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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment.

The Current Issue.

An abridged report of the proceedings of the Ministerial Dairy Council, in the course of which Commonwealth and State functions relating to dairy production and marketing were reviewed, is a leading feature of this issue. Mr. Hubert Jarvis has an informative note on the Queensland Fruit Fly illustrated with an excellent coloured drawing, the work of Mr. I. W. Helmsing. The plate is a fine example of the lithographer's art, and for its reproduction we are indebted to the artist, Mr. A. C. Burrows, of the Government Printing Office. Valuable notes on the Woolly Aphis Parasite and the Codling Moth are also contributed by Mr. Jarvis. Mr. Easterby discusses cane crop prospects, and the regular work of the Bureau of Sugar Experiment Stations is well covered. Mr. Edmund Jarvis's useful hints to canegrowers reached us when this issue was on the press and have been held over for the next issue. Mr. Cyril White adds a note on the Milky Cotton Bush to his valuable series on the weeds of Queensland illustrated by Mr. Helmsing, who has, in addition, two finely drawn plates of recently described Queensland plants. A useful article on creamery butter, in the course of which a striking tribute is paid to the quality of Queensland butter, together with another on the ideal dairy cow, are among the selected features. A banana-packing test for Southern markets is described in a report by Mr. Ellison, junior. Mr. Rumball's subject this month is storage of eggs, while seasonable advice on young judges' competitions at agricultural shows is offered by Mr. Shelton, who also contributes other topical observations on pig raising. Other good features makes the August Journal a very readable number.

Scientific Research.

Pests and diseases levy a tremendous toll on our primary industries. The blowfly alone is responsible for enormous stock losses. The sheep tick costs Australia many thousands of pounds annually, and the cattle tick, though largely under control, is just as expensive, and this applies also to other stock afflictions that either reduce the bank balance or inflate the overdraft. It is satisfactory, therefore, to learn that in placing a quarter of a million of pounds sterling to the credit of the Commonwealth Council of Scientific and Industrial Research, the Federal authorities recognise the need for sound scientific investigation into matters that affect vitally national efficiency and economy. Farmers and graziers will look naturally to the Council to give close and practical attention to their own particular problems of field and run. Modern industrial efficiency demands the attachment of fully staffed and equipped scientific laboratories to manufacturing plants. In the industrial sphere Science has come into its own. In the industries of the soil Science, too, must be regarded as an indispensable co-operator, and the laboratory as an essential adjunct to agriculture and its allied activities. It is, therefore, the duty of the man on the land to see that the needs of his industry on the scientific side are recognised adequately by the Council of Scientific and Industrial Research.

Legislating for the Farmer.

In the course of his speech at the opening of the Twenty-fourth Parliament of Queensland on 28th July, His Excellency the Lieutenant-Governor (Hon. William Lennon) foreshadowed a number of new agricultural measures, including proposals to amend or consolidate the Cotton Industries Acts, the Diseases in Plants Act, the Primary Producers' Organisation Acts, the Primary Products Pools Act, the Primary Producers' Co-operative Associations Act, the Land Act, the Prickly Pear Land Act, to cover the arrangement with the Commonwealth Government under the Federal Aid Roads Scheme, and to submit a Water Bill.

Community Interest in Agriculture—The Governor's Speech.

Community interest in our land industries was further evidenced by the Lieutenant-Governor on the occasion of the opening of Parliament in lengthy references to the condition of agriculture in Queensland generally. The yield of sugar for the year was, he said, the largest ever produced. The total Australian manufacture was 505,000 tons, of which the State of Queensland was responsible for 473,000 tons. This yield was due partly to the season and also to the expansion that had taken place in the industry during the last five years. The area under cane was now over 280,000 acres, cultivated by more than 6,000 growers. The total yield of sugar was in excess of the Australian consumption, and some 200,000 tons were exported at a reduced price. This led to the price for cane being lower than in the immediately preceding years. In addition to the Sugar Board, the Legislature had made provision for the establishment of a Canegrowers' Council to represent the industry. This body was elected by the suppliers to every mill in Queensland, and would give the suppliers control of their own affairs and authority to fix their own levies. During the past year the Tully River mill—the largest sugar-mill in Australia—was completed by the Government and commenced actual operations. The machinery of this mill was almost entirely of Queensland manufacture. Already a flourishing township was in existence, and a large population settled on land which hitherto had been covered with dense tropical jungle. In addition to the expenditure on this mill, a million pounds had been expended during the past five years in increasing the capacity and efficiency of other mills in Queensland. His advisers, he said, had fully realised the importance of the proposals for the establishment of a power alcohol industry in this State, and some time since had entered into an arrangement with the Distillers Company, Limited, the International Sugar and Alcohol Co., Ltd., and the Plane Creek Central Mill, Limited, for the erection of a distillery at Sarina for the manufacture of power alcohol from molasses and starch-bearing plants such as cassava. The erection of the plant at Plane Creek was well under way, and operations were expected to commence about the beginning of next year. Negotiations had also been finalised, it was understood, for the erection of distilleries at Cairns and, later on, at Townsville. Further assistance to canegrowers was being provided by the appointment of pathologists and entomologists to assist in the combating of cane pests and diseases. Students were being trained by the Government at the Queensland University, while others were being trained abroad.

The Dairying Industry.

The dairying industry had made, continued His Excellency, satisfactory progress throughout the State, and the opening for settlement of Crown lands in the Upper Burnett and Dawson Valley would result in the creation of important dairying centres in those districts. Noteworthy advance had been made in modern methods of production, and all butter manufactured within the State was the product of pasteurised cream, while pasteurisation of milk in the cheesemaking industry was being gradually adopted. The adoption of the "Kangaroo" brand for all high-grade butter exported from the Australian States had had a beneficial effect on the prices realised by our butter on the London market. The Hamilton Cold Stores had been put into operation during the present season. The provision made for the storage of dairy products was both beneficial and sanitary, while the facilities for loading from the cold storage rooms into the ships' holds guarded against variation of temperature. When visiting this port, the oversea liners of all shipping companies, without exception, had berthed at the Hamilton wharf. The splendid facilities at the disposal of shipping had been favourably commented on by shipping masters, and it was expected that those facilities will be availed of to a greater extent in the near future by all oversea boats.

Wheat.

The wheat industry, controlled as it was by the growers themselves under the provisions of the Wheat Pool Act, was, he said, showing a healthy development. Modern machinery and appliances were being used, and an increase was noted in the area prepared for cropping. Excellent rains for planting had been experienced this year in the Maranoa district, but elsewhere the falls were rather light.

Cotton.

Referring to cotton, Mr. Lennon said that the season now drawing to a close had unfortunately experienced climatic conditions which, on the whole, must be regarded as the worst since the inauguration of the system of Government guaranteed advances. Not only were the conditions in the spring unfavourable to securing a good strike, but a severely dry period in the latter half of the season had considerably reduced the yields in most sections. Results obtained under such conditions, however, had convinced the farmers that, with proper methods of cultivation, the remarkable drought-resisting qualities of the cotton plant would enable a profitable crop to be obtained when other agricultural crops had failed. The 31st July last marked the termination of the agreement between the Government and the British-Australian Cotton Association. The immediate outcome of that has been the establishment of a Cotton Pool and a Board elected by the growers to administer all matters in connection with the marketing of the Queensland cotton crop. Continuing, the Lieutenant-Governor stated that his advisers had endeavoured to establish the industry on the soundest principles, and at the expiration of the agreement believed that under a proper system of development there was a definite future for cotton-growing in Queensland.

Agricultural Organisation.

The various units under the Agricultural Organisation Scheme continued to function actively. The organisation had been placed on a sectional basis, bodies having been set up for each section of the agricultural industry to deal with problems arising therein. The Government had continued, His Excellency added, to give assistance to marketing boards by means of guarantees for overdrafts obtained from banking institutions, for without that assistance it would have been impossible for the boards in question to have carried out their functions. There was, however, an indication that private financial institutions were beginning to view with favour the financing of Queensland marketing boards on an ordinary business basis and on the security of the product, without State Government guarantees. The Director of the Council of Agriculture had recently made a computation of the gain to producers during the last two years by organised marketing, and assessed the figure at a minimum of half a million pounds sterling.

THE DAIRYING INDUSTRY.

MINISTERIAL COUNCIL DISCUSSES CONDITIONS IN THE COMMONWEALTH.

CULTIVATION AND CONSERVATION OF FODDER CROPS.—TOP-DRESSING OF PASTURES.—HERD TESTING AND IMPROVEMENT.—PROPOSED APPOINTMENT OF FEDERAL SUPERINTENDING OFFICER.—DUPLICATION OF SERVICES CONDEMNED.

On 9th June, at Brisbane, in the course of a break in the proceedings of the Interstate Conference of Ministers for Agriculture, the conditions of the Dairying Industry in the Commonwealth were discussed by the Ministerial Dairy Council. Representatives of the Australian Dairy Council were in attendance and were invited to state their views on matters before the Council. On the motion of Mr. W. Forgan Smith, the Queensland Minister, the Conference affirmed the desirability of the Commonwealth Government assisting Agriculture in general and the Dairying Industry in particular, in the form of a subsidy, grant, or bounty, for approved purposes, through the State Departments of Agriculture, and so avoid unnecessary expenditure and overlapping of the activities of the Federal and State Governments. Subjoined is an abridged report of the proceedings.

MEETING OF THE MINISTERIAL DAIRY COUNCIL.

The Ministerial Dairy Council met in the old Legislative Council chamber, Brisbane, on 9th June. There were present:—Sir Victor Wilson (representing the Commonwealth Government); Hon. W. Forgan Smith, Secretary for Agriculture, Queensland; Hon. T. Butterfield, Secretary for Agriculture, South Australia; Colonel the Hon. M. W. J. Bourchier, Secretary for Agriculture, Victoria; Mr. G. D. Ross, Under Secretary, New South Wales; Hon. M. F. Troy, Secretary for Agriculture, Western Australia.

Sir Victor Wilson was voted to the chair, and in the course of his opening address said that an agenda paper had been prepared on behalf of the Commonwealth, which sought the co-operation of the States to the very best advantage of the dairying industry. The Commonwealth aimed, as far as practicable, for uniformity among the States in respect to financing the trade and the development of the industry, and with that object the conference had been constituted. The Ministerial Conference was set up to follow the various other conferences so that necessary action within the States as well as within the Commonwealth might be taken to give practical effect to any resolutions submitted by organisations interested in dairying. They had been asked to meet a deputation of representatives from the Federal Control Board and members of the Australian Dairy Council. He assured the representatives of the States that the Commonwealth had no ambition whatever to impoverish State departments, but desired greater co-operation so that it might be of greater usefulness to the industry within each State. The first item on the agenda paper affirmed the economic principle of increasing production and the national economic importance of the dairying industry to Australia. They realised the importance of the dairying industry to Australia, and of putting it on a sound footing, with the idea of ensuring those engaged in production a decent standard of living, and producing a commodity satisfactory to the people of Australia, and of a quality to commend itself to purchasers on the world's market.

COMMONWEALTH AND STATE FUNCTIONS.

Mr. W. Forgan Smith (*Queensland*) said that there were principles about which there could be no difference of opinion. He called attention to certain important factors in item three of the agenda under its sub-headings—

(*a*) Fodder production and conservation.
(*b*) Manuring of fodder crops and top-dressing of pastures.
(*c*) Testing of dairy herds.
(*d*) Herd improvement by culling and breeding.
(*e*) Appointment of a superintending officer and the necessary organising and administrative staff.

(*a*), (*b*), (*c*), and (*d*) were matters with which all State departments were dealing. They realised the importance of fodder production and conservation, especially in the matter of eliminating so far as possible the tremendous losses that Australia carries periodically from the effects of abnormally dry seasons. Their difficulty had been that of their not being able to finance a comprehensive scheme that would cope with those difficulties. Queensland had spent a considerable amount of money in this connection and was extending its activities in that direction. The same held good with regard to (*b*)—Manuring of fodder crops and top-dressing of pastures. That was part of the general work of an Agricultural Department to which departmental officers had given attention and were continuing to do so.

The testing of dairy herds was also an extremely important matter, and they had built up an organisation in Queensland which made provision for that, and he was pleased to say that the dairymen of the State were gradually taking more and more advantage of it as time went on, and were having their herds tested and availing themselves of other facilities offered by the Department.

Herd improvement by culling and breeding was also covered by the activities of the State of Queensland; and they had inaugurated a better bull campaign and advanced as a direct grant to the dairy farmer half the cost of a purebred bull with a view to general herd improvement.

The proposed appointment of a superintending officer and the consequential organising and administrative staff brought them to a matter that required very grave and careful consideration by that Conference. That followed on the proposal to set up an all-Australian organisation, and there appeared to be an idea in the minds of the Dairy Council of establishing a staff to give effect to this all-Australian organisation. He thought that he was stating the case fairly when he said that that appeared, briefly, to be the proposal.

They now came to consider the proposal from the viewpoint, not only of the industry, but of the State Governments and of the Australian people. He had set out that practically all of the proposals contained in the agenda paper were at present covered by the ordinary functions of the State Agricultural Departments, to which they were applying increasing enthusiasm each year. He was opposed to superimposing additional organisations on those already established and which were functioning effectively in the several States. If the State Departments were carrying out the functions for which they had been called into being, then there was no need to superimpose any other organisation upon them. The people of the States provided the money for the carrying out of those activities, and it was the people of the States who would also provide the money for carrying on activities of any other official organisation that might be constituted, and consequently they had to guard against having two costs imposed for the same service or two organisations having the same functions to carry out within the Commonwealth. There were definite functions of the State and there were definite functions of the Commonwealth. He believed in co-operation between the Commonwealth and the State in all activities of that kind, but the functions of the respective bodies should be distinctly defined, and there should be no overlapping in any way if it could be avoided.

How the Commonwealth Could Assist.

The Commonwealth could assist in many ways in the direction of instituting research into agricultural problems. There were serious agricultural problems which affected the interests of every State in the Commonwealth. The States had scientific departments applying themselves to those problems, and often there was not that co-ordination in respect to research that was necessary to secure the right results for the whole Commonwealth. In the direction of that scientific research to which he had alluded—in respect to diseases in plants, pests and other factors that affected the interests of the man on the land—the Commonwealth could assist very materially. Again, in regard to agricultural education he believed that a good deal could be done. The various States had inaugurated systems of agricultural education by means of university grants and by means of the establishment of agricultural

colleges. In Queensland they had the Gatton College, and this year they w establishing a Chair of Agriculture at the University. In New South Wales tl also had established very fine institutions for instruction in agriculture. The sa applied generally to each of the other States. Having regard to the means at tl disposal they had done splendid work in that direction. He believed that it v on those lines that the Commonwealth could materially assist the States.

In regard to herd testing and improvement, he reminded the Chairman of fact that three years ago, at the opening of the Sydney Show, the Federal Pri Minister spoke very definitely of the necessity of improving dairy herds. His spe was read by him (Mr. Forgan Smith) with considerable interest and appro Anyone who studied the class of dairy herds in Australia and took into considerat statistics of production could come to only one conclusion—that our dairy he could be greatly improved, and that improvement would be followed naturally increased production.

Those points were well known to all, and the Prime Minister suggested that Commonwealth Government would provide funds to the States with a view to in ducing better herd bulls, and in various other ways assisting the activities of States in that direction. He believed that the Commonwealth and State Gove ments could co-operate in that direction, and agriculture would be benefited in States generally. That benefit, too, would pass on to the people of the Comm wealth. It was his belief that the Commonwealth could secure the best results assisting the several State Departments in the form of bonuses or grants, to expended by the State authorities—the grants to be to agricultural colleges universities in the States, and to be devoted to scientific research in agricult and other activities from which lasting mutual benefit would be derived. He opposed, on behalf of Queensland, to superimposing another organisation for wl the people would have to provide and which would only duplicate functions wl could only be performed properly and adequately by one organisation.

Unnecessary Duplication of Services Condemned.

Mr. BUTTERFIELD (*South Australia*) agreed entirely with Mr. Forgan Sm and it seemed to him that if the Commonwealth were desirous of assisting dairying industry that could best be done by allowing the work of the Agricult Departments in the several States to go on as they were, but with added energy could be given by financial assistance from the Commonwealth Government. work of the officers in the State Agricultural Departments was limited by the fina of the States. They knew what the duplication of departments meant within a St and, with Mr. Forgan Smith, he agreed that there should be no superimposition the Commonwealth Government in regard to the Agricultural Departments of States. That might not be in the mind of the chairman, but the agenda paragr referred to by Mr. Forgan Smith read—

> " . . . . because of the substantial results already achieved in regard universal pasteurisation, and the establishment of the National Bu (Kangaroo), the Australian Dairy Council is the only representative l of an all-Australian character available for the successful developmen this important work."

