowed we'd show these scrub pigs up and prove what kind to buy. Dad laughed at me for thinking I could make a porker pay, He said experience on the farm beat theory any day. I planned I'd give both a try and mix them up a bit; I cleaned and sprayed Mum's chicken house—she had no use for it. And then I bought a purebred pig—bid for her at a sale, She had good bone and silky ears and curlers in her tail. I fed a balanced ration, made her beat a pound a day; Dad, he sort of changed his tactics, couldn't think of much to say; Whistled—easy, but I heard him—when we drove her on the scales. Six months old and weighed two hundred—figures tell no fairy tales. But I broke another record when I sold her—that won Dad. Just ten quid for a breeding sow you bet was not too bad. Dad has changed his way of feeding, has purebreds instead of scrubs, Now we own a purebred motor, leave the Fords for mossback dubs.—Adapted.

Poultry—Work for the Brooder.

The main essentials in brooding are (*a*) warmth sufficient to keep the chickens comfortable; (*b*) pure air; (*c*) good food and water; (*d*) good sanitation; (*e*) ample room for exercise.

With regard to (*a*), this does not mean that chickens should be reared like a hot-house plant in an even temperature all the time. That would be the worst form of brooding. What it does mean is that the temperature provided should be such as will enable the chickens to take advantage of it even in the day time as soon as they feel the cold, and at night it should keep them sufficiently warm, so that they will not be forced to congregate and close up in order to be comfortable. It is no use to say the brooder, or the house, is large enough for many times the number of chickens being run. Space will not prevent packing, nor will the ingenuity of the attendant in rounding off the corners or any such attempted palliatives prevent "crowding"; only sufficient warmth will do that, and no matter whether it is applied (as in heated brooders) or conserved (as in the fireless arrangement), the principle is the same.

In the latter system strips of flannel, or some such woollen material, is the means whereby the bodily temperature is preserved, and whereby the chickens are divided to some extent from too close contact with one another. Trouble arises here when the flannel strips are lifted above the chickens and they can no longer nestle among them. This is one of the main troubles in cold brooding. With heated brooders, trouble commences just as soon as the temperature falls below what is required to induce the chickens to spread out.

It is not so much the cold that hurts the chickens as the crowding together, and the sweating that consequently takes place. It is not too much to say that 95 per cent. of chicken trouble arises from this cause. Strange as it might appear, nearly all the cases of illness arising from this simple cause are put down to coccidiosis, white diarrhœa, or other chicken diseases. If poultry-farmers would look closely into their brooding there would be very little heard of the diseases mentioned.

No harm can come from high temperatures if the brooder is so constructed as to allow the chickens to get away from the heat to a more temperate zone. Trouble from over-heating can only arise where the chickens are shut in and confined to it. Chickens, like any other animals, can be relied upon to seek comfort, and that will resolve itself into a temperature that is best suited to their bodily requirement.

Pig Feeding.

Lucerne, either for grazing or for cutting and feeding in the sty, is the best green feed for the boar, sows, and young pigs. Wheat, oats, rye, and broadcast maize are also very suitable as green feeds for grazing; climbing varieties of cowpeas can be sown among the maize.

Sorghum should be fed only when matured. Rape is a fine winter crop, ranking next to lucerne for grazing purposes. Jerusalem artichokes are very drought-resistant, and grow well in light soils. The pigs should be turned in to harvest these after the plants have flowered.

Sweet potatoes, suitable for warm districts, are good for pigs when fed with a small percentage of maize or other grains, and skim milk; they are utilised in the same manner as artichokes for grazing.

Sugar beet and mangolds are excellent feed fed raw, and can be readily stored in a pit. Potatoes should be boiled and fed with skim milk or maize; the water in which the potatoes have been boiled should not be given to the pigs.

Pumpkins can be largely grown; they should be fed raw. Wheat and barley should be crushed and steamed for a few hours and fed with skim milk or whey.

With regard to mill refuse (pollard, bran, and sweepings), the market value of these determines whether it pays to feed on them or not, but a very little pollard mixed in milk keeps pigs growing and fattening well. Bran, which is properly rather a laxative than a pig food, is very useful for brood sows. Sweepings from mills, &c., should be used carefully, as they often contain a lot of rubbish. It is wise to soak the sweepings, so that any nails, nuts off bolts, or similar dangerous foreign objects may sink and be separated.

Skim milk, butter-milk, and whey are widely used as food for pigs. Skim milk, which should be fed with crushed grains or pollard, is a good flesh-producing food. It should not be used straight from the separator, but allowed to stand an hour or so, so that the gas may work out of it. When feeding butter-milk, always add pollard or crushed wheat, barley, or maize; otherwise the pigs will be soft and blubbery when dressed. Whey also should only be fed when mixed with crushed grains.

To avoid any chance of tuberculosis, all milk products should be boiled before being fed to pigs.

Quality Counts—The Curse of the "Intermediate" Milker.

Notwithstanding the self-evident fact that cows vary greatly in milk-yielding capacity, it is difficult to get most dairymen to keep any sort of record of the quantity of milk obtained from individual members of the herd. It is the "intermediate" cow which is the curse of many herds, says A. W. Bethune in the Journal of the Victorian Department of Agriculture.

If she were a really worthless milker, the most careless dairy farmer would get rid of her, but on account of her fairly high milk yield when freshly calved, or her ability to produce just enough milk to delude her owner into thinking she is paying her way, she retains her place in the herd. It is this class of cow which it is very difficult to detect, except by a systematic daily or weekly weighing of milk over a lactation period. Even those herds which have a high average milk production, but in which weighing and recording is not practised, would be improved by a vigorous milk-recording system, as there is almost sure to be one or more cows whose milk yield would be much below the best cows, and which could be culled and replaced with advantage.

If dairy farmers who have to buy the greater portion of their fodder (as do those in metropolitan districts) would only realise what the saving to them in money would be by making full use of the scales, and by culling the duffers and the cows that are not quite good enough, there would be nothing like the number of struggling dairy farmers and of failures there is at the present time. An average full-grown dairy cow requires approximately 10 tons of fodder per year for the maintenance of her body, and for every 75 gallons of average milk produced approximately an additional ton of fodder is necessary. Thus, one cow producing, say, 750 gallons of milk per annum, consumes 20 tons of fodder during that period (10 tons for maintenance and 1 ton extra for each 75 gallons of milk yielded), while two cows, each giving 375 gallons of milk per annum, consume 30 tons of fodder for the period (10 tons each for maintenance of their bodies, &c., and 1 ton for each 75 gallons of milk produced). It requires very little arithmetic to show that the saving in fodder by having the one good cow in place of the two inferior ones amounts to 10 tons—a big item in itself, but one which must be multiplied many times in the case of a heavily-fed herd containing a number of inferior cows. As well as the saving in money, there would be a corresponding saving in labour; there would be less stock on the premises, yet more milk would be produced.

On every dairy farm there should be none but good cows, capable of producing from 700 to 800 gallons in a lactation period of from nine to ten months, and heifers that will give from 400 gallons up, according to age.

It is only too true that for some unaccountable reason there exists in the minds of many prospective dairy farmers, whose practical experience of the industry is very limited, the idea that less capital is required with which to begin dairy farming than to start any other business. It is this ignorance, combined with a want of financial backing, which often leads a new man to commence with a herd of nondescript cows, and thus begins a hard struggle, to be continued till at last he becomes disheartened or fails financially. Too often the dairy farmer thinks it is numbers that count, whereas the successful man's motto is "Quality before quantity."

The Slippery Slide to Failure.

There are a number of practices that tend to failure at dairying. Following, taken from an American paper, are a few:—

1. Buy any old cow, so long as it is a cow.
2. Buy the cheapest food, if any, regardless of its content.
3. Do not weigh the grain or milk, or do anything advised for dairy improvement.
4. Be careful not to test—your grandfather got along without it.
5. If the cows don't move smartly, prod them with a fork or milk stool—it brightens the animals up.
6. Milk and feed the cows when the notion strikes you, or let them go over one milking; there is nothing in regularity.
7. Breed your cows to any sort of scrub bull, no matter of what breed, so long as they will freshen once a year or so.
8. On no account join a co-operative bull or cow testing association, nor buy a purebred dairy bull. Such new-fangled notions label one as a person who will bear watching.
9. Persevere with these methods—you can depend upon them breaking you in the end.