If they contrasted that with the detail work set out in item three of the agend seemed to him to connote the super-imposition of a duplicate body to carry out v is really detail work that could be better done by the States. Expenditure in nection with agriculture was always and must always be on the increase, but he fe to see that any good could come of a duplication of Commonwealth officers in State and a duplication of expenditure which, of course, was met, as Mr. Forgan Sm well reminded them, by the one set of taxpayers.

Federal Desire for a Working Basis.

The CHAIRMAN (Sir Victor Wilson) remarked that in putting the agenda be the State Ministers on behalf of the Commonwealth he was not fathering it. If dairy organisations concerned had followed the usual procedure they would have and remitted their recommendations to him as the Minister for the time being, that Conference was called for the purpose of considering, as representatives of States and Commonwealth, the proposals of those organisations. It was n Commonwealth agenda. He had put them before them as he had received them the two bodies concerned. They were trying to get a working basis on the lines two Ministers who had spoken had indicated.

Colonel BOURCHIER (*Victoria*) was in accord with the opinions expressed by Forgan Smith. While they all agreed that everything possible should be don improve the conditions of the dairying industry throughout the Commonwealth did not think that the suggestions put forward by the Australian Dairy Co

would assist to a very great extent. The Victorian Government was already doing everything possible to encourage the dairying industry in the way suggested in the agenda items. He deprecated the duplication of services that, in practice, the proposals of the Australian Dairy Council would mean. If greater activity were desired in the Agricultural Departments of the several States, then the Commonwealth could assist with a straight-out grant, allowing the States to spend or utilise that money as they thought most necessary, but to suggest that the Commonwealth should step in and carry out the work which their Agricultural Departments were already doing would be a retrograde step. If every attention were not being given to these matters it would be a different question altogether, but they undoubtedly had in their State departments some of the ablest men in the Commonwealth. (Hear, hear!)

Mr. Troy (*Western Australia*) was of the same opinion. He detailed what had already been accomplished by the Department of Agriculture of Western Australia along the lines laid down in the agenda proposals. They all had ample experience of unsatisfactory duplication of Federal and State services.

The Chairman (Sir Victor Wilson): So far as the Commonwealth Government is concerned, there were no two opinions about the fact that their ambition was to assist and work through the medium of the States. He could assure them that the Commonwealth wanted to work through the States in developing trade and industry. If that Conference could make a concrete proposal as to how the Commonwealth could help financially, he would submit it to his Government. "I admit Queensland has been pushing the interests of the industry very much. I have had a great deal of correspondence with Queensland in regard to it," the Chairman continued, "but we want to treat with the States as a whole and lay down some working basis on which we can give them assistance. I know you are all doing your part, but we are prepared to give that necessary assistance if we can establish a working basis."

Regarding the proposed appointment of a co-ordinating officer, it was very questionable as to whether it would not be better for such an appointment to come under the control of the Bureau of Science and Industry. The Bureau had been reconstructed, and to clearly demonstrate the anxiety of the Commonwealth to obtain the co-operation of the States, it had insisted that the Bureau Council should include one representative from each State, recognising the varied difficulties pertaining within each of the States. The Bureau of Science and Industry would not be fully equipped for doing the work desired unless its activities covered dairying and other primary interests of Australia. He was certain that there would be an officer there who would be in the position of a Federal officer working under the Bureau of Science and Industry; that would largely meet the position as it presented itself to him.

Principles of Government.

Mr. Forgan Smith (*Queensland*) said that they had to remember that they were all Australian citizens as well as citizens of a State, and that the funds expended by both Commonwealth and State Governments were raised by the same people, and the function of Government was to secure the best return from the expenditure of revenues provided by the people. He moved—

> **That this Conference affirms the desirability of the Commonwealth Government rendering assistance to agriculture in general and to the dairying industry in particular; that the assistance should be given in the form of scientific research and/or by means of a subsidy grant or bounty and made available to approved sections of agriculture for approved purposes through the medium of the State Departments of Agriculture, thereby avoiding unnecessary expenditure and overlapping of the activities of Federal and State Governments.**

That motion affirmed a definite principle, with which, apparently, they all agreed. He understood that there was no possibility of any Government agreeing to certain proposals that were contained in the agenda submitted to Ministers for their consideration. He believed that the Australian Dairy Council had done good work, particularly in regard to the establishment of the "Kangaroo" brand and export matters generally. They had justified their existence. They had done excellent work on behalf of the dairying industry. The proposals that were before them were really a recommendation for an extension of the functions of that Council. "Governments often find it of value to establish boards for various purposes, but those who understand and appreciate the principles of responsible government will always see to it that in the constitution of these boards the sovereign powers of the State are retained." That was a sound constitutional principle with which every constitutional authority agreed. If they agreed to the proposals of the Australian Dairy Council, it would mean the setting

up of a board with practical administrative powers, which were the functions of government. He would always oppose the appointment of boards with powers which he believed could only be exercised by responsible Governments. Ministers of Agriculture were responsible to Parliament, and Parliament was responsible to the people, and therefore they should at all times respect that responsibility and retain that sovereign power unimpaired. It was a wrong principle to invest any board with powers, either legislative or administrative, which properly were the functions of the several Ministers of the several Governments of Australia, and that appeared to him to be a fatal objection to the proposals of the Dairy Council. He could understand members of the board who put up the suggestions seeing a number of directions in which their functions could be extended. He could realise that men who were zealous to secure reform may advocate those means of reform which seem to them to lie within the realms of possible accomplishment, but they had overlooked—and Ministers could not overlook—the principles he had enunciated—that those powers were to be reposed only in responsible Governments elected by the people of Australia.

How Departments Grow.

Referring to item "(*e*) Appointment of superintending officer and the necessary organising and administrative staff"—

Mr. Forgan Smith said that he was opposed to duplicating services now performed by the several Commonwealth and State departments. There was no need to establish an office of that kind, nor did they desire to appoint another administrative staff. He knew there was a tendency, once they appointed an officer, for him to have a staff of men about him in a very short period. A British statesman once said that if they appointed an officer in a department and gave him a blotting pad and a packet of stationery and left him to his own resources he would have a big department round about him by the end of the year. They knew that there were things that grew imperceptibly, but still the growth was there. It was quite an easy matter in a department to appoint a responsible officer subject to their control. It was not, he thought, in the interests of good government that some organisation should be able to establish another office with a staff to discharge functions which are now capably discharged by State officers, or who could be detailed for that particular duty. They had already set out what the Conference of Ministers considered to be desirable in connection with agricultural education and extension and in which the Commonwealth could rightly help.

Colonel Bourchier (*Victoria*) seconded the resolution.

Mr. H. Rankin (Chairman of the Australian Dairy Council) and Mr. C. E. D. Meares (Commonwealth Dairy Control Board) were invited to address the Conference on the proposals submitted by their respective organisations and which were embraced in the agenda submitted on their behalf by Sir Victor Wilson.

After further discussion the motion was carried.

OTHER RESOLUTIONS.

Annual Dairy Produce Competitions.

The Conference affirmed the principle of holding annual interstate butter and cheese educational competitive exhibitions under official auspices, the competition to be held, wherever practicable, in each State alternately.

Uniform Grades and Standards.

Mr. Forgan Smith (*Queensland*) moved, with a view of obviating the present confusion and of securing the necessary uniformity of grading throughout Australia, that the following standards be adopted by Commonwealth and State officials:—

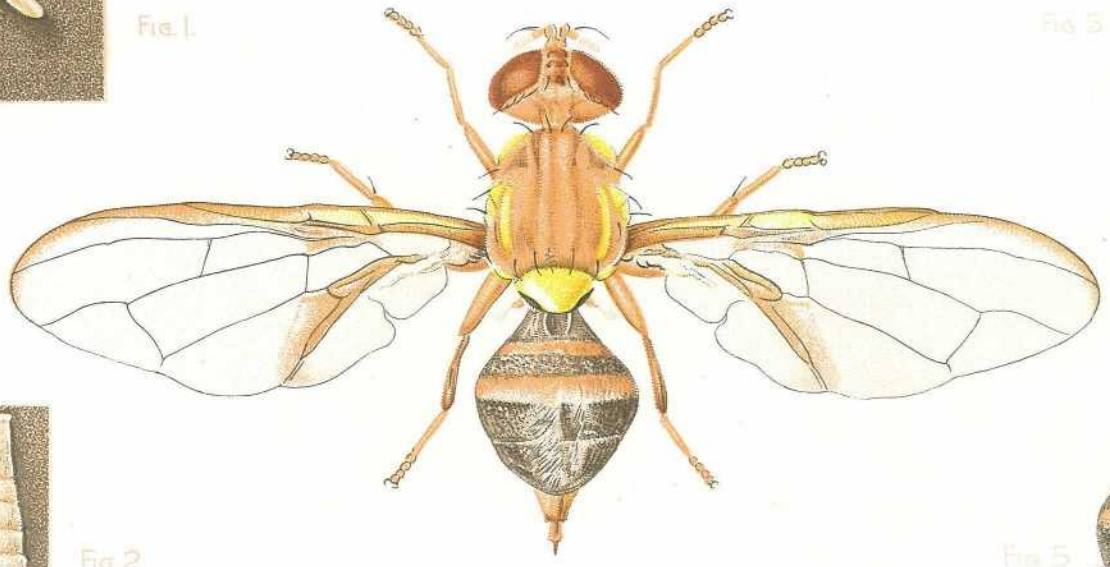
> Butter—Choicest, 92 points and over. First, 89 to 91 points. Seconds, 86 to 88 points. (To be packed under a registered number only and not to carry the name of the State or word "Australia.") Pastry, 85 points and under. (To be firebranded "Pastry," packed under a registered number only, and not to carry the name of the State or word "Australia.") Cheese—Choicest, 92 points and over. Firsts, 89 to 91 points. Seconds, 86 to 88 points. Thirds, 85 points and under.

Colonel Bourchier (*Victoria*) seconded the motion.

Mr. E. Graham (*Queensland*) explained that the proposal was made in the interests of uniformity, and that the standard had been agreed upon by experts and others concerned.

Carried.

After further discussion on relatively minor matters the proceedings terminated.



I. W. Helmsing · 1926.

FIG. 1.—Eggs, enlarged ten diameters.

FIG. 2.—Larva, enlarged five diameters.

FIG. 3.—Puparium, enlarged five diameters.

FIG. 4.—Female Fly, enlarged ten diameters.

FIG. 5.—Abdomen of Male Fly, enlarged ten diameters.

THE QUEENSLAND FRUIT FLY

(*Chaetodacus tryoni* Froggatt).

By HUBERT JARVIS.

Although nearly all fruitgrowers are familiar with the damage to fruit caused by the maggots of the Queensland Fruit Fly, comparatively few are acquainted with the adult fly itself, and this leaflet is written with the object of enabling the orchardist to both recognise the fly and to become acquainted with the best known means of dealing with this notorious fruit pest. The Queensland Fruit Fly was first discovered in 1889 by Mr. Tryon, who at that time very carefully investigated this fruit pest, working out its life history, and suggesting certain measures of control.

Nature of Injury and Economic Importance.

The injury to fruit occasioned by the fruit fly is due to the developing maggot (larva), which, mining in every direction, breaks down the tissue of the fruit, setting up a rot, which soon renders the fruit unfit for market.

In stone fruits, such as peach, nectarine, and plum, the maggots develop more rapidly than in the harder pomaceous fruits, such as apple, pear, and quince.

The economic loss occasioned by this fruit pest is very great, and in one district alone may be estimated at very many thousands of pounds sterling annually.

Fruits Attacked.

The more important fruits attacked by the Queensland Fruit Fly are as follows:—Peach, nectarine, apricot, plum, cherry, apple, pear, quince, citraceous fruits, banana, custard apple, granadilla, mango, papaw, persimmon, passion fruit, fig, and grape. It has also been bred from date, cape gooseberry, walnut, and tomato.

General Description and Life History.

The fly (*see* accompanying plate) is about the size of a large house fly, but is somewhat wasp-like in shape. In colour it is reddish brown, with pale lemon-yellow markings on the thorax or middle part of the body. The eyes in life are dark red shot with purple (resembling an opal); this colour, however, fades in death to a very dark brown.

The Egg (Fig. 1).

The egg of the fruit fly is about one thirty-second of an inch in length, elongated, and tapering at both ends; in general colour it is creamy white.

The eggs are laid by the female fly in the ripening fruit by means of the ovipositor; this is an organ comprising a spear, or puncturing instrument, and a tube through which the eggs are deposited. On

opening the puncture made by the ovipositor, the eggs can readily be seen by means of a pocket lens. The fly usually lays from six to eight eggs in a puncture. The egg-laying capacity of the female has not yet been definitely determined, but, in specimens dissected, from fifty to sixty eggs have been found present in the ovaries. The eggs hatch in about forty-eight hours in warm weather. The fly does not deposit living maggots in the fruit.

The Larva or Maggot (Fig. 2).

The young larva or maggot, on hatching from the egg, at once starts mining and boring into the fruit, breaking down the tissue by means of a very efficient pair of hooked jaws, which are rapidly extruded, and withdrawn, the action resembling that of a pump.

The maggot when full grown attains the length of about half an inch; it is creamy white in colour, and of a slender form tapering from the anal end of the body towards the mouth parts. It possesses the remarkable power of jumping a considerable distance by contracting its body in the form of a loop, and suddenly releasing same.

Under suitable conditions, i.e., a soft fruit and warm temperature, the maggot can reach maturity (become full grown) in from five to seven days. When full grown the maggot leaves the fruit and enters the soil, working its way down to a depth seldom exceeding 2 inches. It then pupates.

The Puparium (Fig. 3).

The puparium resembles a small cylinder in shape, with rounded ends; it is yellowish brown in colour, and about a quarter of an inch in length and just under one-eighth of an inch in diameter; within this puparium is formed the true chrysalis or pupa. The chrysalis stage in summer weather is of about a week's duration, but this period may be protracted in cold weather to many months.

The Adult Fly (Figs. 4, 5).

On emerging from the soil the adult fruit fly crawls up the nearest support and dries its wings, and is ready for flight in an hour or so. About fourteen days must elapse before the newly emerged female fly is ready to deposit eggs. The life cycle of the fruit fly from the egg to the adult insect is approximately about three weeks under summer conditions.

The adult flies feed readily on almost any sweetened liquid, and have been kept alive by the writer on honey and water for a period of four months.

Natural Enemies.

The Queensland Fruit Fly has several enemies, both parasitic and predatory. The true parasites live and operate within the host; they are small wasps belonging to the order Hymenoptera.

Predators, comprising insects of several different orders, prey both on the maggots and also on the adult fruit flies.

The true parasites play the more important part in helping to reduce the numbers of the fruit fly.

True Parasites.

The first parasite of the Queensland Fruit Fly was bred out by Mr. Tryon in 1889. This insect is a small reddish wasp of slender build, and belongs to the family Braconidæ, being known to science as *Opius tryoni* Silvestri. It is about a quarter of an inch in length with an ovipositor measuring from three-sixteenths to one-quarter of an inch in length. It deposits its eggs in the maggots of the fruit fly, and it locates the maggot by repeatedly probing the fruit with its ovipositor. In the native host fruits of the fruit fly, this parasite undoubtedly plays an important part in certain seasons, in helping to control the fruit fly, by destroying a very large percentage of the maggots.

It is also operating against the fruit fly in cultivated fruits, having been bred by the writer from peaches and citraceous fruits.

Dr. T. Bancroft, of Eidsvold, Queensland, has recently succeeded in breeding several new parasites, and some of these, judging by the number reared from maggot-infested fruit, appear to be doing good control work in regard to fruit fly.

Predatory Insects.

Several ground beetles of the family Carabidæ prey on the maggots of the fruit fly as soon as they leave the fruit. These beetles may often be seen running quickly about underneath the fruit trees, and sheltering under leaves, weeds, and rough pieces of soil; they are about half an inch in length, and of a shining bronze colour. They are doing very useful work indeed and should be protected.

Dragon flies (*Odonata*), Robber flies (*Asilidæ*), Mantids (*Mantidæ*), and all spiders are also useful in the orchard, preying as they occasionally do on the adult fruit fly and other insect pests.

Control Measures.

The control measures at present known embrace the following procedures:—(1) The gathering and destruction, by boiling, burying, burning, or drowning of all infested maggoty fruit; (2) the trapping of the adult fruit fly by means of glass fly-traps baited with fruit-fly lures; (3) the spraying of the fruit trees, or a portion of same, with a fly poison combined with some substance attractive to the fly and on which it will feed; (4) the exposure in the trees, in tins or other suitable receptacles, of substances giving off an odour repellent to flies.

The gathering and destruction of all infested fruit is undoubtedly of the utmost importance in controlling the local increase of fruit flies.

Trapping with fruit-fly lure has given encouraging results; thousands of fruit flies can be so trapped and destroyed, thereby reducing to some extent the number of flies present in a certain area.

Poison-bait sprays have also given results that warrant further experiment in this direction, and it is hoped that more definite information as to the usefulness or otherwise of this method of control will be shortly available.

For those wishing to try a poison-bait spray the following formula is supplied:—Molasses, 4 lb.; arsenate of lead, paste form 5 oz., or powder form 2½ oz.; water, 4 gallons. If desired, instead of using

four gallons of water, three gallons of water and one gallon of fruit juice (made by boiling any fairly good waste fruit) may be used. It is claimed by some that by the addition of fruit juice the bait is rendered more attractive to the fly.

Several orchardists using repellents claim to have had good control results.

Summary of Control Measures.

Gather daily all infested fruit and destroy same by boiling, burying, burning, or drowning.

If burying the fruit is chosen as a means of destruction, see that there is eighteen inches at least of soil above the fruit.

Drowning, where this is possible, is a very effective means of destroying the maggots of the fruit fly. An old well or tank can often be used. Fruit when placed in water quickly ferments, thereby destroying all fruit-fly maggots that may be present in such fruit. Fruit-fly maggots cannot live in water more than a very few days.

Burning infested fruit is safe and sure, if carried out properly—i.e., a good ample hot fire made first, and the fruit placed on the fire.

Boiling is also an effective means of dealing with maggot-infested fruit, but the practice of spreading boiled fruit about the orchard is a dangerous one and to be strongly condemned, as such fruit will give off an aroma likely to attract the fruit fly into an orchard where this practice is resorted to.

Clean culture as far as possible is a great help in controlling fruit fly as, in an orchard comparatively clean, fallen fruit can easily be seen and quickly gathered, whereas in an orchard where thick weeds, &c., are present, the gathering of fallen fruit is very difficult, and moreover many individual fruits will be overlooked and remain to breed fruit flies.

Use traps and lure if possible consistently, not forgetting to set traps early in the season—at least three or four weeks before the first fruit is ripe. A few flies caught early in the season are better than hundreds trapped later on.

Set traps on boards if practicable, as better results have been so obtained than by simply hanging the trap on a wire or string. Hang boards (with a wire to each corner) in a good-sized, leafy fruit tree, never in an open tree. Add about one teaspoonful of lure to each trap every twenty-four hours if possible; this will replace evaporation. Clean out the traps once a week and reset.

Traps and lure are obtainable at almost any store in any fruit-growing district in Queensland, but, if difficulty is experienced in procuring either traps or lure, information regarding the same may be obtained by application to the Department of Agriculture and Stock, Brisbane.

Conclusion.

Co-operation is essential if the best results are desired. All orchardists in any particular district where damage from fruit fly is experienced should co-operate in the work of controlling the fruit fly, for nothing is denied to well-directed co-operative effort.

THE WOOLLY APHIS PARASITE.

(*Aphelinus mali* Hald.)

By HUBERT JARVIS.

The woolly aphis parasite, *Aphelinus mali* Hald., is a native of North America, where it has been known since 1859 as a parasite of the woolly aphis (*Eriosoma lanigerum* Hausm.).* It was introduced into New Zealand by Dr. R. J. Tillyard in 1920.

In April, 1923, application was made to Dr. Tillyard for a supply of this parasite for the Stanthorpe district, and in compliance with this request a consignment of parasitized aphids was received in August, 1923.

LIFE HISTORY OF PARASITE.

The Egg.

The female Aphelinus parasite deposits her egg, or eggs, within the body of the woolly aphis; this she accomplishes by stabbing the aphis with her ovipositor and at the same time inserting an egg. Sometimes more than one egg is laid in each aphis,* but not more than one can develop in each individual aphis. Egg-laying is continued throughout the life of the female Aphelinus.* It has been found possible for one female Aphelinus to lay as many as 140 eggs during her life.* Dr. Tillyard mentions sixty eggs as an average number laid by each female.

The Larva (Fig. 1).

The young larva of Aphelinus is slightly elongated; when full grown, however, it fills out, and becomes pear-shaped, and is almost broader than it is long. The larva of the parasite feeds on the internal tissues of its host, and finally completely devours the body contents.

The Pupa or Chrysalis (Fig. 2).

When full grown the larva of Aphelinus transforms to a pupa or chrysalis within the empty hardened shells of the dead woolly aphis, where it is protected from enemies. Here it lies dormant until ready to emerge. The pupal stage appears to be of about ten to twelve days' duration according to the temperature.

The Adult Insect (Fig. 3).

When the adult Aphelinus is ready to emerge, it cuts a circular hole in the shell of the aphis and comes out into the light. On emerging, its first instinct is to feed, and after it has fed mating takes place almost immediately.

The adult is about one twenty-fifth of an inch in length, and not unlike a very minute honey-bee in shape. The female is generally a little larger than the male insect. According to experiments carried out in America by Mr. A. E. Lundie, the adult has been kept alive for forty-two days. Specimens fed on honey and water in the Stanthorpe Insectary lived for twenty-one days, hence the average length of life of the adult Aphelinus appears to be about two or three weeks under Stanthorpe conditions.

* Arnold E. Lundie. Biological Study of *Aphelinus mali* Hald. (Cornell University, Agricultural Experiment Station, Memoir 79.)

Fig 4

Fig 5

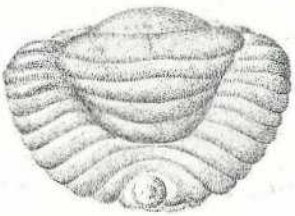


Fig 1

Fig 2

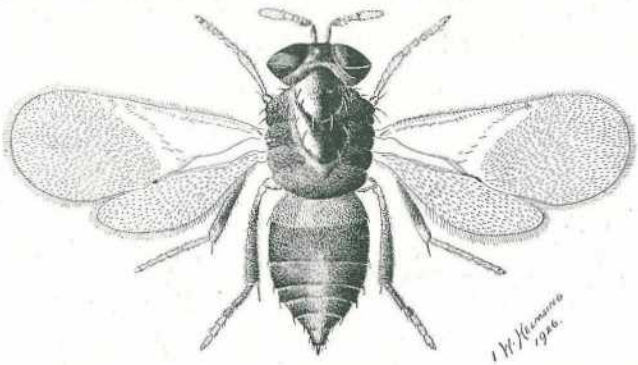


Fig 3

PLATE 23.—THE WOOLY APHIS PARASITE *Aphelinus, mali.*

Fig. 1.—Larva of *Aphelinus mali* × 40.
Fig. 2.—Pupa of *Aphelinus mali* × 40.
Fig. 3.—Imago or adult of *Aphelinus mali* × 30.
Fig. 4.—Twig showing parasitized and unparasitized woolly aphis, all those on the lower colony being parasitized, whereas only a few on the lower edge of the upper colony have been attacked. Natural size.
Fig. 5.—Aphis showing the emergence holes of *Aphelinus mali* × 6.

Duration of Life Cycle.

The period occupied in the development of the Aphelinus, from the egg to the adult insect, is about a month; thus from five to six broods would be possible in the Stanthorpe district during the season.

Appearance of Parasitized Aphids (Fig. 4).

An aphis in which the Aphelinus has deposited its egg soon becomes sick and does not live many days; in some cases parasitized aphids will, after being stung, crawl away from the colony, while others remain stationary. Parasitized aphids soon lose their woolly covering, becoming black and swollen, and at a later stage the circular hole (Fig. 5) through which the parasite has emerged can, on a close inspection, be seen with the naked eye.

Distribution of the Woolly Aphis Parasite in an Orchard.

The parasite can easily be spread throughout an orchard by simply pruning cuttings from a tree on which it is established and distributing these cuttings about the orchard, tying one or two of the cuttings among the branches of suitable trees (i.e., trees exhibiting a good supply of woolly aphis). When once the parasite is established in one or two trees it will soon spread throughout the orchard without any further help.

Effects of Spraying on Aphelinus.

It is not advisable to spray the trees on which it is desired to establish this useful insect parasite, but, when once the Aphelinus is established in an orchard, spraying may be carried on as usual for codling moth, fungus diseases, &c., and the parasite will suffer little harm.

It is advisable to help the parasite by spraying the trees once during the winter for woolly aphis. This will clean up the colonies developed in the autumn after the Aphelinus has ceased to operate. This winter spraying will not seriously hurt the hibernating parasite.

Hibernation.

The woolly aphis parasite passes the winter in a variety of situations encased in the shell of the dead aphis. Some may be found in cracks in the soil, and under stones, leaves, &c.; others remain on the trees on the branches, and under loose bark, &c. The bandages sometimes placed around the trees for codling moth often contain hundreds of parasitized aphids. These bandages, if such are used, and all the prunings from infested trees, should be saved and placed in a cool situation, such as under a house or packing shed, and should be enclosed in a sound box or tin. These prunings, &c., can be placed out in the orchard in the spring, when hundreds of parasites will hatch out and start work on the woolly aphis if this is present.

Earliest Emergence in the Stanthorpe District.

Although an occasional parasite may hatch on a warm day during the winter, the first general hatching in the Stanthorpe district is about the end of August. From this date until the end of April the parasite continues active; should cold frosty weather be experienced towards the end of April it will, however, cease working, and little useful work is accomplished by the Aphelinus after the first frost.

Concluding Remarks.

The woolly aphis parasite has already accomplished very good work in the Stanthorpe district by destroying a large percentage of the woolly aphis, and thereby reducing the number of sprayings usually necessary in order to control that destructive apple pest.

Operating as the parasite does during the fruit season, when the duties of the orchardist are many and insistent, the saving of time and money during this period is especially valuable.

The woolly aphis parasite is steadily multiplying in the Stanthorpe district, and it is only reasonable to conclude that the good work already accomplished by this insect will continue to increase.

SHOULD DAIRY FARMERS READ BOOKS?

There is an old saying that "practice makes perfect," and, true as this may be in relation to many of the arts, he would be a rash man who would say that a lifetime of farming practice perfected the farmer in his forecast of what may happen to-morrow. For that is what the farmer is up against all the time.

He learns from boyhood much that his father has absorbed and much that others who work upon the farm can tell him out of the fount of their experience, he trains his mind to understand, and his muscles to make themselves apt, in the various operations of which farm practice is made up, but the area from which he draws his knowledge is limited, unless in the course of his training he moves from farm to farm, or rather from one farming district to another, in order to reap the knowledge that has grown up from the ripened experience of other men under varying conditions of soil, climate, and established local custom.

Certainly farming covers such a wide area of activities that no young man can learn the whole in the course of a few years, even if he does move about and keep his eyes and ears open. And always there may come a time when an opening occurs, in order to take advantage of which he must turn to departments of farming where he has little actual experience.

He finds that he will have to occupy himself in some feature of stock farming with which he is not familiar, or grow crops that have not before been numbered among those he has been able to study in field practice.

Taking all this into consideration, there is no doubt that nowadays it pays the farmer to train himself to read. We have known scores of men, grown so accustomed to being out in all weathers, tiring themselves with work and supervision in the fresh air to such an extent, that to spend more than a few minutes in glancing at the weekly paper indoors sends them to sleep where they sit. They work hard; they make the most of conditions on the farm as they understand them, but they get to understand new conditions so late that they are often behind the times, and only follow the men who try new ways as soon as they learn sufficiently of them to feel they can put them into profitable practice for themselves.

The use of "artificial" manures took a lot of introducing, but now, within limits, everybody believes in "chemical fertilisers," and many thousands of tons are used every year in this country alone.

The man who thought reading was worth while was first in the field in this advantageous knowledge. He took the earliest opportunity of inquiring into the matter, and of seeing trial plots demonstrating what the new form of manure might be expected to do on his farm. And this is the man who still suffers least from too highly priced manures, because he knows how to buy and check the value of his purchases without waiting to be taught by the chance conversation of other men, or by the hard experience of a bad bargain.

The economical value of purchased cattle foods is also very much a matter for careful consideration, this time based upon a knowledge of the comparative value of food constituents from a scientific point of view, and affords another instance of the value of special knowledge. Standard rations are carefully worked out by agricultural authorities, and the individual farmer should know enough to modify general schemes to his own particular profit, by changing them on sound scientific lines, to suit the convenience of his own food stocks, and the state of the market in relation to what he needs to purchase among the many concentrated foods that are offered him.—"The Dairy."

THE CODLING MOTH.

(Cydia pomonella Linnæus.*)*

By HUBERT JARVIS.

General History and Distribution.

The first occurrence of the codling moth in Australia was recorded in 1883, during which year it made its appearance in South Australia. It was identified in New South Wales in 1887, and in Queensland in 1889. It is now present in every apple-growing centre in the Commonwealth.

In Queensland it has spread with great rapidity during the last twenty years, and the losses due to the codling moth, in apple and pear growing districts, have been very great, and this pest, in the districts mentioned, must be ranked as second only in importance to the notorious fruit fly.

Nature of Injury and Fruits Attacked.

Codling moth injury is directly due to the larva or caterpillar eating its way usually from the calyx end, right into the centre of the fruit, where it finally devours the pips, causing the fruit attacked to ripen prematurely, and to fall from the tree. Such fruit is usually undersized and quite unfit for market.

In Queensland the following fruits are attacked:—Apple, pear, quince, peach, nectarine, and plum; codling moth occurrence in the three latter fruits is, however, rare.

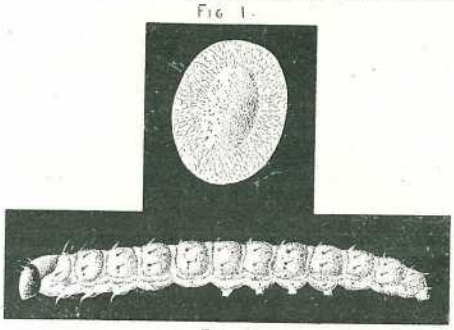
Life History—The Egg (Fig. 1).

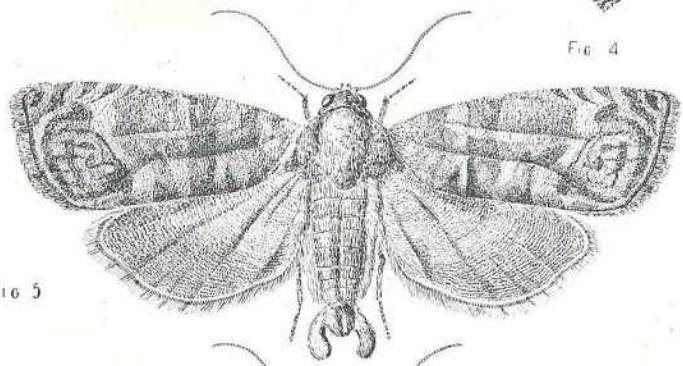
The egg of the codling moth is a tiny pearly-white object, more or less oval in outline when viewed from above; it is about the size of a very small pin's head, and is just discernible to the naked eye. The eggs are laid in a variety of situations; often in or near the calyx, and sometimes on the young fruit and leaves of the tree. The egg usually hatches in about ten days, but the duration of this period is largely governed by temperature.

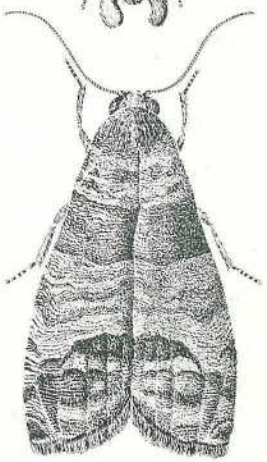
The Larva or Caterpillar (Fig. 2).

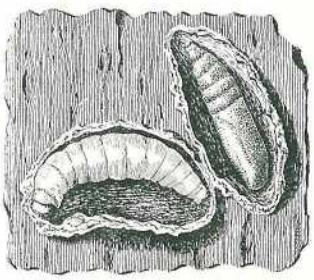
The caterpillar, on hatching from the egg, is about an eighth of an inch in length; when full grown it measures just under three-quarters of an inch. In colour it is creamy white, shaded with pink; this latter colour is more noticeable in the older caterpillars.

The newly hatched larva either makes its way into the calyx, or burrows beneath the skin of the fruit, where it eats out a small cavity, stopping the entrance with excreted particles or frass webbed together with silk. When the young grubs perish, as they often do, without causing any further damage, the small injuries inflicted by them are known as stings. The most common point of entrance in the apple is at the calyx, or flower end; sometimes, however, the larva enters from the stem end, and often, in the later broods, directly from the side of the









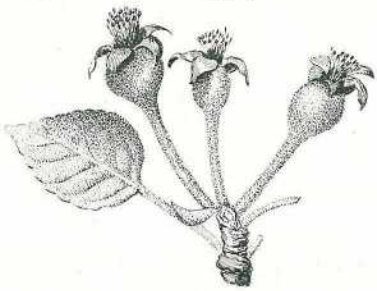


PLATE 24.—THE CODLING MOTH (*Cydia pomonella Linnæus*).