Watering Dairy Stock.

The system of watering dairy stock from earth tanks cannot be recommended, the tanks being quickly polluted by the excrement of the animals which use them, and by the surface drainage when the adjacent land is flooded. Too often one sees cattle drinking from such tanks when the water is dirty and stagnant; some farmers even use this water for washing dairy utensils, with consequent contamination of the cream. The position is improved if, when the earth is being scooped out, it is placed all round the outside of the tank, thus preventing the inflow of surface water. It is not uncommon to see tanks very boggy around the sides. This causes a good deal of straining and twisting for the cow when turning to walk out, with possible injury.

When earth tanks are used for dairy stock, they should, if practicable, be fenced off and the water pumped by a small windmill into an overhead tank for the supply of troughs. There will thus be made available wholesome drinking water for all stock, as well as a convenient supply for washing the bails and spraying the yard to lay the dust prior to milking.

Kikuyu Grass—Are There Different Strains?

Inquiries are reaching the New South Wales Department of Agriculture from many country centres, especially the drier parts of the State, as to whether there are two strains of Kikuyu grass, which are spoken of as Belgian Congo and South African; also whether either of these is harmful to stock, and if there is any truth in the claim that this grass is superior to lucerne and other well-known fodder plants in respect to withstanding cold and drought.

In a report which has been furnished by the Agrostologist it is made clear that there is only one strain of Kikuyu, which was imported to New South Wales from South Africa about seven years ago, but it is understood the grass is native to Belgian Congo, also British East Africa; hence the impression that there are distinct strains. Being of identical origin, there can, of course, be no question of superiority between plants imported from South Africa and others brought direct from Belgian Congo. Similarly, this grass is not in any way injurious to stock, as large areas are planted in coastal districts of the adjoining State, where the plant thrives exceedingly well, and is superior to paspalum, being more resistant to drought and frost. It is, however, primarily a summer grass, and for winter feeding it is inferior to other grasses, such as *Phalaris bulbosa*, Tall Oat, and Tall Fescue in such districts. In regard to lucerne, it must certainly take second place, as lucerne is not only of better feeding value, but will grow in most places where Kikuyu will succeed. The latter will only thrive in districts having a good rainfall, and its cultivation in the drier portions of the neighbouring State is not recommended.

The advantages of Kikuyu in smothering bracken, sorrel, and certain other noxious plants are well known, but in view of the restricted area in which it will thrive its usefulness in this direction will not, of course, extend to the drier parts of the State. Its smothering habits, useful in the directions indicated, make it unsuitable for planting in areas, such as alluvial flats, that are likely to be used at a future date for cultivation purposes.

Foul Brood in Bees—Sterilisation of Infected Combs.

There is still very much doubt in the minds of professional apiarists as to whether combs infected with American foul brood (*Bacillus larvæ*) can be effectively sterilised and made fit for use without a recurrence of the disease in the hive, and at a figure that will make the treatment of such combs a payable proposition, writes the Apiarist, Hawkesbury Agricultural College, in the "Agricultural Gazette" of New South Wales. The discovery in 1922 of a method of treatment by Dr. Hutzelman, who used a 20 per cent. formalin-alcohol solution (the mixture now commercially known as Hutzelman's solution) was received by bee-keepers with much interest, but little hope was entertained that this method would ever be practicable on account of the high cost of the solution, and excessive evaporation that took place during the process of treatment. It will be a matter of interest to bee-keepers to learn that a formalin solution with water as a diluent has given results equally as effective as the Hutzelman patented solution.

The writer then quotes D. H. Jones, Professor of Bacteriology, Ontario Agricultural College, Canada, as follows:—"The questions we wished to decide in the experiments were, first, whether or not Hutzelman's claims could be substantiated; and, secondly, whether or not the use of water as a diluent could be substituted for alcohol with satisfactory results. Accordingly, combs were immersed for twenty-four and forty-eight hours, respectively, in various aqueous dilutions of formalin, alcohol dilutions of formalin, and Hutzelman's solution, after which cultures were made from the larval scales.

"It will be seen that in the case of uncapped cells, after twenty-four hours' immersion in all dilutions of formalin used, the spores of *B. larvæ* were killed. In the case of the capped cells, however, a few of the spores were not killed in this length of time, either in the water dilutions or in the Hutzelman solution.

"After forty-eight hours' immersion, however, all spores were killed in capped cells as well as uncapped cells. Thus, in these experiments, the water dilutions of formalin proved to be as effective as the alcohol solutions in destroying the spores of *B. larvæ* as they occur in the scales of infected brood combs.

"On removing the combs from the formalin dilutions, strong odour of formalin persisted on the combs for days. As this odour is strongly objectionable to bees, attempts were made to get rid of it. The method that gave the best results was washing the combs under the water tap immediately on removal from the formalin. The combs should be held in a slanting position and passed backwards and forwards and from side to side under the free flowing tap. In this way all traces of the formalin can readily and easily be removed, after which the combs are stood up to dry."

Similar tests were also made with certain proprietary disinfectants in varying proportions, but in each case growth of *B. larvæ* was obtained from combs immersed in solutions for periods varying from forty-eight hours to eighteen days.

From the foregoing report, bee-keepers may reasonably hope that, by widespread and consistent effort in districts badly infected with American foul brood, the enormous losses of those who are at present compelled to boil down their combs may be overcome.

Tobacco-Growing in the South.

Field experiments alone can determine whether a locality will produce a suitable type of tobacco. The plant is adaptable to many classes of soils, but its aroma, yield, and habit of growth are affected by climatic conditions very considerably. Generally, it will be found that "leaf" useful for commercial purposes cannot be grown within 15 miles of the sea, as the "burn" of the leaf is seriously affected by the chlorides in the soil and atmosphere.

There are many varieties of tobacco, all types of which are highly susceptible to a change in locality. If seed be imported and grown for a number of years, it will be found that ultimately the plants will assume characteristics common to the new locality, and lose their original distinctive features. The market in Australia is for Virginian leaf suitable for pipe and cigarette tobacco.

Each country produces a leaf having it sown particular burning aroma, and American aroma has become the standard for leaf used in the manufacture of Virginian pipe and cigarette tobaccos. The burning aroma of leaf so far produced anywhere in Australasia is totally different, though in many cases it would not be possible to discriminate on its appearance. In Australia the locally-produced leaf is principally used for blending purposes. Hence, the more neutral in the above respects the Australian leaf is, the greater the quantity for which use can be found by the manufacturer.

The largest amount of leaf is generally produced in the northern portion of New South Wales, but in quality, and more particularly in its qualities of burning aroma, tobacco grown in the southern portion of the State much more closely resembles the American article. This is probably due to the better rainfall and cooler nights during the growing period.

The crux of the position as to tobacco is the burning aroma, and all processes lead up to the attainment of a product pleasing in that respect and acceptable to the palate. The manufacturer of tobacco is prepared to pay up to 3s. per lb. for the best leaf in Australia, whereas a manufacturer of flour is only prepared to pay in the neighbourhood of 1d. per lb. for wheat, and a little more for maize. The fact is, the skill and science which must be devoted to the production of tobacco is very much greater than that necessary for the production of wheat and similar crops—partly because "production" in the case of tobacco involves a vital and very delicate secondary process.

One crop is for the small man tilling a small acreage under constant advice during growth and maturing of the crop; the other is for a man with a large acreage, using machinery to put in his crop, and then doing practically nothing until harvest time, when it is harvested by machinery and sold just as it is taken off the field. With tobacco the harvesting is only a part of the work. Flue-curing is a process which must be carefully watched day and night—and hourly—for six days, and the slightest error in judgment in the regulation of temperature or humidity may result in a most serious loss. After flue-curing a careful watch must be kept on the tobacco when it is placed in bulk and undergoes a further process of maturation.

Climate and the physical characteristics of the soil must be carefully considered, and (as stated before) actual field trials must be carried out before one can determine whether a locality or farm is suited to the production of a marketable tobacco.

Heavy rich soils invariably produce rank tobacco, as also do soils with a clay subsoil close to the surface. Standing water very quickly affects tobacco. The best ground is a sandy, friable, deep, well-drained loam, which contains lime and a clay content of not more than 8 per cent. Such a soil is suitable for almost all classes of tobacco. Within reasonable limitations, the more sandy a soil is the better will be the quality of the tobacco. Clay should be avoided in all cases.

Four acres appears to be a safe area for one man to work. Experience shows that the most consistently prosperous grower is the small-area man. In large areas labour difficulties arise. Few crops require such assiduous and careful handling—from the time of planting out until the day when the leaf is received in the warehouse—but the good grower is usually well recompensed for his trouble and labour.

There is a fixed market in Australia for flue-cured leaf, but no market for the old type of air-cured leaf.—Agr. and Pastoral Notes, N.S.W. Dept. Agr.

Ill-fitting Harness—Look at it from the Horse's Point of View.

Much depends upon the tractive power of the horse, and its effective utilisation necessitates the adoption of harness which will not in any degree tend to depreciate the value of his strength. The price of all horses, whether used for light or heavy draught, is extremely high, and, even apart from considerations of comfort, it does not pay owners to have their horses laid by through injuries contracted in the course of their work. The harness is necessary to enable the animal to exert his strength efficiently, and in selecting the harness it must be remembered that while securing this, it must not cause more than the unavoidable minimum of discomfort. No horse put in harness should suffer any inconvenience except that arising from fatigue. Unfortunately, however, through lack of knowledge of the proper adjustment of harness, many horses do suffer considerable pain while at work. This gradually leads to temporary incapacity, and in some cases to permanent injuries, such as fistulous withers, &c.

Many vices—for example, jibbing and bolting—have their origin in badly-fitting harness. When the horse is compelled to work in an unsuitable collar, the undue pressure on any part of the shoulder causes chafing and soreness, and the horse naturally recoils from what causes him agony. Ultimately, the best-tempered beast becomes vicious and uncontrollable, through nothing but culpable ignorance on the part of his driver.

Every horse differs in size and shape, and to fit him properly, it is necessary to use much care. It is not sufficient to depend upon the saddler to fit horses with their harness. The owner should know the use and proper adjustment of every part. Wrung shoulders frequently occur through leaving the selection to the saddler, who, rather than go to the trouble of obtaining a proper collar for a horse that is difficult to suit, may choose the nearest fit in his ready-made stock, and justifies his choice by the contention that the collar will soon adjust itself to the shape of the shoulder. If it is not a good fit in the first instance, it will never become so, and in the so-called self-adjustment it is quite possible that the horse will be permanently injured.

The Care of the Young Pigs—The Time of Woe for Weaners.

Weaning time is a very critical period in the life of a pig. If the young pig has been given feed in addition to what it has received from the mother, it should have made a good start and should then be fed, at least twice daily, all that it will eat up clean. The young pigs should have the run of good fresh pasture if possible, and should be fed on crushed grains, pollard, and skim milk, with lucerne, rape, or barley as green feeds, or pumpkins, mangolds, &c., if possible. All slop feed should be fed while sweet, and should preferably be given warm, after having been steamed for about four hours. The steaming of such grains as are given is attended by better results than merely soaking. The pigs should have a shallow wallow (preferably of concrete) in which the water is kept as fresh as possible. Wood ashes, cinders, and a piece of rock salt should be available in the yards, which should be provided also with a dry shelter shed and bedding. Too many pigs should not be kept in one yard. When about three to three and a-half months old, any boars that may have been kept should be separated and placed in different small paddocks, where they should be kept until ready for penning prior to marketing as porkers or baconers.

An important point is always to have the pigs graded, so as to keep the same-sized animals together, thus preventing large pigs from jostling the smaller ones at the feed trough. Pigs will be found to do much better if a system of grading is in force. Approximately, forty pigs can be run to the acre, but the exact number will depend upon the size of the animals and upon the pasture provided.

The Food Value of Cheese.

Cheese is a food second to none and cheaper than any commodity (or group of them) of similar food value. Its extremely high food value, both as regards protein and total energy, entitles it to a much more important place in the diet than it has commonly been given in this country.

It has been demonstrated that, contrary to the general impression, cheddar cheese is neither indigestible nor constipating; indeed, 95 per cent. of it is digestible and 90 per cent. of its energy is available. The protein value of 1 lb. of cheddar cheese is equivalent to 2 lb. of sirloin roast, 22 eggs, or 3 lb. of fish. To equal the energy value of 1 lb. of cheddar cheese, 2 lb. sirloin roast, 26 eggs, or over 6 lb. of fish are necessary. As a substitute for meat, cheddar cheese holds first rank both in regard to food value and relative cost. Instead of being used solely as an appetiser or condiment, cheese is worthy of, and should be given, a substantial place in the diet.

No mention has been made of the indispensable dietary constituents known as vitamines. Fat-soluble A and water-soluble B are both present in cheese. Butter-fat contains fat-soluble A in abundance. Vegetable oils do not furnish this vitamine, neither are the body fats of animals, such as lard or beef fat, important sources of it.

Unfortunately, points out a senior dairy instructor of the Department of Agriculture, too much cheese of very inferior quality is passed out for consumption, and this has had a very much greater retarding effect than one would at first imagine. "Picture the man (and there are thousands of them) who daily lunches on bread rolls and butter; who, feeling he wants more, calls for cheese, and receives a piece which is bitter or has a bad smell, or in appearance is uninviting. He probably eats it, but with every mouthful conceives a deeper prejudice against cheese. Good cheese, on the other hand, has the very opposite effect, the man's palate clamouring for more of the thing that is pleasing. Thus good cheese establishes a habit, which is persisted in till the bad piece comes along again."

Modern Farming.

The essential difference between the new methods of farming and the old is that the old rule-of-thumb methods are being superseded by those which are based on a study of the conditions under which crops grow, and of the relationship of the growing plant to soil and air and water.

These new methods have become necessary because of the changed conditions under which farming is carried on. The number of people who have to be supplied with food is continually and rapidly increasing, competition is getting keener, the available land of good quality is diminishing, and poorer land or land in a less favourable climate has to be opened up, and the need has arisen of utilising to the utmost the resources of the soil. This is only possible by the application of principles which science has discovered. This does not mean that the farmer must necessarily be a scientific man, but it is becoming every day more and more necessary that he should understand something of the principles on which farming depends.

Agriculture is an art, and it is an art that was practised centuries before the sciences were born with which it has become associated in modern times. Man raised corn and made bread and wine thousands of years before he knew anything of the constituents of grain and grape, or the nature of fermentation, and a man can to-day be a thoroughly successful farmer without knowing anything about botany or pathology, or entomology, or chemistry. Nevertheless, the farmer of to-day, working under modern conditions, cannot afford to neglect the teachings of science as far as they affect his own art; and that farmer will be the successful one who is able to understand what science has to tell him, and to utilise the weapons which she puts into his hands. And agriculture is indebted to science not only for the knowledge of useful facts and principles, but in a still higher degree for the scientific method of work, the spirit of inquiry, the patient, accurate, and systematic attention to the minutest details. Without this, the farmer becomes a mere sowing and reaping machine, incapable of progress, and at the mercy of adverse seasons and crop diseases.

The Need for Better Horses.

Although the day of the horse is by no means past, urges a writer in the "Agricultural Gazette" of New South Wales, the day of the inefficient horse is numbered. Horse users to-day want a better article, and horse-breeders would be well advised to keep abreast with the demands of the times, and produce the class of goods which is wanted and sells best.

The carriers, merchants, and brewers of Sydney complain of the great difficulty they have in securing horses of the right class for their work. The markets are flooded with under-sized, scrubby types, for which there is no demand. Farmers should be in a good position to breed the class of horse which is wanted in the city, as by breeding a few they can give them more attention, and so help their development. The horse with weight, good appearance, and with hard, flat bone and sloping pasterns is the sort required. The best class of draught horse in Sydney is to be found principally in the brewery lorries, and it would be a good education for any farmer or horse-breeder when in Sydney to visit the stables of the brewers and inspect the horses. That there is a demand for good horses cannot be too strongly impressed on breeders. They city user wants a better standard of animal and the farmer also wants a more efficient horse. The satisfaction of this requirement lies in the hands of the horse-breeder. Is he, by breeding and rearing a bad, nondescript type of horse, going to discredit horse-breeding, or is he going to produce a horse of better standard which will give more efficient service on the farm or in the city? By breeding nondescript animals, sending them into the city markets in an unfit state, and expecting top prices, sellers show a lack of business acumen. No wonder carriers and others who are anxious to procure good horses become disgusted and turn their attention to motor power.