Fig. 1.—Egg of codling moth × 15.
Fig. 2.—Larva × 4.
Fig. 3.—Larva and pupa in silken cocoons × 2.
Fig. 4.—Pupa × 4.
Fig. 5.—Moth or imago with wings spread × 5.
Fig. 6.—Moth or imago with wings folded × 5.
Fig. 7.—Correct time for first spray.

fruit. The excreted matter passed by the caterpillar during its progress is pushed behind it, and it can usually be seen in the form of a brown coarse dust, projecting from and blocking the mouth of the tunnel.

The larval period usually occupies about twenty days. When full grown the larva leaves the fruit by an exit tunnel, which it bores for the purpose; it then crawls underneath any convenient shelter in the orchard, such as a piece of loose bark, or into a fissure formed by the intersection of two branches, or in fact in any suitable hole, crack, or crevice which it can find, either on the tree or near to it. It then spins a tough silken cocoon (Fig. 3) inside which it turns to the chrysalis or pupa.

In the packing sheds the codling moth cocoons may be looked for in any cracks in the walls, floor, or packing bench, or in the corners of any old stored cases; they are somewhat difficult to see owing to the grub's habit of weaving little pieces of chewed wood fibre into the silken cocoon, thus matching closely their surroundings.

The Pupa (Fig. 4).

The chrysalis or pupa of the codling moth is about five-eighths of an inch in length and one-eighth of an inch in diameter; it is of a shining brown colour. The empty pupal cases may often be seen protruding from the cocoons on the trees in the orchard. The average pupal period is of about ten or twelve days' duration, but this period also is very variable.

The Imago (Figs. 5 and 6).

The codling moth measures about three-quarters of an inch across the expanded wings (Fig. 5); it is of a rich chocolate-grey colour, with a beautiful oval patch of copper-coloured metallic scales at the tip of each fore wing; the hind wings are lighter in colour, and are finely fringed at the edges.

When at rest (Fig. 6) the moth folds its wings closely across the body, and is thus quite inconspicuous. The moths will feed on almost any slightly sweetened liquid, and the average life of the moth is about fifteen days.

The female is usually ready to oviposit about four or five days after emergence. The average number of eggs laid by each female is about forty, but the number varies greatly.

The number of broods possible during one season is governed by altitude and temperature; in some countries only two broods are recorded, but during the normal Queensland summer three broods are possible. The average life cycle, or period of development from the egg to the moth, varies from five to eight weeks.

Codling moths may often be seen flying in the orchard in the day time, but they are more active just at dusk, at which time oviposition usually takes place. More moths seem to emerge from the cocoons in the afternoon than at any other time of the day; they do not travel far, and those bred in the orchard would probably remain there. They are, however, capable of flying half a mile or more, and may, of course, be carried by strong winds to a considerable distance.

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Over-wintering.

The codling moth passes the winter in the larval or caterpillar stage; practically all the last brood larvæ overwinter in this way. Towards spring they assume the chrysalis form, and in due course the moths emerge in time for the first blossoming apples.

Control Measures—Spraying.

Happily the codling moth can be to a great extent controlled by efficient spraying, combined with strict cleanliness in all orchards, storehouses, and packing sheds. The fact has been demonstrated in almost every country where the pest occurs.

At least four sprayings with arsenate of lead are necessary in order to effectively control codling moth. The calyx or first spray should never be omitted, and it should be followed by three cover sprayings at intervals of from two to three weeks. The calyx spray should be applied as soon as the petals have fallen, before the calyx is closed (Fig. 7). The poison can then be driven well into the calyx cups, through which the majority of young codling moth larvæ enter. A thorough spraying at this time is of the utmost importance in controlling the pest.

The second spray should be applied about fourteen days after the calyx spray; the young apples are then well formed, and by covering them with the poison they are protected against the attack of the caterpillars which are daily hatching from the eggs laid by the early brood moths. A third spray should be applied about three weeks after the second spray, and a fourth spray is recommended about three weeks later. In America as many as six sprays are used in codling moth control. Where possible a power spray should be used, at a sufficient pressure to form a mist-like spray. The amount of pressure required will, of course, vary with the type of outfit used.

Some authorities recommend the addition of a spreader to the codling moth spray; arsenate of lead and water when mixed alone tend to separate into droplets, but this defect is overcome by the addition to the mixture of a spreader which makes it possible to distribute an even surface of poison.

The most satisfactory spreader to use is calcium casenate; this product is put on the market in convenient tins and can be purchased at reasonable cost. It is already used extensively in Australia by many orchardists. A 1-lb. tin of calcium casenate is sufficient for about 100 gallons of spray fluid.

Arsenate of lead either in paste or powder form is the best poison to use for the control of codling moth; any well-known brand should be purchased and used at the strength of—Powder form, 1 lb. to 50 gallons, or paste form, 2 lb. to 50 gallons. The spreader may be added to the spray during the mixing or when mixed.

Paste arsenate of lead should be first mixed with water to the consistency of thin cream before being added to the spray; powder arsenate of lead may be sprinkled into the tank through a muslin bag or a fine sieve while the tank is being filled. The spray mixture should be kept thoroughly stirred during application; this is accomplished in most spraying outfits by means of a paddle or mixer worked from the engine.

Other Control Measures.

The importance of cleaning up and destroying all codling moth infested fruit in the orchard cannot be too greatly emphasized. Packing sheds and storehouses should also be thoroughly inspected and cleaned up in the autumn; the cracks between floor boards and in packing benches should be carefully examined and treated with boiling soapy water into which also all stored and returned fruit cases, if such are used, should be immersed. Apple-trees having loose bark should be scraped with an old piece of hoop-iron or similar implement, and any holes, cavities, &c., likely to harbour codling moth grubs should be stopped with putty or a good sticky clay. Bandaging trees, although not now resorted to as much as formerly, is a very good way of trapping the caterpillars, and, provided that the bandages are examined periodically and the grubs destroyed, bandaging is a method of control well worth while. Bandages should be in place in the Stanthorpe district about the end of October; they should be of good strong cloth a foot wide folded lengthwise to six inches, and placed right around the tree with the folded edge uppermost; they can be kept in position with one nail placed at the upper edge, which should fit tightly to the tree, allowing the bandage to hang loosely at the bottom. Bandages should be examined once a fortnight.

Systematic thinning of the fruit is also of great importance; codling moth larvæ will enter sometimes where apples touch; this cannot of course always be avoided, but a heavy crop of undersized fruit is a danger, and is the best possible breeding ground for codling moth; it is also more difficult to spray such fruit than it is a rightly thinned crop.

Trapping the moths by means of a lure is now being tried in New Zealand and other countries, and so far encouraging results have been obtained. Experiments with codling moth lure will be carried out in the Stanthorpe district during the coming season 1926-7.

Dual or Combined Spraying.

If it is desired a combined spray can be used; either atomic sulphur or sulphate of iron can be mixed with the arsenate of lead, thus making the spray effective both for codling moth and powdery mildew of the apple. Atomic sulphur should be used at the strength of 10 lb. of atomic sulphur to 100 gallons of the arsenate of lead spray; if sulphate of iron is used, 6 lb. of the sulphate of iron to 100 gallons of the arsenate of lead spray is the correct quantity.

Concluding Remarks.

Use a good brand of arsenate of lead at the strength recommended; excess of poison, besides being wasteful, will result in spotting of fruit; a similar result will follow spraying too late in the season.

Never omit the calyx spray, and spray the fruit thoroughly from two sides both inside and outside the tree; the leaves need not be covered at all. Realise that neglected orchards are a danger to neighbouring clean orchards.

Finally, remember that co-operation is essential if the fullest measure of success is to be achieved in the control of this very serious pest.

Bureau of Sugar Experiment Stations.

CANE CROP PROSPECTS.

The Director of Sugar Experiment Stations, Mr. H. T. Easterby, who has returned from an extended visit to most of the sugar-cane areas, from Bundaberg north, states that the dry season experienced has to a large extent cut down the estimates formed early in the year. Practically every sugar-mill in the State has reduced its estimate, some of them quite considerably. While it is still expected there will be a surplus, it will not be large, and the price paid to growers and millers should be much better than last year owing to smaller export. An estimate of this year's crop will be issued shortly.

Bundaberg cane was a good deal backward, but a heavy fall of rain in this district, followed by warm, sunny weather, has improved the outlook to some small extent, though the crops will be on the light side.

At Mackay there is a very fair crop, but not so good as that of last year. At Plane Creek the foundations for the new power alcohol distillery are well under way. Storage tanks to hold approximately 1,250,000 gallons of molasses have been completed. The estimated cost of the distillery is about £35,000, and the factory will cover about 1½ acres. There are to be five open molasses vats and three closed vats for fermenting cassava starch. Steam will be supplied by the Plane Creek sugar mill. It is proposed to use both mill molasses and the cassava roots in the manufacture of power alcohol. Cassava was seen growing in several parts of the Plane Creek district, and has made good progress. It is hoped that the distillery will be ready for operations about December. This, the first power alcohol plant in Queensland, will be watched for results with the utmost interest by all interested in sugar growing. Messrs. Barbat and Sons, of Ipswich, are erecting the plant. It is proposed to follow this by the erection of another plant to treat molasses in the Cairns district.

The Marian mill management at Mackay has made extensive additions and alterations to plant. These include a new steel building for the crushing-house and three new mills, 6 feet by 35 inches, with independent drives. The mills were made by Fletcher and Co., of Great Britain. A new 20-ton Calandria pan with 1,800 square feet of heating surface has been installed. This is 12 feet in diameter. The syrup capacity has been increased by 7,000 gallons. Two travelling gantries have been constructed, also new superheater, additional fugals, and 3 feet 6 inch loop line in yard. An additional Wolverhampton boiler, with 6,000 square feet of heating surface, new chimney, Ingersoll Rand pump, crystalliser, new locomotive shed, and extension of heavy rail tramlines are also included in the improvements.

Proserpine has also suffered this year, and a large quantity of cane has been affected by the drying up of the foliage. The new cane area at Banana Pocket looked well, and some exceptionally fine Badila cane was inspected. Many improvements have been carried out at the mill, including a new pan, set of effets, and new Babcock boiler. Recent additions have cost in the vicinity of £40,000.

Very little cane is now being grown at Bowen for the Proserpine mill, the irrigation facilities being on too small a scale; dry weather, too, has seriously interfered with prospects.

At Home Hill some remarkably good cane was seen where irrigation had been constantly employed; other patches that had no water were dying. On the whole, however, there should be a good crop for the Inkerman mill. The irrigation scheme is working satisfactorily, and farmers are receiving much benefit from it.

The Lower Burdekin was very dry, and non-irrigated cane looks nearly as backward and dried up as it did in 1915. Irrigated cane is much better, but even this is not so far forward as is usual. Another noticeable feature is the small amount of young plant cane visible. This time last year large areas of beautiful young cane were seen. The quantity of pumping done this year has been enormous, and irrigation plants have been kept going almost continuously. Poor cane is being used as fodder for sheep which have been brought in from the West.

Kalamia mill has recently added four crushing mills to its plant (5 feet by 30 inches) to supplement its previous four sets of 4 feet 6 inches by 30 inches. These have been grooved according to latest practice. A new superheater and subsider have been installed; two new Babcock boilers have been erected, together with a new set of quadruple effets, adding 7,500 square feet of heating surface as well as new boiler feed pump, new condenser, and five new fugals. Six miles of 3 feet 6 inch tramline have been converted to 2 feet, and a 3 feet 6 inch line for haulage of sugar built from mill to North Coast Railway. A new spray system is being constructed for cooling, and new chimney stack 100 feet by 6 feet 6 inches. A new sugar store has been erected of 3,500 tons capacity, and 200 new cane trucks provided. Altogether, over £100,000 has been spent in improvements in the course of the past twelve months.

South Johnstone and Goondi cane areas are also backward when compared with last season, but the cane shows a great improvement nevertheless on most of the Southern areas. The cane in the new Tully areas is also backward this year. Grubs are doing damage on the Daradgee lands.

At Babinda the effect of grubs is not so marked as in previous years. There is a fair crop this year, and the mill expects to crush up till about the end of the year. Hambledon mill, near Cairns, has a very fine crop, and so has Mulgrave. Both mills were crushing smoothly. The new area at the Little Mulgrave is a fine piece of cane country on the way to the new Range road, and some remarkably good Badila cane was seen on this land.

Highly successful Field Days were held at the Sugar Experiment Stations of Bundaberg, Mackay, and South Johnstone. The attendance at the Mackay Station constituted a record, there being 600 growers present. At Bundaberg the Principal of the Gatton Agricultural College, Mr. Murray, delivered a highly interesting address on tractor costs, while at Mackay Mr. John Reid, editor of the "*Queensland Agricultural Journa*'," gave a special address to farmers on agricultural education and publicity work, which was listened to with the greatest attention.

CANE PESTS AND DISEASES.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received from Mr. N. L. Kelly, Assistant to Pathologist, the following report (21st July, 1926):—

Mackay Areas.

The majority of farmers in this district are showing considerable interest in disease control, with the result that the incidence of disease is very slight and scattered, with the exception of Red Rot, which will probably be as serious as in 1925.

Mosaic was noted in about 2 per cent. of the farms visited, being perhaps more in evidence around Farleigh, though North Eton and Sarina are not entirely free. In the Mackay district the main spread seems to take place in the planting, secondary infection through corn aphides being important only where corn or Shahjahanpur 10 or the grasses which harbour the aphis abound. Control measures have been elaborated in a previous report.

Gumming disease does not show in the leaf except in vigorously growing stools or those that have lately been growing well, hence an effective survey would be unsuccessful during the present drought. It was observed near Dumbleton and at Lindley Creek, Sarina, in D. 1135 only, also at the Sugar Experiment Station. Eradication, avoidance of knife infection—sterilise knives in hot water after cutting an infected crop—and careful selection of seed should eliminate the disease from the Mackay district.

Red Rot was most widely distributed, though nowhere had it reached serious dimensions as yet—July. At Plane Creek it was found in M. 189, M. 1900, Q. 813, and H.Q. 426. Around Mackay M. 1900 was by far the most seriously damaged. The disease is secondary to bad growing conditions, wherein the cane reaches maturity some time before harvesting. If dry conditions continue the resistance of the stool is weakened, and the comparatively weak parasitic fungus attacks the cane, entering probably through a split rind or artificial wound. The fungus *Colletotrichum falcatum* abounds everywhere, but appears to be more troublesome in acid soils.

Control.—

1. Do not plant infected sets, though in very favourable conditions the shoots may resist infection.

2. It may bring relief to plant a little later, cultivate longer, and harvest earlier.

3. Restore alkalinity, humus, and texture of the soils by applying lime and green manure.

It is a pity to abandon the useful M. 1900 without a trial of these measures.

The Cane-killing Weed.—This weed was found in various localities, mainly on new forest land, and causing comparatively small damage. The weed, a Striga species, belongs to the family Scrophulariaceae (to which also the snapdragon belongs). Under natural conditions it probably parasitises a grass, for unless its root pierces the root of another plant it dies, as it cannot take in sufficient liquid food to keep itself alive for long. It is a prolific seeder, but careful preparation of the land induces the seeds to shoot, and, in the absence of a host plant, to die off. Affected canes are usually considerably stunted, with leaves narrowed and unhealthily pale in colour. The more or less square-stemmed weed can be found near the base—usually dead at this time of the year.

FIELD REPORTS.

The following field reports have been received by the Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby:—

The Southern Field Assistant, Mr. J. C. Murray, reports (20th July, 1926):—

Coolum.

Seasonal conditions have been favourable for growth. Growers here have the best cane in the Southern District this year. Q. 813 has made extraordinary growth. N.G. 15 has also done well; Q. 970 is making a good showing. Growers are gradually overcoming drainage difficulties. Growers are recommended to experiment with fertilisers with the object of obtaining definite data. There is abundant humus in these soils, but humus alone is not sufficient.

A farmer would be wise to keep in view the following laws:—

(1) A soil can be termed fertile only when it contains all the materials requisite for the nutrition of plants in the required quantity and in proper form.

(2) With every crop a portion of these ingredients is removed.

(3) The essential plant foods, therefore, must be replaced.

An analysis of a soil typical to Coolum shows:—Humus, 8·99, very good; nitrogen, ·465, good; readily available phosphoric acid, ·0091, low; readily available potash, ·0095, fair.

The most important effect of drainage is that it makes the soil warmer. A wet soil is cold, chiefly because the water in it is constantly evaporating, and evaporation is a cooling process. Moreover, water is a poor conductor of heat; wet soils warm in the sun slowly because the water they contain holds down the temperature. Warmth is one of the chief essentials for the germination and growth of cane; it is the coldness of a poorly drained soil more than the mere excess of water it contains that is responsible for most of the unsatisfactory growth of crops on it.

Maroochy River.

There are some very good crops of cane in this area. Q. 813 has made the best showing; in fact, when this variety is planted the chances of getting a good harvest are excellent. Growers are recommended not to cut this cane too early in the season. If they do a shy ratoon is to be expected. Wait, if possible, until after the middle of September.