The Menace of the Mongrel Sire.

The average horseman in this State, says the same writer, has shown a great deal of apathy in all matters connected with the breeding of horses of higher standard. While legislation to prohibit mongrel and unsound sires is essential, there is no reason why breeders should wait for Government action before trying to do something for the improvement of horses. The lack of progress and improvement in horse-breeding in this State is to a large extent due to the use of sires deficient in breeding and quality, and the failure on the part of owners of mares to recognise the necessity for patronising pure-bred, sound sires of good conformation. The neglect, too, to adopt a more rigid culling of breeding mares is a big contributing factor, and to this, and to the use of undesirable sires, is consequently attributable the low standard of the horse, which, on account of showing unprofitable results, has led to decreased breeding.

Everything possible should be done to improve the standard of draught horses, to increase their value, and to render them more efficient for the work for which they are intended. The greatest menace to the industry has been the cheap stallion, and it is to be deplored that legislation has not been brought into force to eliminate this class of animal. The breeder himself, however, is largely to blame, on account of his short-sightedness in patronising such horses and encouraging their use, simply because they are to be had for a small fee. Anything cheap in the horse line is dear in the long run. If breeders would realise that "like begets like" they would know that the union of the average farm mare with the cheap, nondescript sire, lacking in breed, type, and quality, must result in progeny which can, at best, be no better than either parent—a foal which can grow only into an indifferent horse, lacking desirable working qualities, and, on account of its poor type, of little value in the sale-ring.

Comfort in the Piggery.

We are told that there is no animal on the farm that is more likely to suffer from colds, caused by lying on damp floors or in draughts, than the pig; and yet there is none that is, as a rule, so carelessly provided for with buildings. Anything seems to be thought good enough for a pig-sty, either in design or construction—few, indeed, can be said to have any design about them at all.

The class of sty usually provided for the pig is placed in a corner of the yard, and consists simply of posts and rails (round saplings usually) for walls, and a few sheets of bark for covering, but no floor. The trough may be either a half hollow log with ends nailed on, or a log mortised out of the solid lying in another part of the yard and half buried in the soil. A pig housed as described cannot give as good results for the feed it consumes as another more comfortably housed, and to the man who is rearing pigs for profit this should be a serious consideration.

Bees—Points for Beginners.

Success or failure is often determined by the method of beginning with bees; and it is well to avoid if possible the purchase of bees in old boxes and the consequent necessity for transferring, which process is itself sufficient to dampen the ardour of one who is unacquainted with the work. There is also the risk of introducing disease. The better way is to purchase outright a hive (or hives) which (unless purchased from a reputable breeder) have been previously examined by an expert to certify their freedom from disease. Consult a text-book and become familiar with the queen, workers and drones, and their life history and functions.

This is a most fascinating study, but it sometimes prompts the too frequent disturbance of the bees, much to their detriment. Guard against this practice, and handle them as little as possible apart from the occasions when they need attention. Allow the bees to swarm once, in order that experience may be gained thereby, and follow closely the text-book methods of preventing "after" swarming. Bear in mind that one strong colony will store a greater surplus of honey than two of medium strength. Study the main sources of the honey flow, and aim at having colonies at their maximum strength before it opens. Remember, that upon the queen depends all that is hopeful in bee-keeping. The Italian strain is prolific, quiet, and an excellent honey-storer. Queens of this strain can be bought and introduced to any hive of bees, following the directions supplied with the cage.

In handling bees, use the smoker judiciously and avoid punishing them unduly. Harshness and hasty motions are quickly detected and resented; hence, all operations should be carried out gently, deliberately, and without fear.

Successful bee-keeping, in effect, is the application of various principles for the purpose of so repressing natural colonising instincts that the bees' entire strength is utilised in the storing of honey. In their efforts to this end it is not surprising that we find among amateur bee-keepers so many keen experimentalists. While this

spirit is to be admired, it is found as a general rule to be carried too far, and much time and energy is wasted in trying out methods and appliances that have long since been weighed and found wanting by experts in the craft.

Something for Nothing.

"Gleams of humour," says a writer in the '*New Zealand Fruitgrower and Apiarist*,' "are sometimes to be found in appreciative letters sent by our correspondents, and we cannot resist mentioning a certain Scot who wrote to us to thank us for sending a supply of Aphelinus, and said that he particularly appreciated it, as he had now achieved his life's ambition, viz., to receive something really worth having for nothing."

Woolly Aphis Parasite from New Zealand—Minister's Act Appreciated.

Thus a writer (Dr. R. J. Tillyard, M.A., D.Sc.) in the "*New Zealand Fruitgrower and Apiarist*" in the course of a reference to the distribution of *Aphelinus Mali*, a parasite of the woolly aphis:—"Good progress has been made with the establishment of the parasite in Queensland during the past year. In Queensland, where apple-growing is confined commercially to an area of about sixty miles by twenty, in the Stanthorpe district (elevation 2,500 to 4,000 feet) the Entomologist-in-charge at Stanthorpe, Mr. Hubert Jarvis, reports most enthusiastically on the results obtained in less than two years, and claims that already the Woolly Aphis is practically under control without any further need of spraying.

"An appreciative letter of thanks has been received from the Minister for Agriculture in the Queensland Government (Hon. W. Forgan Smith), and it is perhaps worthy of note that such a graceful action has come only from a Labour Government."

Blue Mould of Tobacco.

This disease makes its appearance particularly in seasons when the rainfall is excessive. It is due to a fungus, *Peronospora* sp. As in the case of most fungus diseases, a particular relationship must exist between the weather, the plant attacked, and the fungus before the latter can establish itself and spread with rapidity. Blue mould especially attacks young plants in the seed-bed, and if it makes its appearance when the particular relationship above referred to exists, it spreads so rapidly that the whole seed-bed may be damaged in the course of a few days.

The fungus makes its appearance on the *under* surface of the leaves, which appear to be covered with fluff of a faint violet tinge. This fluff consists of fungus threads which come out from the leaf and branch freely, each branch bearing at its extremity a small oval spore; these spores are produced in millions. Another kind of spore (known as an oospore) is produced within the tissues of the host plant. It can remain dormant much longer than the other form of spore, hence old diseased plants should be burnt. The fungus threads travel in the tissues of the young leaf, absorbing nourishment and causing it to wither and rapidly die. Attacked plants early lose their bright green colour, and a practised eye can quickly detect the change.

Methods of control must aim at preventing conditions favourable to the development of the disease. They may be summarised as follows:—

1. Prepare a number of seed-beds, suitably manured, so that the young plants may quickly become established.
2. Sow these beds at intervals of two to three weeks.
3. Do not over-water the young plants; excessive moisture favours the disease.
4. Allow the young plants plenty of air and sunlight. Plants grown under hessian are more liable to develop the disease than those grown under straw.
5. Transplant at the earliest opportunity.
6. If the disease makes its appearance in any one of the beds, pull up and burn the infected plants immediately, and spray the remainder with Bordeaux mixture (2-2-50).—A. and P. Notes, N.S.W. Department of Agriculture.

Sulphur as a Fertiliser.

Experiments have been conducted in two seasons at Yanco Experiment Farm, New South Wales, with sulphur as a top-dressing. A lucerne stand was chosen for the purpose, and applications were made of sulphur only and of sulphur and superphosphate together.

The only definite conclusion that can be arrived at, reports the experimentalist at the farm, is that sulphur alone as a fertiliser for lucerne is a failure. The first season's results seemed to indicate certain possibilities in the use of sulphur and super-

phosphate combined, the comparisons being made with unfertilised plots, but the second season the comparisons were made with plots that had been top-dressed with superphosphate, and the previous season's results were not confirmed. The yields from the sulphur and superphosphate plots showed a slight increase over the checks (which has been top-dressed with superphosphate only), but they had the residual effect of the previous year's top-dressing, and allowing for differences due to local variations in the soil, &c., the increase in the yields of these plots is not commensurate with the extra expenditure incurred, and not consistent enough to warrant the recommendation of the practice of applying sulphur as a top-dressing to lucerne.

To Combat Fungus Attack.

Most diseases of plants are caused by low forms of vegetable life, known as fungi, which live upon and within the tissues of the higher plants. The main difference, other than size, between the fungi and the higher plants is the lack of the green colouring matter so abundant in the higher order of vegetation. The methods of development in the fungi are often different from those of higher plants, and their microscopic size renders their study more difficult. The parasitic fungi spend the winter months mostly within the living and dead vegetable tissues, and during the early spring days send out small spores, which correspond to the seeds of the higher plants. These spores are disseminated by the wind and other agents from plant to plant. With favourable conditions as to moisture and warmth, the spores send out small branches, which penetrate into the living tissues of the higher orders of plants.

By the application of a fungicide to a plant we destroy the spores which found lodgment upon it, and thus prevent the development of additional spores which would cause disease. Just as long as the tissues of plants are covered with a thin, even coating of fungicide, very few fungi can develop upon them. The principal fungicides used are Bordeaux mixture and lime-sulphur.

Instructor's Itinerary.

The following itinerary has been arranged by the Instructor in Pig Raising, Mr. E. J. Shelton:—

Sunday, 4th October.—Leave Brisbane for Maryborough.

Monday, 5th October.—Leave Maryborough for Biggenden, thence per car to Dallarnil; Lantern Lecture, Public Hall, 8 p.m.

Tuesday, 6th October.—10 a.m. State Schools, Dallarnil and Woowoonga. Biggenden: Lantern Lecture, Biggenden State School, 8 p.m.

Wednesday, 7th October.—11 a.m. State School, Biggenden; Coulstoun Lakes: Lantern Lecture, Public Hall, 8 p.m.

Thursday, 8th October.—Degilbo School, 2 p.m.; Lantern Lecture, Public Hall, 8 p.m.

Friday, 9th October.—Gooroolba State School: Lantern Lecture, Public Hall, 8 p.m.

Saturday, 10th October.—Byrnestown: Lantern Lecture, Public Hall, 8 p.m.

Monday, 12th October.—Ban Ban Springs: Lantern Lecture, Public Hall, 8 p.m.

Tuesday, 13th October.—Gayndah: Lantern Lecture, School of Arts, 8 p.m.

Wednesday, 14th October.—Reid's Creek School at 3 p.m.; Lantern Lecture in School, 8 p.m.

Thursday, 15th October.—Binjour Plateau School, 2.30 p.m.: give Lantern Lecture, 8 p.m.

Friday, 16th October.—Gurgeena School, 11 a.m.: Lantern Lecture, 8 p.m.

Saturday, 17th October.—Mundubbera: Lantern Lecture in Shire Hall, 8 p.m.

Monday, 19th October.—Mundubbera district: Lantern Lecture, Upper O'Bil Bil School, 8 p.m.

Tuesday, 20th October.—Eidsvold: Lantern Lecture, Shire Hall, 8 p.m.

Thursday, 22nd October.—State School, Tiaro, 11 a.m.; Lantern Lecture, Public Hall, 8 p.m.

Friday, 23rd October.—Gundiah: address farmers, Public Hall, 11 a.m.; Gundiah School, 2 p.m.; Munna Creek: Lantern Lecture, Public Hall, 8 p.m.

Saturday, 24th October.—Return to Brisbane.

Further particulars in connection with this itinerary may be obtained from the Department of Agriculture and Stock, Brisbane, from Mr. J. Bourke, District Organiser for Local Producers' Associations at Biggenden, and from members of District Council in the districts to be visited.

Staff Changes and Appointments.

Mr. D. McDonald has been appointed Canegrowers' Representative on the Moreton Local Sugar Cane Prices Board, *vice* Mr. D. F. Story, resigned.

Mr. C. B. Buxton, Clerk of Petty Sessions, Mackay, has been appointed Chairman of the Local Boards at Cattle Creek, North Eton, and Racecourse Mills, as from the 17th September, 1925; and Mr. M. Gallagher, Police Magistrate, Mackay, has been appointed Chairman of the Farleigh, Marian, Plane Creek, and Pleystowe Mills' Local Boards, as from the 17th September, 1925, *vice* Mr. F. J. Cherry, Police Magistrate, resigned and transferred from Mackay.

Peanut Board.

An Order in Council has been approved altering the constitution of the Peanut Board in order to provide for representation of the Central District on the Board. For the purposes of the Board, the State is now divided into three districts, as follows:—

District No. 1 (comprising Petty Sessions Districts of Wienholt and Nanango);

District No. 2 (comprising Petty Sessions Districts of St. Lawrence, Rockhampton, Mount Morgan, Wowan, Gladstone, Emerald, and that portion of the Clermont Petty Sessions District situated to the east of Suttor River and Mistake Creek);

District No. 3 (comprising rest of Queensland).

The members have already been elected for District No. 1 for the 1925-26 Board, but nominations are being called for election as growers' representatives for Districts Nos. 2 and 3. One representative is required for each of these districts.

Cheese Board.

The following persons have been appointed to be the Cheese Board until the 30th June, 1927:—

H. T. Anderson, Biddeston; H. Keefer, Pittsworth; D. G. O'Shea, Southbrook; A. G. Tilley, Rose Hill; M. P. Hansen, Maclagan; Representatives of the Growers; and

J. McRobert, Tiaro (Representative of Council of Agriculture).

Oranges and Health—Their Food Value.

In addition to whetting the appetite and quenching thirst, oranges have a special food value. As a matter of actual fact, no other fruit is equal to the lemon or the orange in providing so much nutritive health-giving juice. The organic salts in citrus fruits arouse the appetite and aid digestion by increasing the flow of saliva and gastric juice. They render the blood less alkaline and increase the phosphates in the red blood cells. They are anti-scorbutics, preventing scurvy and other so-called deficiency diseases. They are rich in the life-giving vitamine, so necessary for growth and health. Oranges are of special value in the treatment of anæmia and in convalescence after acute illnesses.

Oranges have established a reputation in the prevention and treatment of influenza and other catarrhal infections, due, no doubt, in a great measure to their effect in building up the general resisting power of the individual.

An interesting experiment in nutrition showing the relative value of oranges *versus* milk in the lunch of school children is recorded from America. Five groups of children, 7 per cent. or more under weight, were induced to eat the school lunch during two periods of eight weeks, and were not influenced by change of home diet. Group 1 was given half a pint of milk and two "crackers." Group 2 was given an orange of medium size and two "crackers." Group 3 was given half a pint of milk and one orange of medium size. Group 4 was given quarter of a pint of orangeade and two "crackers." Group 5 (the control group) was given nothing. The economic status of the homes permitted adequate food in the home.

That a mid-morning lunch was of value in improving underweight children was demonstrated. The supplementary lunch of one orange and two "crackers," as measured by gain in weight, gave better results than milk and orange or milk alone. The percentage in weight gained of all the groups was greater than that made by the controls. The conclusion was that milk, while producing favourable increase in weight, is not the only food valuable for the mid-morning lunch; and that concentrated bottled orange juice appears to be of marked value in stimulating growth in the underweight child, though not equal in value to fresh oranges.

A Reported New Weevil Killer.

A report of a new weevil-killer, said to be safe and 100 per cent. effective in use, which was reprinted from an American paper by an important Queensland newspaper, created interest in the Department and, in view of its importance to the grain grower, further information on the subject was immediately sought. A letter addressed to the United States Department of Agriculture brought a courteous reply from which we quote:—

"The fumigant to which you refer was developed by this Bureau in co-operation with the Bureau of Chemistry. It is made up of a mixture of forty parts of ethyl acetate and sixty parts of carbon tetrachloride. The resulting mixture is similar in nature to carbon disulphid and is used in exactly the same manner. It is recommended by this Department for fumigating thrashed grain in railway box cars or elevator bins. It is not quite as effective as carbon disulphid, but has the advantage of being non-explosive and non-inflammable under ordinary conditions. It has the disadvantage of leaving a distinct odour on fumigated grain. This odour, however, is not carried over into the by-products and does not affect the baking quality of wheat. It is necessary to use this fumigant at the rate of from 40 to 50 lb. per thousand cubic feet of space. The necessity of using such a large amount of the material is one objection to its use in fumigating railway cars of grain. Where carbon disulphid can be safely used, you will find it superior to the new fumigant. The chemicals, ethyl acetate and carbon tetrachloride, may be purchased separately and mixed as desired, or the fumigant may be purchased already mixed."