There is a popular idea that Q. 813 is resistant to Mosaic disease. On the contrary, while Mosaic is not frequently seen in Q. 813 it is most susceptible to injury. On this account this disease is very readily recognised in this variety. The important thing is to get rid of Mosaic altogether, and, owing to its remarkable effect on Q. 813, its recognition and consequent elimination is comparatively easy. Other varieties of cane doing well are H. 227 and Pompey. The latter was introduced by the writer some time ago from the Childers district, and is making a good showing. The Hawaiian variety is also doing well and improving as time goes on.

Many writers deprecate the value of bringing a number of varieties into a district, but where organised experiments cannot be carried out the next best thing is for the farmers to conduct local experiments. The value of this is amply demonstrated in this area. Since 1918 the Bureau has been experimenting through local farmers, with the result that as soon as staple canes showed signs of deterioration the Bureau was able to indicate a further group of useful canes, including Q. 813, Q. 970, and H. 227.

Yandina.

Cold checked growth in this area. Some very fine crops are in evidence, however, particularly round Bridge's. The majority of the growers are not going in exclusively for cane, but are also cropping legumes and turnips. Varieties doing well in this area are H.Q. 285, Q. 813, M. 1900 Seedling, and D. 1135. B. 208 is also making a good showing. This cane is very susceptible to Mosaic, but it has a very high sugar content. Farmers growing B. 208 should take great care in plant selection.

Cooroy.

At one time quite a lot of cane was grown in this district, but at present farmers find other pursuits more profitable. Only very small areas are now in existence. Standing crops, however, look well, and if farmers continue to plant they could profitably use more M. 1900 Seedling. This cane has a peculiar liking for high, well-drained, volcanic soils and is a profitable variety when it can be grown.

The Northern Field Assistant, Mr. E. H. Osborn, reports (22*nd July*, 1926):—

Lower Burdekin.

Rainfall records since last October:—

	Ayr. Inches.	Home Hill. Inches.	Giru. Inches.
October	—	—	—
November	·27	·30	·6
December	1·22	·30	2·03
January	1·42	2·11	3·95
February	8·11	6·38	7·82
March	1·60	1·18	3·42
April	—	—	—
May	—	—	·20
June	—	—	·14
	12·62	10·27	17·62

These figures indicate the abnormal dryness of the season.

Plate 25.—Plant E.K. 28, thirteen months old, Grown at Burke Bros., Drynie (Ayr).

Home Hill.

The township is still making progress. Crops were very patchy. Inkerman had just started crushing and reported that a lot of last season's stand-over was fluctuating very much in quality, some of the B. 208 and Giru being very inferior. Plant Badila was, however, very fair, but nearly all the cane was weighing light.

Ayr.

Practically the same conditions were prevailing upon the northern side of the river as in the Home Hill areas, and the available cane for harvesting this year will fall a long way below last season's bountiful crop. Continuous irrigation had been

carried out by growers who had cane to cut. Several paddocks where no water had been spared were only passable, and its condition suggests that, however helpful irrigation may be, it fails to give the best results without at least moderately good weather conditions.

Varieties.—The cane that has shown up to best advantage this year is E.K. 28. Among the many good blocks seen, a 6-acre thirteen months plant crop belonging to Messrs. Burke Bros., near Pioneer, was excellent. It will probably cut from 55 to 60 tons per acre, and is standing well up. It has certainly had plenty of water, but so has the adjoining Badila. (See illustrations.)

B. 208 has not given its usually good returns this year; it does not seem to be a cane that will stand too much adverse weather.

H.Q. 426 (Clark's Seedling) is also below its usual standard here this year, and M. 1900 was only medium.

N.G. 15 Badila is a very good cane, and, considering the season, some wonderfully fine crops were observed.

Q. 813, being a very shallow rooter, does not do too well under very dry conditions.

Diseases.—It is rather hard to differentiate between loss caused by disease and abnormal dryness in a year like the present one. Leaf Stripe to a rather larger extent than usual was noticed in plant B. 208. In one case the plant crop was noticed to be infected to a slight extent some eighteen months ago, and was pointed out to the grower with reference to his using seed from the same block, but as one corner of the paddock seemed quite clean the owner took the risk of using some for plants, after very careful selection. The resultant crop, however, is now very heavily infected, and a serious loss in tonnage is inevitable. His best plan now is to plough out as soon after harvesting as possible, clean, fallow, or plant leguminous crops after having quite killed the last vestige of cane in the block, and subsequently plant with a resistant variety such as Q. 813 ten or twelve months after.

Mosaic was noticed in H.Q. 426 and a few stools of Badila had suffered from Top Rot on the Home Hill and also on the Ayr side.

Giru.

Here the dry conditions were also very marked, more especially as Giru is not blessed with such a splendid underground water supply as Ayr and Home Hill. There are several farms with a very fine supply of open water to draw from, and where this has been taken full advantage of the cane has responded; but in nearly all cases the crops are a long way below last year's; the total quantity expected being about 30,000 tons, against 78,000 tons for last season.

Very little planting had been possible, although a good deal of ground was in course of preparation. The prospects for 1927 are anything but good.

Varieties.—Cane that shows up to greatest advantage during the present dry time is E.K. 28, and if it carries as good a density in general as it does in odd places then its popularity is assured. In several places some young cane of this variety was seen growing, and seemed to have struck well.

Diseases.—Mosaic was noticed in B. 208, first ratoon, about a mile away from two farms on which it was noticed some eighteen months ago, also in B. 208. Now it is learned that all these plants came from the same place. This again shows the absolute necessity of careful seed selection.

The Northern Field Assistant, Mr. A. P. Gibson, reports (21*st July*, 1926):—

Cairns.

Improvements.—Extraordinary progress continues in Cairns and surroundings. New and more modern buildings are being constructed. Extensive road improvements are under way, the more general use of motors is speeding up the necessary work. Great quantities of sugar are coming in by rail and hurried South on more spacious freighters. The town has been wisely planned, and is destined to become one of magnitude and importance in the near future.

Seasonal.—The season for the greater part has been abnormally dry, only 44 inches of rain has been recorded to the 10th July, 22 inches of this total fell towards

the latter part of January. About the 20th June, and at intervals since, high and gusty south-easters blew; this had an increased drying effect on the soil and tumbled some of the more advanced crops, especially that having its root system partly severed by the cane grubs.

The Crop.—Adverse conditions have not been favourable for big crops. Early cane estimates of the eight most northerly mills totalled 1,270,000 tons; this tonnage, if realised, would have yielded about one-half of Australia's sugar requirements, a later estimate has reduced the total by some 50,000 tons.

On the whole the cane is of moderate length, the foliage is surprisingly green considering the unfavourable season, but is now rapidly browning, more especially that growing on the drier highlands. Fine crops were seen on the very fertile alluvial deposits of the Lower Barron and Mulgrave Rivers. Present quality is very satisfactory considering the earliness of the season.

Grinding and Harvesting.—These operations are proceeding smoothly. Factories have not reached their possible maximum weekly cane tonnages. The small but surprisingly powerful locos. are bringing forward enough cane to keep the big factories moving continuously for the full running time. The bulk of the cane being treated is short of stem, moderately clean, and unburnt. It is remarkably free from rat and borer destruction, and improving daily in quality.

High Ground and Top Cutting.—Appalling waste in tons of cane and sugar results from improper cutting, subsequent ratoons are also seriously affected. The heaviest and sweetest part of the crop is near the ground, therefore, it is of immense importance that the crops be harvested as near the ground surface as possible. Much unnecessary trash is picked up with the cane.

Railroads.—The Cairns district has a good system; the fields are laid out for speedy crop removal by portables.

Arrowing.—Widespread purple stretches among the waving sea of green cane is due to the beautiful cane flower. Flowering marks the end of the growing period of affected canes. The time to which cane can be left standing after arrowing depends mainly on variety and season.

Planting.—Much ground had been planted. The stage of growth varied from primary shoots just bursting through the soils to well-established stools. The quality of the strike was found to be all the way from poor to excellent. The depth of soil overlying the plants varies from 2 to 5 in., according to season; when the soil is dry a greater covering is required than when moist. Improperly prepared or lumpy ground is responsible for poor strikes, mainly due to lumps preventing the thorough encasing of plants by the much required pulverised soil. Not sufficient care is exercised when selecting cane for seed, this should be selected from disease-free plant cane or vigorously growing stubble. The time has come when we must pay more attention to the details of the industry. The rind or skin of cane when cut into seed by blunt knives is shattered, thereby permitting fungi to gain entry to the sets; for the same reason all plants damaged by vermin should be eliminated. It is highly possible that organisms responsible for diseases are transmitted from one cane to another by direct inoculation.

Earthing Up.—Soil thrown by implements on to the newly planted cane reduces manual labour by weed smothering and is often of benefit, but when abused has detrimental effects. Mechanical injury often follows when removing this surplus covering.

Manuring.—Offal from nearby slaughter-houses is being applied to a few resting fields. The growing of leguminous crops is not being practised to the extent that it should.

Ratooning.—When the cane is harvested the greater part of the old root system dies, therefore ratooning should be performed as soon as practicable or prior to new roots forming.

Diseases and Pests.

We must endeavour to control our diseases and pests or they may control the industry. This control can be assisted by encouraging their natural enemies and destroying, where possible, the breeding places. Gumming, Leaf Scald, Leaf Stripe, Top Rot, Red Rot of Sheath, Brown Rot, and Pineapple diseases were noted.

Gumming.—This exists, but is not spreading apparently. Pronounced gum-like streaks were located in H.Q. 426. When the stem was severed gum immediately oozed from the vascular bundle; other canes having similar leaf markings did not contain the gum. Leaves obtained and tested under the miscroscope at Meringa confirmed the presence of bacteria responsible for the disease.

Leaf Scald.—This continues to spread; red fibre, similar to gum, is also found in this disease.

Leaf Stripe.—The disease had not spread, the severely affected canes had mostly died. Ratoons generally are more troubled than is plant; sets from infected canes transmit the condition.

Top Rot.—The red streaks observed in the foliage in January last had disappeared. Canes troubled with the complaint were found.

Red Rot of Sheath.—The whole leaf sheath becomes red and the disease passed on to the stem.

Pineapple Disease.—Primary shoots of newly planted cane were found dying or dead, the interior of affected sets varied in colour from crimson red to black, and had a pineapple odour, hence the name.

Brown Rot observed only on the virgin lands.

Cane grubs, rats, weevil, and moth borers so far have not damaged the crop to any great extent, seasonal conditions seem to control them. Minor pests, such as mid-rib borers and bud moth borers were noticeable, more so on the fringe of grassy headlands.

Molasses.—Cane had been planted on a portion of the land at Mulgrave over which molasses was gravitated. A good strike followed, save where the portion was intersected by the gravitational drains. The portion receiving overmuch is still in an unplantable condition.

The Mulgrave district tonnages, with their respective c.c.s. averages for season 1925, will be found interesting:—

District.	Tons.	Percentages C.C.S.
Little Mulgrave and Pyramid	11,600	13·39
Riverstone	8,700	14·50
Meringa and Yattee	23,700	14·40
Heighleigh	45,080	14·10
Over River and Aloomba	42,400	14·15
Behana to Fishery Creek	37,500	13·96
Eubenangee, Bellenden Ker, &c.	10,000	12·42
	178,900	14·00

Variety Tonnage and C.C.S. Average for Season 1925.

Variety.	Tons.	C.C.S. Percentages.	Crop Percentages.
N.G. 15 (Badila)	122,000	14·16	67·9
D. 1135	41,200	13·47	23·0
H.Q. 426	8,300	14·67	4·6
Other varities	8,200	13·67	4·5
	179,700	14·00	100·0

A Beautiful Valley.

Little Mulgrave is a beautiful valley, with its fertile soil tucked in by wooded uplands. It is served by a small railroad and drained by two sparkling running rivers, not deep but picturesque, and one through which Nature has permitted the construction of a winding but comparatively easy crossover to the good land beyond.

The Southern Field Assistant, Mr. R. W. Mungomery, reports (19*th July*, 1926):—

The greater part of the Mackay district, with the exception of the Homebush and Sarina areas, was visited in the course of June, and, on the whole, insect damage has not occasioned great losses in these areas. This is quite unusual considering the abnormally dry season these districts have suffered, for it is widely recognised that insect damage in a dry year is always more than in a wet one, since the vitality of the plant through continued starvation is impaired during a dry spell and the plant

readily succumbs to attacks, especially if it happens that roots are affected. This does not imply that insect damage is not bad on individual farms, for I have witnessed some very serious damage in parts, and one outstanding case came under my notice in which a field of 6 acres of first ratoon cane, containing mixed varieties and averaging about 20 tons per acre, was eaten out completely. This will be an absolute loss to the grower. Other blocks though badly eaten were holding out, and arrangements were made by the farmers with the mill authorities to have the cane harvested at the commencement of the crushing season.

Mackay also proved interesting from the variety of the insect fauna found there, and although various southern species were observed, most of the injurious cane insects taken included those which are essentially northern in their distribution. The following pests were observed doing damage:—

The Greyback *(L. albohirtum).*

Serious destruction from these grubs occurred at Barcoo, and in the Farleigh area and at Mount Jukes. In the latter area there is an estimated loss of 2,500 tons of cane this year and most of the affected fields will have to be ploughed out. On another estate one farm which suffered so badly this year was under cane thirty years ago and had to be abandoned owing to the grubs making canegrowing unprofitable then. It was taken up two years ago, cleared of its lantana, and planted with cane. Grubs appeared last year in the plant crop in small patches, but the invasion of the first ratoons this year has been complete, and scarcely a green stick remains. Thus this completely upsets the theory that spelling the land will rid it of grubs, for I have even seen cane in new land fall a victim to these insidious workers.

At Owens Creek, Kungurri, and part of the Pinnacle Plain there are a few grubs, but it is difficult at a casual glance to differentiate between the effects of dry weather, frost, and grubs, all of which have left their mark there. However, I understand that injury from this pest in these localities has not been so far-reaching as in previous years.

In a few farms in the Racecourse area patches of Q. 813 were eaten out, and I blame the presence of small feeding trees (Moreton Bay Ashes) right up against the cane for the appearance of grubs on these farms. Moreover, the variety Q. 813, as well as H.Q. 426—*i.e.*, Clark's Seedling—should never be planted in areas subject to grub attack. In compact localities like Racecourse, farmers could most profitably cut down, ringbark, or poison these feeding trees and put an end to this menace for all time, and it was particularly encouraging to see when I visited this locality at a later date that several had acted on advice. Shire Councils as a rule do not favour indiscriminate destruction of trees on roadways for they add much to natural beauty. Grubs now are mostly full fed and have gone down deeper into the soil to pupate, but a few had evidently recently (about 12th June) changed into their third stage, thus giving evidence of a prolonged flighting season of the beetles last year, as pointed out by Mr. Jarvis (see "Queensland Agricultural Journal," June, 1926).

The Weevil Borer *(R. obscurus).*

The cane borer was found at Farleigh, Mount Jukes, Finch Hatton, Sybil Creek, and Kungurri, but its damage this year is not great. This I attribute to the unfavourable conditions for its development during the past season, for it seems that only cane which grows rank and lies down is especially favourable for the increase of this pest. Farmers, too, are getting more careful about seed selection, and one finds most of them rejecting bored cane when cutting plants. This is to be commended; but what happens to the rejected material? One invariably finds it lying about the field near the spot where the plants have been cut, and if left for a few weeks without being burnt weevils emerge and migrate to other fields, where they continue to multiply. So the futility of such a practice can be realised. This season, when very little cane in the districts harbouring these pests will be left to stand over, should be an excellent one in which to clean up paddocks of old borer-infested cane and leave no breeding grounds for the weevils. If this be carried out conscientiously by all concerned a big reduction in the pest should follow.

The Soldier Fly *(M. rubriceps).*

This species still confines its attention to Finch Hatton and the surrounding districts, and at the time of my visit the insect was represented in its pupal and imaginal forms and therefore could not be classed as doing any actual damage then. The pupæ were located at from 1 to 1½ inches below the surface of the ground, and they much resemble the larvæ, since metamorphosis takes place within the old larval skin, so that it is quite natural for farmers to make the mistake and assume that the insect is present as a larva or "maggot" throughout the whole year, whereas there

is a decided quiescent pupal period about May and June, when it would be quite safe to plant. Probably one other such period occurs in the summer months. Pupæ were also found under blady grass (*Imperata arundinacea*), whilst the flies were seen flying about a field of potatoes, which crop Mr. Dormer suggested might be useful for rotation. It will be interesting to see in the spring whether these flies have oviposited in the soil there and what measure of success has attended this crop rotation. One fact is established—that they have not been found to attack potato roots or tubers. Wireworms have been damaging sets in the low-lying parts of Mackay, particularly in the "devil pan" type of country, and much good might be done by draining and otherwise improving the physical condition of the soil. Later planting may also help to lessen their attack.

Wallabies, Scrub Turkeys, and Cockatoos.