The Department has since been advised by the manufacturers of the fumigant as follows:—

"Your request to the Department of Agriculture in Washington has been referred to this company. We did manufacture a mixture of ethyl acetate and carbon terachloride, and while it was a very good grain fumigant, we found that the ethyl acetate combined with the oils of the sour wheat and left an odour with the wheat which took a great deal of trouble to eliminate, and in some cases it was not eliminated entirely.

"In view of this, we have discontinued the manufacture and sale of this product. We have no agency in Australia."

How America Does It.

According to the Department of Markets and Migration, Melbourne, arrangements are already well in hand in the United States for the observance of Canned Foods Week in November. This observance is carried out annually and is designed to educate the nation as to the value of canned goods and to popularise their sale. The arrangements for the conduct of the campaign are under the control of a central committee representing canners, brokers, wholesale grocers, retail grocers, and others interested in promoting the sale of canned foods. Local committees will be organised, and they will consist of local grocers and others interested. Seven hundred thousand posters will announce the event. Three hundred thousand of these are suitable for window decoration, and it is intended to make use of one thousand large posters in the subways of New York city and environs alone. Sixty thousand large muslin streamers will be provided for motor trucks and delivery wagons. It is hoped to arrange a demonstration in at least every city in the United States of 10,000 population or over. "Stock Your Pantry," "Rich in Vitamines," and "If it's Canned it's Fresh," are to be the official slogans of the campaign. The California Packing Corporation also intends a new campaign to sell its well known "Del Monte" products, and states that it will deliver over 165,000,000 separate advertising messages—a steady, continuous drive to create sales.

Advertising Citrus Fruits.

According to the Department of Markets and Migration, Melbourne, the California Fruit Growers' Exchange, Los Angeles, had available, in round figures, 900,000 dollars for advertising of the 1923-24 citrus crop. Because of the increased production of citrus fruits in California and Florida, and because of the large fraction of the California orange crop which was undersize, due to unfavourable weather, it was believed necessary to make unusual merchandising inducements. It was important to increase the unit of sale. Oranges in many districts were sold by the peck, and special sales with special prices on odd quantities were conducted. As lemon shipments were 53 per cent. in excess of the preceding year, intensive sales methods had to be employed to dispose of the fruit in the hands of the exchange. An increased quantity of citrus fruit was exported to Honolulu and the Orient, and the shipments to the United Kingdom were three times those of any recent year.

Advertising assessments have been increasing since 1919, as will be noted by the following table:—

Year.	Oranges and Grape Fruit.	Lemons.	Approximate Assessment.
	Cents per Box.	Cents per Box.	Dollars.
1916	2·5	4·0	335,000
1917	2·25	4·0	395,000
1918	2·0	4·0	215,000
1919	2·5	4·0	425,000
1920	2·5	6·0	515,000
1921	3·5	6·0	780,000
1922	3·5	6·0	490,000
1923	4·0	6·5	790,000
1924	4·5	7·0	900,000

The advertising campaign included 53,000,000 copies of full colour-pages in magazines with national circulation, and 175,000,000 insertions in daily newspapers in the United States and Canada. In addition, farm papers were used; also, trade papers, posters, window displays, and special news articles in newspapers and magazines. More than a million especially prepared bulletins for classroom instruction were supplied to schools. The support and co-operation of 3,000 jobbers and 400,000 retailers who handle oranges and lemons were enlisted. During the year the exchange's seventeen service men "personally visited 44,000 retail stores, and, in addition to giving advice and suggestions on fruit sales, placed in store windows 225,000 pieces on Sunkist and Red Ball display material."

Empire Cotton Futures.

According to the "Times Trade Supplement" considerable satisfaction will be felt in Empire cotton circles at the announcement made recently by the Liverpool Cotton Association that it has agreed to adopt a new form of "futures" contract, officially styled "The Empire and Miscellaneous Cotton Delivery Contract." Thus the marketing of Empire cotton will in future enjoy the same facilities as American, and the producers will benefit by the removal of the disadvantages resulting from the fact that banks as a rule will give much larger advances on cotton which can be bought and sold in the freedom of a "futures market." The new facilities will also tend to enhance the popularity of Empire cotton amongst spinners and manufacturers, for, as the President of the Liverpool Association has pointed out, they will provide cotton users with the means of obtaining the necessary safeguards against the risk of price fluctuations. The association hopes that the fact that a "hedge" in the futures market is now provided for growers, and importers of Empire cotton will greatly benefit Empire cotton-growing.

Boosting the Hawaiian Pine—A Tip for Queensland Growers.

According to the Commonwealth Department of Markets and Migration, the Association of Hawaiian Pineapple Canners, San Francisco, is planning a campaign to increase sales. This is to continue unabated throughout the year. Every variety of pineapple is to be featured, and artistically coloured illustrations of dishes in which pineapple may be used are to be widely distributed. One hundred and twenty million separate advertising messages are to be delivered, and these will cover every town and hamlet in the United States.

Answers to Correspondents.

Berk-Tamworth Cross.

H.C. (Manyung)—

The Berkshire-Tamworth cross is regarded as excellent for the purpose of bacon production, and you cannot go wrong in keeping to this type. Mr. Shelton recommends the use of a Berkshire boar crossed on to Tamworth sows, or, in the event of good first cross sows being available, to mate them to an unrelated Berkshire boar; but on the other hand, the Tamworth boar can be used to much advantage if good type Berkshire or Berkshire grade sows are available.

Sick Sow.

J.S. (Comboyne, N.S.W.)—

The Instructor in Pig Raising (M. E. J. Shelton) advises:—

It is apparent that the sow had previously developed a very heavy cold, which, being neglected, developed into pneumonia, which is very difficult to treat. Give several 2 oz. doses of epsom salts in food—doses, say, on Monday, Wednesday, and Friday, of each week, for two weeks. This should tend also to relieve gastric trouble and to improve appetite. Give plenty of clean drinking water, and green lucerne, &c., and compel regular exercise. With care and attention there is no reason why she should not recover.

When making new purchases, isolate them for a period of three weeks before allowing them to mix with your other pigs. In this instance it certainly looks as if the disease has been introduced into the herd by your newly-purchased boar. Sick pigs should be immediately isolated and receive special treatment and attention. Your district Stock Inspector would probably assist you with information and advice. We shall be pleased to hear further from you at a later date. There is something wrong either in the system of feeding or of housing. Why not have your district Stock Inspector investigate the matter for you?

Pneumonia in Pigs.

R.F. (Scone, N.S.W.)—

The Instructor in Pig Raising (Mr. E. J. Shelton) advises:—

At first sight it appears that your pigs have been suffering from a form of contagious pneumonia, probably brought on as a result of continuous wet and cold weather experienced in recent months. Feeding is evidently at fault also, for it would appear that your pigs have suffered also from constipation, the result of consuming too much indigestible fibrous matter. Pigs coming from the stud you name would have been accustomed to being fed on soft, succulent, nourishing foods, such as the refuse from the dining-rooms and kitchen, and waste leaves from vegetable garden, and to concentrated meals such as barley meal and pollard, and it is evident that the change of food and environment has upset the animals since arriving at your farm. You may be overfeeding. Pigs suffer from digestive disorders just the same as human beings, and indigestion and gastric troubles predispose animals to a variety of diseases.

"Currant Bush" *(Leptomeria acida).*

E.R. (Dunwich)—

The Government Botanist (Mr. C. T. White, F.L.S.) advises:—

The specimen forwarded by you with the wild flowers for the Gardens was *Leptomeria acida*, commonly known as "Wild Currants" or "Currant Bush." It is a fairly common shrub along the islands off the coast, particularly Stradbroke Island in Moreton Bay and Fraser Island in Wide Bay. The fruits are eaten raw, but it is not thought they would be of any use for culinary purposes. A peculiarity of the plant is that the finer underground roots attach themselves to the roots of other plants, from which they absorb water and possibly a certain amount of plant food in solution.