All are worthy of note as doing a fair amount of destruction in scrub country. Turkeys hollow out the big sticks of Badila which usually grow on new scrub land, and they further destroy great lengths of cane which snap off when the weight of the bird comes on the higher portions above the pieces they have hollowed out. This damage was seen at the Gorge, Finch Hatton. At Septimus a block of Q. 813 was being visited by a flock of cockatoos, which ate the mature cane about a foot above the ground, and in one patch alone I estimated that about 1 ton of cane had been destroyed, and it had been almost spoilt from a ratooning point of view. Wallabies, owing to the scarcity of their native grasses this year, have eaten both mature and young ratoon cane.

I would like to bring before the notice of all growers in the Mackay district the excellent provisions made by the members of the Mackay Pest Destruction Board. Not only does the Board encourage the destruction of beetles by payment on the pound basis, but growers are refunded half the cost of any fumigant, &c., approved by the Bureau of Sugar Experiment Stations which may be used by them in the control of cane pests. Growers therefore are working under excellent conditions, and they cannot sincerely express the opinion that the cost of soil fumigants is prohibitive. They should take fuller advantage of this liberal concession.

TWELVE MILK PRODUCTION RATIONS.

Twelve good examples of suitable production rations for cows giving milk of normal quality are given in Leaflet No. 388, issued by the British Ministry of Agriculture, as follows:—

(*a*) One part by weight of dec. groundnut cake and two parts of maize meal; 3¼ lb. per gallon.

(*b*) Two parts of bean meal and one part of maize germ meal; 3½ lb. per gallon.

(*c*) One part of dec. groundnut cake, two parts of rice meal, and two parts palm kernel or coconut cake; 3½ lb. per gallon.

(*d*) Coconut cake, or palm kernel, or maize gluten feed, singly or mixed; 3½ lb. per gallon.

(*e*) Three parts of beans, two parts of barley meal, and one part of linseed cake; 3¾ lb. per gallon.

(*f*) Two parts of oats, one part of dec. cotton cake, and one part of coconut cake; 3¾ lb. per gallon.

(*g*) Equal parts by weight of oats, bean meal, and maize gluten feed; 3¾ lb. per gallon.

(*h*) Two parts by weight of bean meal and one part rice meal; 3¾ lb. per gallon.

(*i*) Three parts of oats, two parts of dried grains, two parts of palm-nut meal, and one part of dec. cotton-seed meal; 4 lb. per gallon.

(*j*) Two parts of dried grains and one part of coconut cake; 4¼ lb. per gallon.

(*k*) One part of oats, two parts of bean meal, and one part of bran; 4¼ lb. per gallon.

(*l*) Three parts of Egyptian cotton cake, three parts of dried grains, and two parts of maize meal; 4½ lb. per gallon.

It will be noticed that the quantity to feed varies from 3 to 4½ lb. per gallon of milk, according to the particular foods that are being used. For Jersey or Guernsey cows the quantity should be increased by one-fifth—*i.e.*, 3½ to 5½ lb. per gallon of milk. A farmer should always consider whether it would pay him better to sell his home-grown foods and buy something in their place. Cases often occur where it would be profitable to sell maize gluten feed or grain.

ABSTRACTS AND REVIEWS.

All foreign agricultural intelligence in this section, unless otherwise stated, has been taken from "The International Review of the Science and Practice of Agriculture," published at Rome by the International Institute of Agriculture.

The Fertilisation of Pasture by Liquid Manure, with Relation to the Utilisation of the Nitrogen of Liquid Manure for Green Fodder Production.

Liechti, P. and Ritter, E. Ueber die Wesendüngung mit Gülle. "Landwirtschaftliches Jahrbuch der Schweiz," Vol. 35, p. 1, 1921.

The authors have studied a problem of paramount importance for the Swiss agricultural industry. The first point to settle was to find the most suitable yearly application of liquid manure for a soil. A light, to medium heavy, lime-deficient, sandy soil, was divided into a number of meadow plots, each of an area of 50 square metres and each manured. The exhaustive results are arranged in thirteen tables, each table of several pages, and the following are the main conclusions:—

(1) In a liquid manure fertilisation of grass land only larger amounts of manure give a good yield of nitrogen, smaller amounts, even if repeated several times, give comparatively high losses of the nitrogen by evaporation.

(2) When using large amounts of liquid manure large amounts of lime also reach the soil, but these can only be utilised if at the same time large quantities of phosphatic manure are supplied.

(3) Large amounts of liquid manure produce a lime-deficient fodder, and this unfavourable action of the manure can be counteracted by a heavy application of lime.

(4) Liming of the soil brings about both an improvement in the quality of the fodder and an increase in the crop.

(5) Potassium phosphate manuring alone, resulted always in diminished crop, but potassium phosphate and liquid manure gave an increased yield.

(6) Each addition of fertiliser brings about a simplification in the botanical constituents, the clover varieties are repressed, but the albumin content of the fodder does not suffer.

(7) Fertiliser conditions or weathering conditions influence the water content of the grass but little; the grass has the lowest water content on unfertilised plots.

(8) Non-nitrogenous fertilisers give a grass of better quality, but nitrogen containing fertilisers give a much heavier crop. The profits from nitrogenous manuring are considerable.

(9) If it is not possible to apply a nitrogenous fertiliser, a high nitrogen crop can be obtained by a simple potassium phosphate manuring. In these experiments the crop per hectare per year was 40-200kg. on non-limed plots and 70-230 kg. on limed plots.

Diversification of Crops.

"Tropical Agriculture," Vol. II., No. 5, pp. 93-94. Trinidad, 1925.

The recent depression in certain tropical products brings into prominence the fact that one-crop areas are based upon an unstable economic foundation. While the main crop is in demand at remunerative prices the country prospers, but when any disaster overtakes this crop the whole area is thrown into profound depression. Much may be said in favour of specialization of large areas, but the inherent danger of the system should always be remembered by planters and administrators.

A well-known example of a one-crop area is that of the coffee industry of Ceylon, which was prosperous until in 1868 the disease *Hemeliea vastatrix* appeared and practically destroyed the industry. Other crops were then cultivated, and salvation was ultimately found in tea, which was introduced on sound economic lines; although the failure of the Ceylon tea industry would be very serious for the island, owing to the introduction of other crops, such as cinchona, cinnamon, rubber, and coconuts, the effect of failure of tea would not be so disastrous as was the case with coffee.

A more recent example is that of the rubber industry of Malaya, and also that of Ceylon, in this case due to over-production, with the consequent fall in market prices.

Another instance is that of cocoa; the production of the Gold Coast rose from 39,000 metric tons in 1912 to 194,000 tons in 1923. Recently prices fell, owing to a variety of causes, with serious results to the producing areas.

A remedy may lie in co-operation to extend the market, to limit production, or by publishing reliable information regarding stocks and supplies. The chief remedy, however, lies in a greater diversification of crops.

The danger is again illustrated on a smaller scale by the failure of the lime industry at Montserrat, brought about by disease, hurricanes, and competition of the Italian lemon industry.

There are many minor crops in the tropics which could be developed into profitable industries if they received adequate attention.

The need for practical recognition of the necessity of broadening the economic basis of those tropical areas whose fortunes are founded upon the continued prosperity of one main crop.

Fruit Storage Experiments in Denmark.

Experiments in the storage of apples and pears were begun in 1918 at Blangsted (Denmark) in a building erected in 1917 and consisting of an ordinary cellar and a cold storage plant of fruit. Comparisons were made between storage of apples and pears in cellars and in cold storage rooms at temperatures of 4·5, 3·5, 2·5, 1·5, 0·5 deg. C. Other experiments were carried out in cellars and cold storage rooms which were (*a*) unventilated, (*b*) ventilated, (*c*) with the addition of ozone.

The main results were as follows:—

The keeping power of fruit varies greatly from year to year. All varieties of apples and pears kept much longer in a cold storage room than in a cellar. During the winter months, after removal from cold storage, fruit kept fresh for at least two weeks, with the exception of the variety Nouveau Poiteau, in which core rot was found. The flavour of apples does not seem to be affected by the temperatures or duration of storage. Pears picked before they are ripe do not obtain a good flavour when ripened at a low temperature. Some varieties lose flavour under protracted storage. Ventilation with outer air or the generation of ozone, does not seem to increase the keeping power of fruit. Scabby fruit does not keep as well as sound fruit. Wrapping the fruit in tissue paper seems to have no preservative effect, but generally enhances its beauty. Fine, dry, powdered peat as a packing material increases the keeping power of fruit by one month or more. Large fruits do not keep as well as smaller ones from the same tree.—"Ice and Cold Storage," Vol. XXVII., No. 317, London, 1924.)

Ground-Nuts.

Strenuous efforts are being made in Gambia to improve the quality of the ground-nuts ("Ann. Rep. Dept. Agric., Gambia, 1924, p. 24), and considerable attention is being paid to seed selection. Using raised platforms on which to stack the nuts is another means advocated, as this will prevent the development of moulds which cause the blackening of the shells and spoil the appearance of the nuts. Owing to the common practice of mixing sand and other foreign materials to increase weight, an ordinance has beeen passed making it compulsory to screen all nuts purchased or stored for export. The screening removes sand and dirt and also the majority of shrivelled and immature nuts. Reference to the use of rotary screens in Gambia, and an illustration of one at work, were included in the article on the cultivation and utilisation of the ground-nut published in the "Bulletin of the Imperial Institute" (1925, 23, 291). In many cases, concrete floors are used on which to store the screened nuts, and in others grass or bamboo mats are used. As a result of these measures, the crop in 1924 showed a marked improvement over that of 1923, while the difference in price between Gambia and Senegal nuts has been decreased from 10s. to 5s. a ton. The percentage of foreign matter has been reduced to a negligible figure through the compulsory screening, and the average acidity of the oil has fallen to 1.2 per cent. The improvement in the quality shown by the 1924 crop was due partly to the fact that the plants were raised from seed carefully selected from the previous year's crop, whilst the climatic conditions were particularly favourable. Trials made at the Agricultural Station with Senegal seed from Cayor showed that this seed was not so suitable as the Gambia seed, the yield per acre of the former being 1,120 lb. in comparison with 2,055 lb. for the latter. Nigerian and Philippine seed have both given good results when grown under Gambia conditions. In 1924, 60,622 tons of ground-nuts, valued at £861,925, were exported from Gambia.—From the Bulletin of the Imperial Institute.

WHAT IS CLEAN MILK?

"Clean milk is produced, not by straining the dirt out of the milk, but by preventing it from getting in." This sentence summed up the lecture given by Miss Jackson, the dairy instructress for the county, on the occasion of a practical demonstration of the production of clean milk given under the auspices of the Herefordshire County (England) Agricultural Committee.

The cowman, who was dressed in white overalls, after quickly brushing the cow's flanks and washing her udder from one bucket, and then rinsing it with clean water from another bucket, proceeded to milk the cow into a pail especially designed for clean milk production, it having only a very small opening to prevent dust and impurities from falling into the milk. It was noticed that the man milked dry handed, and that he rejected the first squirt from each teat, the reason being that these contain a large number of bacteria which have found their way into the teat, not from the udder, but from the outside.

"It is important," said Miss Jackson, "that the milkers should be healthy and not come into contact with any person suffering from a contagious disease. They should wash their hands immediately before milking, and as often as may be needed besides, and their finger-nails should be kept short and clean. Care should also be taken not to place the head against the cow's side while milking, for by this means dirt or hair may be loosened and fall into the milk."

After the cow had been milked the milk was strained through a cotton wool disc, which was compared with one through which milk had been strained from a cow milked into an ordinary bucket by a man who had not washed the cow or taken any precautions to keep impurities from getting into the milk, and the company were astonished at the difference between the two discs, the one showing no sign of impurities, but the other showing an amount of hair and bits of straw and dirt.—"The Dairy."

WEEDS OF QUEENSLAND.

No. 42.

MILKY COTTON BUSH *(Asclepias curassavica).*

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

Description.—An erect glabrous herb with a single stem or few branches. Leaves opposite, lanceolate, 3 to 4 inches long, tapering at the base to a short stalk of about ½ inch. Flowers about 1½ inches diameter, on stalked umbils in the upper axils, often forming a rather large showy terminal inflorescence; sepals green, petals (corolla lobes) red, reflexed; staminal column in the centre of the flower capped by 5-lobed bright yellow corona. Seed-pods (follicles) 3 inches or more long and ½ inch in diameter tapering very much at both ends, when ripe bursting along a central suture and letting free the plumose seeds. Seeds brown, capped by a tuft of white silky hairs.

Distribution.—A native of tropical America, now widely distributed as a weed in most warm countries.

Common Names.—Names by which this plant goes under in Queensland are "Milky Cotton Bush," "Milk Weed," "Wild Cotton," "Red Head," "Wall Flower Cotton Bush," and "Wild Oleander."

Botanical Name.—Asclepias, from the Greek Asklepios (Latin Aesculapius), the God of Medicine, evidently from some supposed medicinal properties of the earlier described members of the genus; *curassavica,* Latinisd word meaning a native of Curacao, West Indies, from which place specimens were first described.

Poisonous Properties.—The plant has at numerous times been suspected of poisoning stock in Queensland, and several species of the genus in other parts of the world are known to be definitely poisonous.

I received recently from the Acting Director of the Australian Institute of Tropical Medicine, Townsville (Dr. A. H. Baldwin), three specimens of plants from Ayr with the report that these plants had been received at the Institute as the probable cause of losses among sheep. The three plants sent were *Solanum torvum* (Devil's Fig), *Trema aspera* (Poison Peach), and *Asclepias curassavica* (Milky Cotton Bush).

Later Dr. Baldwin wrote me as follows:—"We have carried out experiments on guinea pigs with portions of all the three plants, with the following results:—

" (*a*) Guinea pigs ate readily Nos. 2 and 3—*i.e., Solanum torvum* and *Trema aspera,*' and suffered no apparent ill effects.

PLATE 26.—MILKY COTTON BUSH (*Asclepias curassavica*).

"(*b*) Guinea pigs were apparently reluctant to eat No. 1, *Asclepias curassavica*, but after twenty-four hours one pig was observed to eat a small quantity of the finely chopped leaves. This pig was found dead next morning. The post-mortem picture was as follows:—Eyes moderately dilated, some frothy fluid about the mouth. On opening the body a curious gelatinous oedema of the abdominal wall was noted. Some fluid (also gelatinous in the abdominal cavity). Liver pale; spleen normal; intestines moderately distended; suprarenals hæmorrhagic; lungs very engorged.

"Another pig was placed in a cage and given some of the leaves. Two hours later symptoms developed as follows:—Weakness and staggering gait; intermittent convulsive shivering fits. Death ensued some hours later. On post-mortem the same picture as in the former case was noted in a lesser degree, save that there was no gelatinous oedema.

"The stomach and intestinal contents and urine of these pigs were tested for HCN and the common alkaloid, with negative results.

"It would therefore seem fairly conclusive that plant No. 1, *Asclepias curassavica*, was responsible for the death of these pigs. The symptoms and the post-mortem findings recorded from the affected sheep at Ayr were very similar to those noted by us in the case of the guinea pigs.

"We have not isolated a specific toxic agent which would probably be 'Asclepiadin.'"

Other Properties.—In the "Queensland Agricultural Journal," vol. 3, page 437 (December, 1898), F. M. Bailey had an article on this weed. Among other things he states—

"According to Don the juice of *A. curassavica*, made into syrup, is said to be a powerful anthelmintic. In the West Indies it is given to children for that purpose, from a teaspoonful to a tablespoonful. The juice and pounded plant are reputed to have the power of staunching blood. The root dried and reduced to powder is frequently used by the negroes as an emetic, and hence its name 'Wild Ipecacuanha.' Dymock says that Dr. Guimares described the physiological action of *A. curassavica*. He found it to act directly upon the organic muscular system, and especially upon the heart and blood vessels, causing great constriction of the latter and distention of the larger arteries. Secondarily, it occasioned great dyspnoea (difficulty of breathing), vomiting, and diarrhœa."

In the October (1897) number of the "Kew Bulletin" an account of this plant as an insectifuge is given. It states that it grows everywhere, as a weed, about the Isthmus of Tehauntepec (Southern Mexico), and is used by the Indians there to keep away vermin, especially fleas. They make a broom of it, and sweep the floors and walls of their huts, and find that they are not troubled with fleas for a considerable time afterwards. They have also tried brushing dogs with it when their coats are full of vermin, and it appears to answer the same purpose with them. The Indian name of the plant is "Chilpati."

Eradication.—It is usually nowhere so abundant that hand-pulling or hoe-cutting cannot cope with it.

Botanical Reference.—Asclepias curassavica Linnaeus. Species Plantarum I. 215, 1753.

RECENTLY DESCRIBED QUEENSLAND PLANTS.