Canadian Wonder Beans as Pig Food.

A.H. (Radford)—

It is doubted if you will find any reference to these beans in any list of recommended pig foods. This is not because they are of no value as a pig food, but because commercially they are invariably more valuable for domestic purposes. Of crops of a similar nature Mr. Shelton recommends field peas, sown in conjunction with skinless barley or feed oats or even wheat or cowpeas. Field peas have the advantage that they make ideal green food when the pods have fully formed, the vines being eaten greedily by pigs of all ages. That is not the case with cowpeas, for this plant is of much coarser growth, and the stalk and leaves are comparatively tough and fibrous, and pigs are by no means keen on them, but the pea pods are relished highly, especially when the pods have ripened. The peas also make splendid food for use in combination with maize or other cereals.

Farm and Garden Notes for November.

Field.—Farmers are commencing to realise that quick-maturing wheats which possess a degree of rust resistance are more dependable than the slow-growing and often rust-susceptible kinds, which are gradually giving place to these and mid-season varieties.

Growers are advised to make every preparation to work up the surface of the ground immediately after the removal of their crops, so that the soil may be put into good condition to receive any rain which falls, the conservation of which is the best guarantee for the success of the next succeeding crop. Such initial preparation also encourages the early growth of all foreign and weed seeds, and permits of their eradication by the implements used to produce the desired soil mulch. In such manner paddocks are kept clean and the purity of crops is maintained. The careful preparation of areas intended for maize-planting cannot be too strongly impressed upon growers. Deep and thorough ploughing, followed by cross-ploughing and subsequent cultivation of the soil, must precede sowing if success would be attained; and all efforts must be concentrated to obtain a good surface mulch. Failure to follow up the subsequent sowings by harrowing prior to the appearance of the young plant conduces to weed growths and very often entails, by neglect of this operation, subsequent hand-hoeing between the plants in the drills. Harrowing should be discontinued before the plant breaks through the surface, otherwise damage will accrue to the tender shoots of the young plants. When the young maize plant has hardened up it may, with advantage, be lightly harrowed in the direction of the drills, but such practice must discontinue once the plant has attained a height of 6 inches. Close cultivation by inter-row cultivation implements is necessary after every shower to conserve moisture and to prevent weed growth, care being taken to ensure each cultivation being shallower than the preceding one, and so prevent damage to the root system of the plant, which is extensive. Inter-row cultivation should cease with the advent of the cob on the plant; and, if proper attention has been given to the crop, it should, at this period, be unnecessary. Where crops are planted on the check-row principle, inter-row cultivation is facilitated, and more even crops result.

The French millets (red and white), owing to their rapid maturing qualities, form excellent intermediate or supplementary crops, and are suitable for present sowing. Their value for fodder and seed purposes is worthy of more general recognition at the hands of the average farmer.

Past dry periods have impressed upon us the necessity of providing during good seasons against the return of less favourable ones, and in this connection the cultivation of quick-growth fodder plants appeals to us. Many varieties of useful classes of fodder can be cultivated over a large portion of this State; chief of which, perhaps, are the sorghum family for grain and fodder purposes. Of the latter, Sudan grass has much to commend it, and is fast becoming one of the most favoured by stockowners. Grain sorghums, of which Feterita, Red Kafir, and the various Milos are examples, should occupy a more prominent position for purposes of horse and pig feeding, and are particularly suited to those localities which are unsuitable for maize production. Some varieties of sorghum have strong frost-resisting qualities, and lend themselves to those localities where provision for some form of succulent fodder is necessary during the winter months.

Orchard Notes for November.

THE COASTAL DISTRICTS.

November is somewhat of a slack month for fruit in the coastal districts, as the citrus crop, excepting a few Valencia Late oranges, off-season lemons, and a few limes, is over. Pineapples are also scarce, as the late spring crop is finished, and there are only comparatively few off-season fruits ripening. The main summer crop of fruit in the principal producing districts is only in the flowering stage, though that in the more tropical parts is ready for marketing. It is also a slack month for

bananas, as the summer fruit is not yet fully developed, and the bunches that make their appearance are usually poor. They have been slow in developing on account of the comparatively cool weather of winter and early spring, when the suckers were more or less at a standstill. Young suckers should, however, be making vigorous growth now, and the plantation will require constant attention to prevent the stools being overcrowded with too many suckers. Keep the land well worked and free from weeds of all kinds, as good growth now means good bunches in the autumn and early winter. Where there is a danger of the soil washing badly with heavy rain, rows of Mauritius, velvet, or other suitable beans should be planted at right angles to the fall of the land, as the growth they make will tend to hold the soil and thus save any from being washed away. When planting beans of any kind, either to prevent washing or for green manuring, don't forget to manure them, as thereby you will get a much greater yield, and as none of the manure is removed from the soil, as the crop is allowed to lie and rot on the ground, it is all made use of eventually by the permanent crop.

A good all-round manure for a bean crop is a mixture of 1 cwt. of sulphate of potash and 4 cwt. of basic superphosphate or finely-ground phosphatic rock to the acre, and, if the soil is deficient in lime, a dressing of not less than half a ton to the acre will be found very beneficial, as all leguminous plants require lime to yield their maximum return both of haulm and pulse. The pineapple plantations require to be kept in a state of thorough tilth, and no weeds must on any account be allowed to grow. If blady grass makes its appearance it must be stamped out, as once it gets established in the rows it is only a short time before it takes control, and the plantation is ruined, so that it can only be brought back into profit by taking out the pines, killing the blady grass, and, after thoroughly and deeply working the land, manuring it and replanting.

The planting of pineapples and bananas can be continued throughout the month, taking care to see that the land is properly prepared and that the advice given in previous monthly notes is followed. Young pawpaw plants that have been raised in the seed bed can be set out now, as also can young passion fruit. Citrus orchards require to be well looked after; the ground must be kept in a state of thorough tilth, and if the trees show the slightest sign of distress, owing to lack of moisture in the soil, they must be given a thorough irrigation if water is available for this purpose. The trees should be carefully examined from time to time so as to note when young scale insects of any kind are hatching out, and when this is noted they should be sprayed with a weak emulsion of a miscible oil consisting of one part of oil in forty parts of emulsion, as this is quite strong enough to kill any young scales before they develop their protective covering. As stated in these notes previously, no oil sprays should be used when the trees are suffering from lack of moisture, as they are then likely to do more damage than good to citrus trees. If scale insects are very bad, and it is important that the trees are sprayed, a weak lime-sulphur spray, or even a soap and tobacco or weak resin wash, will kill the young scales as they hatch out. In the earlier districts a keen lookout must be kept for the first appearance of the mites, which are the direct cause of the darkening of the skin of the fruit known as "Maori." The first indication of the trouble is that when the sun is shining on the young fruit, it appears to be covered with a grey dust, and if the fruit is examined with a good lens it will be seen to be covered with large numbers of small yellowish slug-like insects which are living on the skin. Spraying with sodium or potassium sulphide washes, as recommended by the Department, or with a weak solution of lime sulphur, will destroy these insects and prevent the fruit from turning black. Borers of all kinds should be looked for and destroyed wherever found. Water sprouts, if not already removed, should be cut away. Vines will require careful attention, and the vineyard should be kept in a state of thorough cultivation. Spraying for downy mildew and black spot should be continued, if necessary, as well as sulphuring to prevent oidium.

Fruit fly must be systematically fought whenever seen, and special care must be taken to gather and destroy any early ripening peaches or other fruit that may be infested. If this is done systematically by all growers, as provided by the Diseases in Plants Act, there will be many less flies to attack the later crops of mangoes and other fruits.