In a recent paper read before the Royal Society of Queensland the Government Botanist, Mr. C. T. White, F.L.S., and the Assistant Government Botanist, Mr. W. D. Francis, described a number of new and little known Queensland plants. Two of these plants are shown in the accompanying illustrations, which are from the pen of the departmental illustrator, Mr. I. W. Helmsing. *Grevillea sessilis*, which belongs to the Silky Oak family, was collected at Torrens Creek, North Queensland, by Mr. J. E. Young, who later accompanied the Wilkins Expedition to North Australia. Mr. Young's specimens bore flowers. Many years before the late F. M. Bailey had collected fruiting specimens of the same species between Mantuan Downs and Springsure. The examination of Mr. Young's specimens showed that the species was undescribed.

Cassia neurophylla is a leguminous shrub only recently found in Queensland. It was collected in the sandstone ranges of Settlement Creek, in the Gulf Country, near the Queensland-Northern Territory border, by Mr. L. Brass. The Queensland specimens were described as a new species, but attention has has been drawn to the fact that Mr. W. V. Fitzgerald found the same plant in the Kimberley district in the north-west of Western Australia and named it *C. neurophylla*. Strangely enough the same specific name was chosen for the plant by Messrs. White and Francis. Mr. Brass's specimens are illustrated in the accompanying plate.

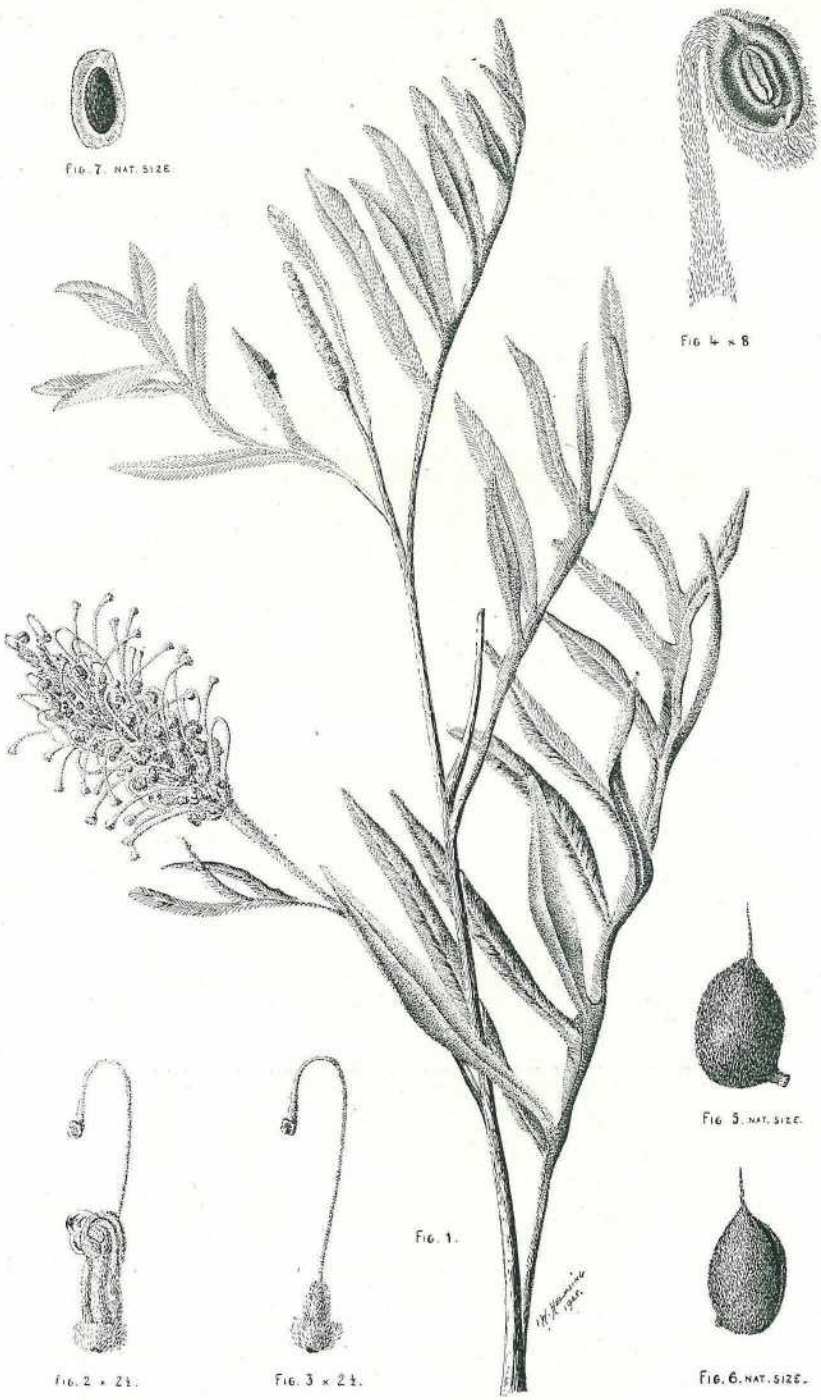


PLATE 27.—GREVILLEA SESSILIS, *White and Francis.*

1, about one-half natural size; 2, flower × 2½; 3, flower with perianth removed × 2½; 4, anther inserted on perianth lobe; 5 and 6, fruit; 7, seed.

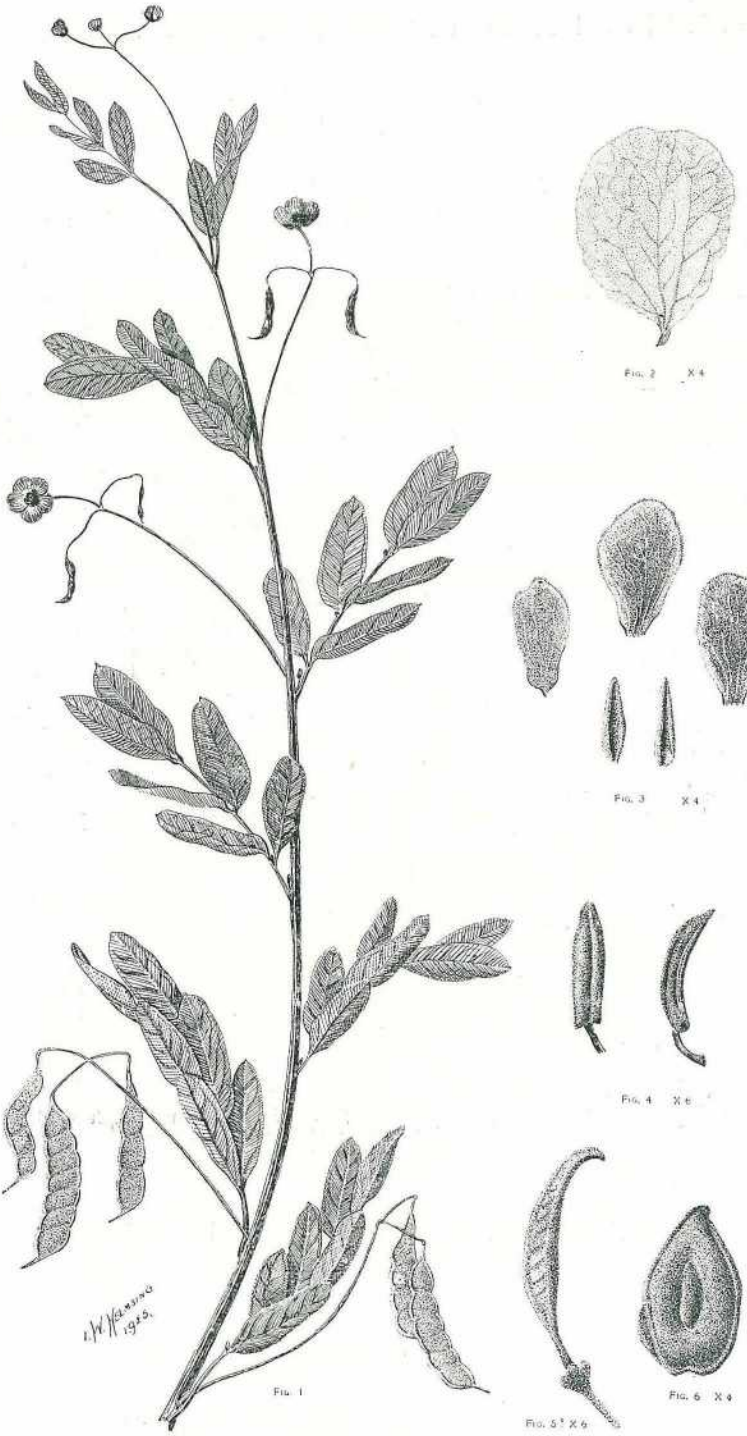


PLATE 28.—CASSIA NEUROPHYLLA, *W. V. Fitzgerald.*

1, about natural size; 2, petal × 4; 3, sepals × 4; 4, stamens × 4; 5, ovary × 6; 6, seed × 4.

CREAMERY BUTTER MAKING—A GROWING DANGER.

By G. SUTHERLAND THOMSON, F.R.S. Edin., N.D.D., B.D.F.D.*

Permanency and success of the butter industry in every country will be found in the source of the milk and cream supply, and in transport and cold storage services. The source is the birthplace of the hereditary qualities which give the foundation to choice and health-giving elements in butter. It is natural, therefore, that the exponents of artificiality and expedients in the creamery will, at least, indirectly ignore the source of high-grade produce, and also overlook the necessity for reforms in the great auxiliaries—road and rail transport and cold storage.

Sound Development Based on Intelligent Study.

Before an industry can be developed along sound national lines, the dairy hereditary of each division of the country must be carefully examined and intelligently studied. Without this, injury, as seen to-day in some countries, will follow, and which is more intensified in an export butter trade. It may be stated that hereditary is the constitution of the milk and cream supply, and also of the butter. It is well known among graders and judges of the butter of different countries, that good and bad qualities are directly and indirectly associated with the climate, soil, and the food of cows. Butter from one division, or it may be from a whole country, is constitutionally weak; in other instances it is constitutionally strong. It follows that different treatment is required to get the highest results in the manufacture of the butter, keeping separately in view home consumption and an export trade.

Let us begin with a country productive of butter of insipid flavour and correspondingly weak in body. The creamery manager would be conscious of the fact that butter from such a country would not have an aroma, flavour, or texture characteristic of superfine produce, and its keeping properties would be secondary. What would the intelligent dairy expert do if he had the power? He would, first of all, turn to the raw milk and cream. He would take searching steps to remove the chief outside sources of injury. He would also make a special point of protecting the transport of the milk and cream by road and rail. What would he do in the creamery? He has overcome, shall we say, the terrors surrounding the raw material, which means that the milk and cream are free of irreparable injury. Would the expert attempt to ripen this cream to an advanced acidity, such as practised in Denmark, Holland, and other countries readily accessible to the British market?

Importance of a Pleasing Aroma in Butter.

Provided the butter was to be consumed soon after manufacture, he would pasteurise the cream and ripen thoroughly. With the general treatment of butter-making, however, one does not base instruction on storing the produce for unusually long periods, or in openly catering for speculation. But if the regular output of a creamery had to undergo storage, afterwards transported long journeys by steamer at uncertain and faulty temperatures, and to arrive on a market often necessitating further storage before going into consumption, a different policy would be necessary. And what might it be? The expert butter-maker would pasteurise to a maximum degree of heat, coming as near as it is safe to practical sterilisation, which would clean the cream of any possible hidden bacterial dangers, and give greater promise to the keeping qualities of the butter, including texture. Also the high pasteurising temperature would attack moulds and yeasts, which appear inseparable from cream in all countries. But before pasteurising, do you think the butter-maker would neutralise the cream? Provided the cream is pure and sweet, and has a texture consistent with a well-conducted industry, he would have no occasion to neutralise. And would he develop acidity after high pasteurising? Yes, he would; but with great care, one important reason being that prominent and skilled British buyers seldom taste the butter they handle; it is the breath of the butter they examine. The trained butter-maker knows that it is worth much to cultivate a choice lactic aroma at the bidding of commerce, and that indirectly all butter is made for the commercial man, whose influence, training, and business principles cannot be brushed to one side. When the buyer examines butter that is dead, it is on the aroma that condemnation rests. And he may be tempted to judge severely when good qualities in the butter are badly developed, and do not reflect on the aroma, which we know does happen. *Let it be repeated, give to your export butter a lactic breath that speaks of health and quality.* And as experience grows the butter-maker will realise more and more the necessity to treat aroma with increasing respect, and ever to remember

* In "The Dairy" (England) for May, 1926.

that it is distinct from taste, and far removed from smell and taint; and the same applies to flavour.

When pasteurising cream, the butter-maker will be well advised to take precautions that a pronounced scalded taste is not given to the butter. The lactic flavour of pasteurised cream will partly neutralise, so to speak, a scalded taste and give to the butter a pleasing aroma, with other distinct advantages to marketing. With a well-controlled acidity in the pasteurised cream, you have a pure and clean acid which is characteristic of superfine butter.

The Danger of "Fishiness" and Other Defects.

The butter-maker will have firmly planted in his mind that immediately the sweetness in cream is controlled by the acid—that is, the fine acidity has gone—the safety line is passed, and butter is brought within the dangerous influence of fishiness and other grave and costly defects.

It was the writer who first brought to light a primary cause of fishiness, and the advantages of controlling acidity in cream; and to follow is a brief extract of Part I. of the investigation he completed twenty-seven years ago, and which is taken from the "Queensland Agricultural Journal" for May, 1900. From this investigation much permanent good to butter-making in the British Empire has resulted. The writer may be considered negligent for not having more ardently followed up his success, but even as far back as the year 1900 there appeared obvious dangers which are now disclosed in this contribution, and grow more and more apparent:—

EXTRACT OF INVESTIGATION.

"The following table records the hours of ripening, also the flavour of the butter manufactured under the headings of 'Fishy' and 'Sweet':—

FISHY BUTTER.

Flavour.	*Hours of Ripening.*
1. Very strong fishy	48
2. Strong fishy	72
3. Strong fishy	48
4. Strong fishy	24
5. Full fishy	60
6. Full fishy	30
7. Light fishy	53
8. Fishy	45
9. Strong fishy flavour	20

SWEET BUTTER.

10. Good flavour	26
11. Sweet	28
12. Sweet	20
13. Sweet	14
*14. Sweet	Speedily churned
15. Sweet	Speedily churned
16. Good flavour	51
17. Good flavour	48

* This refers to sweet cream.

"From the above it will be observed that the fishy butters were manufactured from the old creams.

"No. 9 of the fishy lot show twenty hours for cream ripening, but this is accounted for owing to a starter having been added.

"No. 16 had the cream preserved in salt before churning, hence the delay of fifty-one hours in ripening, and No. 17 was pasteurised.

"An examination of the fishy butters for an alkaline and acid reaction showed that the sweet butter favoured the alkaline test, and with all the fishy samples taken strong acid reactions followed. An acid flavour in the fishy butters prior to refrigeration was very evident."

The butter in this part of the South Australian investigation was winter made, and the hours given cannot be taken as a specific guide to cream ripening in export dairy countries. All the butter was cold-stored for seven weeks. Part II. of the investigation was devoted to fishiness and storage temperatures, and was completed in Queensland in 1902, with very valuable results.

It is shown in the above extract that over-acidity is a bad mistake when butter has to be transported long distances and cold-stored for extended periods. In Britain, for example, great damage is done to the quality of butter owing to the average acidity of the cream being excessive. This follows a system of collecting small quantities of cream in the same vessel and churning on definite days of the week. Were it possible for British-made butter to be manufactured from cream showing a milder and better controlled acidity, an improved quality would be immediate. It is also known that Danish butter and Dutch butter, which is made for quick sale in Britain, does not store well, and a striking illustration may be given. Danish butter competed in an international butter test which was organised in New Zealand, and the award of the judges bore striking evidence in support of a lower acidity, Danish butter having to take a subordinate place in the list of awards.

Queensland Butter a Revelation—Awarded Premier Honours.

A much more exhaustive test was organised later . . . and the unanimous opinion of a large body of eminently practical judges gave the premier honour to butter from Queensland. In this test the butter of many nations passed through the most searching of trials, and the remarkably fine quality of the Queensland butter was a revelation to all the experts. Neutralised butter was included in the exhibits and proved a bitter disappointment.

Neutralising a Difficult Expedient.

Let it be said that neutralising is a difficult and uncertain expedient. The cream of certain dairy divisions or districts, for example, may have a hereditary slowness in developing acid. When this class of cream is neutralised with soda, and the butter shipped from a distant country to England, the taste of the soda will be found pronounced, everything else being dead. One might say that the nutrient had destroyed the weak life of this class of cream. Neutralising should apply to faulty supplies of cream only—that is, when acidity has passed the danger line. The creamery manager should not be encouraged by any class, including merchants, to think that first-grade butter can be made from second-grade cream.

It cannot be too often stated that artificial practices of treating cream should not be adopted before every effort is exhausted in the natural development of the butter industry. An overdose of lactic acid in butter will always be preferred by the British consumer to an overdose of soda, and as years advance the feeling against chemicals will increase.