Leaf-eating insects of all kinds should be systematically fought wherever seen, by spraying with arsenate of lead, and potatoes and tomatoes should be sprayed with a combined spray consisting of Bordeaux or Burgundy mixture and arsenate of lead, so that diseases such as early blight and Irish blight may be prevented and leaf-eating insects, which frequently cause very heavy losses to these crops, be destroyed.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Keep the orchards and vineyards in a thorough state of cultivation, so as to keep down all weed growth and conserve moisture in the soil. This is important, as, if a long spell of dry weather sets in, the crop of summer fruit will suffer severely from the lack of moisture. Citrus trees should be irrigated where necessary, and the land kept in a state of perfect tilth. Spraying for codlin moth should be continued, and all pip fruit trees must be bandaged the beginning of the month; further, the bandages must be examined at frequent intervals and all larvæ contained in them destroyed. The neglect to spray thoroughly and to attend to the bandages properly is responsible for the increase in this serious pest in the Granite Belt, and growers are warned that they must pay more attention to the destruction of this pest if they wish to grow pip fruit profitably. Fruit fly may make its appearance in the cherry crop; if so, every effort should be made to stamp out the infestation at once, as, unless this is done, and if the fly is allowed to breed unchecked, the later ripening crops of plums, peaches, apples, pears, apricots, and Japanese plums are bound to become more or less badly infested. Combined action must be taken to combat this, the most serious pest of the Granite Belt, and growers must realise that, unless they take this action and see that careless growers do not breed the fly wholesale, they will never keep it in check, and it will always be a very heavy tax on their industry. Rutherglen bug is another serious pest in this district, and is propagated by the million by careless orchardists. The best remedy for this pest is to keep the orchard clean and free from weeds. Brown rot in fruit should be watched for carefully, and, on its first appearance in a district, all ripening fruit should be sprayed with the sodium sulphide wash.

All kinds of leaf-eating insects should be kept in check by spraying with arsenate of lead, and all grape vines, potatoes, and tomatoes should be kept sprayed with Bordeaux or Burgundy mixture, the former for black spot and downy mildew, and the latter for early and late (Irish) blight.

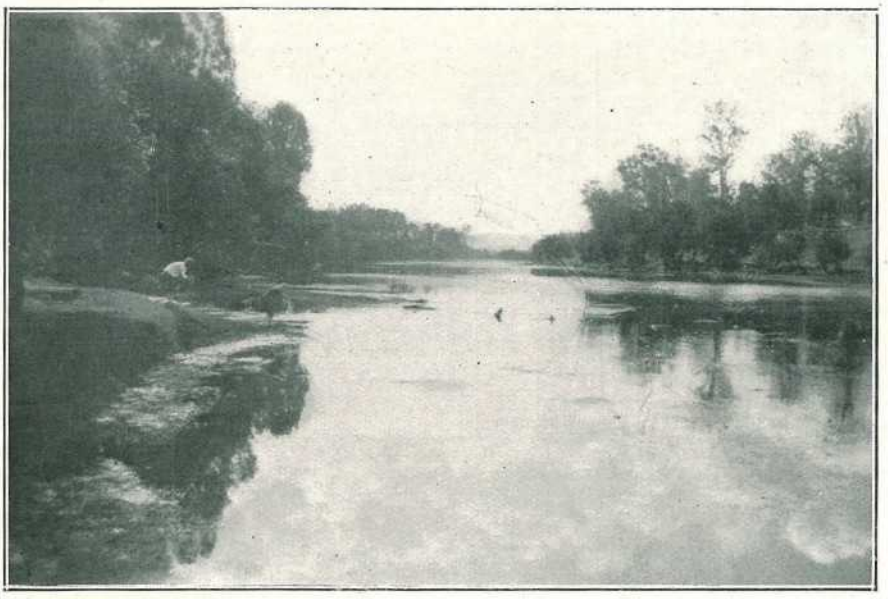

Photo. : O. A. Jones.]

Cloud Shadows on the Upper Brisbane.
Plate 115.

ASTRONOMICAL DATA FOR QUEENSLAND.

Times Computed by D. EGLINTON, F.R.A.S., and A. K. CHAPMAN.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

1925.	September.		October.		Moonrise. Sept.	Moonrise. Oct.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
1	6·7	5·37	5·33	5·51	p.m. 3·51	p.m. 4·49
2	6·6	5·38	5·32	5·52	4·58	5·52
3	6 5	5·38	5·31	5·52	6·4	6·51
4	6·4	5·39	5 30	5·53	7 8	7·52
5	6·3	5·39	5·29	5·53	8·10	8·49
6	6·2	5·40	5·28	5·54	9 9	9·46
7	6·1	5·40	5·27	5·54	10·8	10·42
8	6·0	5·41	5·25	5·55	11·4	11·35
9	5·58	5·41	5 24	5·55	11·59	nil
10	5·57	5·41	5·23	5·56	nil a.m.	a.m. 12·24
11	5·56	5·42	5·22	5·56	12·52	1·12
12	5 55	5·42	5·21	5·57	1·43	1·55
13	5·54	5·43	5·20	5·57	2·31	2·34
14	5·53	5 43	5·19	5·58	3·17	3·13
15	5 52	5·44	5·18	5·58	3·59	3·49
16	5 50	5 44	5·17	5·59	4·38	4·26
17	5·49	5·45	5·16	6·0	5·15	5·0
18	5·48	5·45	5 15	6·0	5·50	5 35
19	5·47	5·46	5·14	6·1	6·26	6·15
20	5·46	5·46	5·13	6·1	7·1	6·55
21	5·45	5·46	5·12	6·2	7·38	7·40
22	5·44	5·47	5·11	6 2	8·15	8·29
23	5·42	5·47	5·10	6·3	8·57	9·26
24	5·41	5·48	5·9	6·4	9·43	10·23
25	5·40	5·48	5·8	6·4	10·34	11·27
26	5·39	5·49	5·8	6·5	11·30 p.m.	p.m. 12·29
27	5·38	5 49	5·7	6·6	12·31	1·32
28	5 37	5·50	5 6	6·6	1·34	2·35
29	5·36	5·50	5 5	6·7	2·39	3·38
30	5·34	5·51	5·4	6 8	3·45	4·37
31	...	...	5·3	6·9	..	5·36

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

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

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

Phases of the Moon, Occultations, &c.

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

3 Sept.	○	Full Moon	5 53 a.m.
10 „	☾	Last Quarter	10 12 a.m.
18 „	●	New Moon	2 12 p.m.
25 „	☽	First Quarter	9 51 p.m.

Perigee, 1st Sept. at 3 54 p.m.
Apogee, 13th „ at 5 12 p.m.
Perigee, 29th „ at 2 48 p.m.

On the 11th September Mercury will be at its greatest distance (about 18 degrees) west of the Sun, rising 44 minutes before the latter. Mars being in conjunction with the Sun on the 13th instant will not be observable during this month. On the 21st, at 3·44 p.m., Venus will apparently be at a distance equal to that of the length of the Southern Cross southwards of the Moon. This should form an interesting daylight spectacle, especially with the aid of a pair of binoculars; good eyes should, however, detect both objects without very much difficulty. Another interesting daylight spectacle will be afforded by Jupiter and the Moon on the 26th, between 5 and 6 p.m., when Jupiter may also be seen a little southward of the Moon without binoculars by persons of keen eyesight. About 8 o'clock on the same evening an occultation by the Moon of a third magnitude star in Saggitarius will occur in Queensland, but not as far South as Sydney.

2 Oct.	○	Full Moon	3 23 p.m.
10 „	☽	Last Quarter	4 34 a.m.
18 „	●	New Moon	4 6 a.m.
25 „	☾	First Quarter	4 38 a.m.

Apogee, 11th October at 11 12 a.m.
Perigee, 25th „ at 10 24 p.m.

On 7th October Mercury will be in conjunction with the sun on the far side of its orbit and invisible until toward the end of the month. On the same day Jupiter will be in quadrature with the sun, and would therefore rise at midday were it not for its greater southern declination making it do so three-quarters of an hour earlier. As the planet Mercury will be in conjunction with the moon on the 18th, Saturn on the 19th, Venus on the 21st, and Jupiter on the 23rd it will be seen that these four planets will extend eastwards at no great distance from one another. Mercury will be apparently in the constellation Virgo, Saturn in Libra, Venus in Scorpio, and Jupiter in Sagittarius. These four planets will follow the sun down to the western horizon in the order shown, and with the exception of Mercury, which will be too near the sun to be visible, will form an interesting spectacle soon after sunset.