Cold, the Finest Preservative.

Had some expedients never been introduced, the butter industry of the world would be more advanced than it is to-day. There would be, without doubt, a sounder milk and cream supply, better transport, and a decidedly better cold storage and distribution service. Cold, the finest preservative of all, largely governs the milk and cream supply, and also butter, and, in addition, it has a powerful influence for good on distribution. Cold has been tragically neglected, chiefly on account of obedience to policies and practices which mask the worst defects in the raw and manufactured produce.

The writer conclusively proved in 1901-2 that staleness and other taints common to neglected cream continue to grow in butter at cold storage temperatures which are regarded at present as perfectly safe for the preservation of butter for long periods. An extract of the writer's investigation, which was published by the Government of Queensland in 1902, is as follows:—

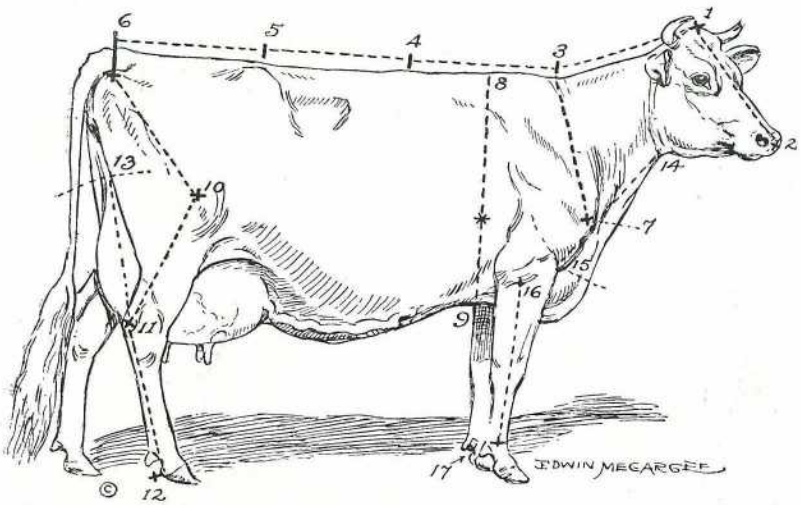
"The striking features were the pronounced stale and rancid flavours in butter which were kept at a temperature from 25 to 32 deg. F., and the consistent weakening of the flavour at temperatures of 18 and 12 deg. with its entire absence at a temperature of 5 deg. F., in the case of butters which were not affected with these flavours at the commencement of refrigeration. Boxes of butter which were either slightly 'off' or distinctly 'off' in flavour when refrigeration began, did not develop a stronger flavour at 5 deg. F., or, in other words, the affected butter practically came out of the chamber (5 deg. F.) in the same condition as it went in. Of the forty-four boxes tested before refrigeration, stale flavours were found in sixteen boxes. After refrigeration at temperatures from 25 to 32 deg. F., forty-two were found affected, the flavour having greatly increased."

The obsession of every creamery manager and butter-maker should be low temperatures in the preservation of the raw and manufactured produce, pasteurisation and carefully controlled acidity, and to treat chemicals with the feeling of one who is afraid to begin lest he be unable to stop.

THE IDEAL DAIRY COW.

The well-known animal painter, S. Edwin Megargee, and Gozo Kawamura, sculptor of animals, were commissioned by the True Type Committee of the Holstein Friesian Association of America to make a study of the best cows of the breed and to make therefrom a painting and statue of the ideal Holstein cow. They worked in conjunction with such competent judges as W. S. Moscrip and R. E. Haeger, and made exact measurements with calipers and tape of more than a thousand cows.

These measurements bore out to a certainty what both men had believed for a long time, viz., that all great cows when measured show an invariable mathematical proportion, and that by a series of simple measurements any one may determine to what degree any particular cow measures up to this standard of perfection. It was found also that great producing cows measure up to this standard. Indeed, there was demonstrated an almost absolute correlation between type and production.



By courtesy of the "Live Stock Bulletin."]

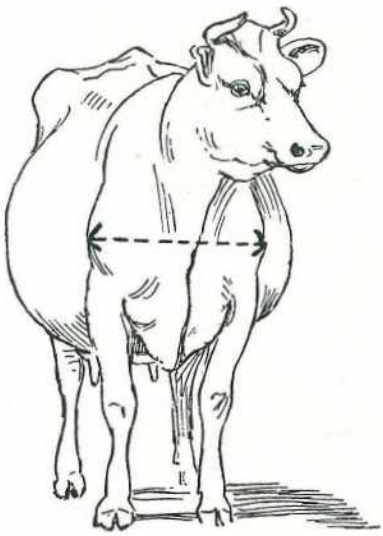
PLATE 29.—(Diagram A) SHOWING METHOD OF APPLYING THE NEW SYSTEM OF MEASUREMENTS.

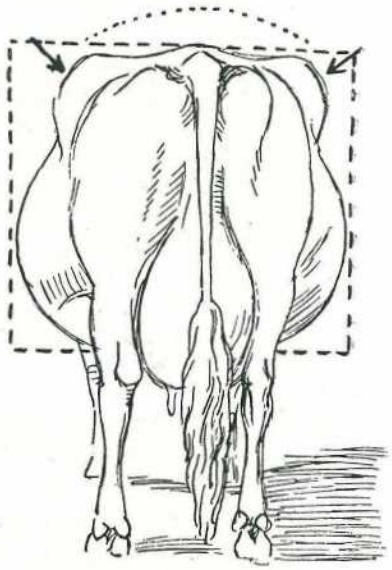
Score cards are composed of such vague generalities that no painter, let alone a sculptor, could fashion a painting or statue from them. A cow should have a deep heart girth. How deep? A long body. How long? Wide hips. How wide? A high rear udder attachment. How high? Just how thick in the middle is a cow with well sprung ribs? Mr. Kawamura, with nothing but two hands and some clay realised that it was necessary for him to obtain accurate three dimensional measurements before he could proceed to make a statue.

These measurements were likewise important to Mr. Megargee, the painter, and so the two men set about obtaining them. Their first step was to consult expert breeders and judges. It was thereupon discovered that there existed among these experts differences in opinion as to the relative merits of different animals. After much travail these warring ideals were reconciled, and Messrs. Kawamura and Megargee proceeded with tape measure and calipers to measure a thousand individual specimens, every one of which was strong in at least one point and sometimes in many. The purpose was to obtain the correct measurements from which to make a composite animal, which should combine the best features of many other animals, blended into a harmonious whole with fixed dimensions and representing the consensus of the most expert judges. Messrs. Megargee and Kawamura have been using for years in their work a certain system of measurement and proportion, and they discovered that their methods were practically identical. In the many herds which they had visited and in the show ring where they stood with judges, and in the countless individual animals they had examined, they found a certain definite proportion of one part to another, and the more measurements that they made the more they were convinced that there existed a fixed system in the structure of a good cow, and that the nearer the cow approached this system by actual measurement

the better cow she was. The presentation of this system of measurement and proportion, which is herewith given, sheds light for the first time on a much disputed problem. It is believed by the originators of this system that it will show up the faults of any cow to which it is applied. It will also show to a large extent how close to perfection a cow approaches and in what respects she achieves perfection.

Standards of perfection have been used for many years in breeding domestic animals. There are accurate standards for the different breeds of poultry and for many breeds of dogs. Greek sculpture defined perfection in the human female form in the statue of Venus de Medici, which is used to this day as the standard of perfection in beauty contests. No one will deny the value to the dairy cattle industry of establishing an ideal type of dairy cow. This type will be both an example and an inspiration, but unless it is correctly done it will defeat the very purpose for which it was constructed. It will have an invaluable beneficial effect upon the work of our judges, and by establishing an exact standard will serve to eliminate the bickerings and jealousies which, alas, only too frequently are engendered by faulty judging and favouritism.





By courtesy of the "Live Stock Bulletin."]

PLATE 30.

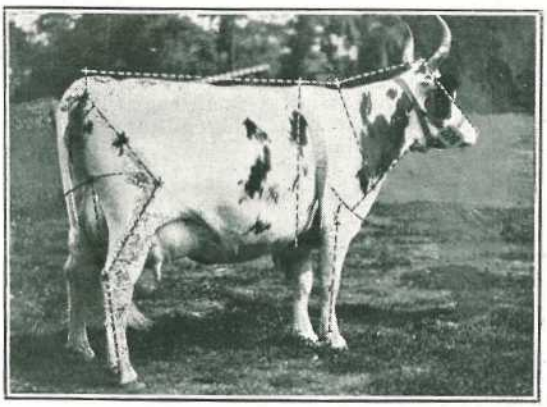
(Diagram B.) SHOWING MEASUREMENT FROM SHOULDER POINT TO SHOULDER POINT.

(Diagram C.) SHOWING MEASUREMENT FROM HIP TO HIP.

In addressing the Western Pennsylvania Guernsey Breeders' Association recently, Mr. Megargee gave the following description of measurement and proportion with the accompanying diagrams and photograph.

"In this system the unit of measurement is the head, from the poll to the flat of the muzzle, as numbered on the chart 1 to 2. Following the chart it will then be found that from the joint of the withers and the neck (3) to the pin bone is three head lengths, being divided as follows: Withers to middle of chine (3 to 4) one head length, chine to hip (4 to 5) one head length, and hip to pin bone (5 to 6) a head. Now from the withers to the point of the shoulder (3 to 7) is also a head length, and through the heart (8 to 9) the depth should be a head and a-half. This measurement varies slightly, but I regard the head and a-half as ideal. From the pin bone to the gambrel (6 to 10) is a head, from the gambrel to the hock (10 to 11) a head; and from the hock to the heel (11 to 12) a head. If one swings an arc with the hock as a pivot, with a radius of one head, it will cut across and mark the proper spot from the rear udder attachment at the point marked 13. Similarly, an arc from the junction of jaw and neck (14) with the same radius will give the spot where the upper arm joins the shoulder. From the poll to the withers should also be a head, but this varies greatly with the varying carriage of head, so that one should be careful to make the measurement only when the head is carried at the normal angle as shown in the illustration. From the upper arm, as indicated at 16, to the pastern joint (17) should be a head, but this does vary, and many excellent individuals do not conform to this. Nevertheless, I regard it as the ideal length of foreleg.

"The one measurement that hardly ever varies, even in the poorest animals, is from the hock to the heel. This is practically always exactly a head. So true is this that this measurement serves as a means of checking up on all the others. For instance, one occasionally meets with an animal that seems all wrong when measured by heads—every measurement seems too large. If it is found that the hock to heel and the head do not agree, try using the former as the standard and it may be found that the animal is correct everywhere in body but is small in head. In diagram B is



By courtesy of the "Live Stock Bulletin."]

PLATE 31 (Diagram D).

BLANCHE OF LONGLANDS, CHAMPION AYRSHIRE OF QUEENSLAND, IS ALMOST IDEALLY PROPORTIONED.

shown that from point of shoulder to point of shoulder is one head. Also in C that from hip to hip should be at least one head; if this measurement goes over a head so much the better.

"Good dairy cows are much the same, structurally. Breed differences are in the head, udder, thurl, and other minor points."

Messrs. Megargee and Kawamura plan to publish a booklet telling in greater detail of this system."—By Harold G. Gulliver, in "Country Life."

FALLOWING—THE MAIN PRINCIPLES.

In exactly what degree the increasing popularity of fallowing for wheat is attributable to the fallowing and crop competition movement it would be difficult to say, but that much of the credit is due to the inauguration of the contests is undeniable. Nor, it would seem, is only more land being fallowed—the fallowing is of an improved standard. In this connection it is interesting to note in a review in the current "Agricultural Gazette" of New South Wales, of the fallowing competitions of the season 1925-26, the following comment by the Senior Agricultural Instructor in the Western District (Parkes Centre):—

"The judging of a fallow competition to-day is a more difficult matter than it was three years ago, when usually the three leading fallows could readily be separated from the rest. Little faults that were hardly worthy of notice then have now become matters of considerable importance as a means of picking the winners. This indicates a higher average standard of work. Fallows are now worked more frequently, and where five workings used to be about the maximum, eight are now given. The average number of workings up till judging time which the ten fallows in the Parkes competition received in 1924 (including the ploughing) was 4.9, while the nineteen fallows competing in 1926 received 5.63."

For the guidance of those interested in the improvement of their methods, the following further extract is taken from the report of the Agricultural Instructor who acted as judge in the Cumnock competition:—

"While, owing to the great variation in types of soil met with in any given district on the western slopes, it is not possible to lay down any hard and fast rules for working the soil, it is undoubtedly a fact that if certain methods, with modifications to suit the individual soils, are adopted, satisfactory results can confidently be expected.

The First Essential.

"The first essential perhaps is the conservation of moisture in the soil during the ten to fourteen months prior to sowing the crop, therefore the earlier the preparation of the soil the better in most cases. If the ground is known to be dirty with wild oats, thistles, &c., a spring-tooth cultivation or discing the previous autumn is recommended. This ensures that with the advent of suitable rains there will be an early germination of weeds, which can easily be kept in check by sheep until after seeding operations are completed, when the land should be ploughed as soon as possible to an even depth, which on most classes of soil need not be more than 4 in. It is also advisable to turn under as much green growth and straw as possible, as this will augment the humus content of the soil, which is essential to a good tilth, and to the maximum activity of useful bacteria in the soil. It is very important to create as suitable conditions of moisture and soil temperature as possible for these soil bacteria, as upon their activity depends the availability of plant-food under the chemical processes of oxidation and nitrification.

Other Factors.

"While bearing these factors in mind, the farmer must not lose sight of other essential factors in the preparation of an ideal seed-bed, namely, the compactness or consolidation of the surface soil or of that layer of soil between the surface mulch and the original ploughing depth. The control of weed growth during the summer must receive attention, and also the prevention of loss of moisture by means of a suitable mulch. If the ground is known to be dirty an early harrowing is advisable to break down the plough furrows and to fine the soil, in order to induce the maximum germination of weed seeds. With reasonably clean ground, however, the first operation after ploughing should be a cultivation with a tine implement down to the full ploughing depth, in order to bring many clods (dry and otherwise), which have been ploughed under, to the surface, thus avoiding air pockets, which prevent consolidation and allow too great an aeration of the soil. During this cultivation the finer particles of soil are sifted down to fill up the spaces originally occupied by the aforementioned clods, and from that time forward compacting of the soil will be gradually brought about by the subsequent necessary cultivation, by the use of sheep, and by the rains which may fall on the fallow. This cultivation should be done before haymaking operations commence.

Subsequent Cultivations.

"Thereafter all subsequent cultivations should be carried out after any and every serviceable fall of rain, with the object of keeping a loose mulch surface, and to prevent moisture evaporating and the growth of weeds. The best implements to use are the harrows or tine implements, such as the springtooth, scarifier, &c. The various disc implements are often used, generally to deal with weed growth which has got out of hand, but these should be avoided as much as possible, as they tend to spoil the fallow, especially if used in the autumn, firstly by going too deep and affecting the consolidation, and secondly by fining the surface soil, so that it then has a tendency to run together and set hard after rain. An effective mulch need not be deeper than from 2 to 2½ in.

"It is quite recognised that when weeds, such as black thistles, saffron thistle, Mexican poppy, wild oats, &c., get out of hand, the only implements that will deal effectively with them are of the disc or skim plough types, but a cultivation at the right time, before the weeds make too much growth, and the judicious use of sheep by the farmer, can largely prevent this."

Seven Main Factors.

The main factors in the production of a good fallow are enumerated by the writer as follows:—

(1) Early ploughing or cultivation of the land to conserve moisture and rid the soil of weed and fungus pests.

(2) A deep primary cultivation in the spring to bring all clods to the surface, thus aiding consolidation.

(3) The judicious working of the fallow when necessary, which, combined with the aid of sheep, will help to produce the ideal seed-bed.

(4) The avoidance of the use of disc implements where practicable.

(5) The obtaining of a shallow mulch with a nicely clodded surface, which will prevent evaporation of moisture, erosion and washing of soil, and the crusting of the surface.

SOUTHERN BANANA PACKING TEST.

The Director of Fruit Culture (Mr. A. H. Benson) has received the following report from Mr. W. Ellison, junr., Instructor in Fruit Culture:—

The packs reported on were:—

(1) Single Banana Pack.

(2) Full hand (Up and Down Pack).

(3) Four Pack.

(4) The Ellison Pack.

A test was initiated on Mr. A. E. Gordon's plantation, at Wamuran, on the 14th June, with fruit supplied by that grower. Weather conditions when the fruit was cut—dull, cloudy, and humid.

The fruit was well developed, and was conveyed from the plantation to packing-shed by horse and sledge.

The shed in which bunches were placed, and afterwards dehanded and packed, was open at the front only, with galvanised roof.

The bunches were dehanded three and a-half hours after being cut from the plant.

The hands were kept twenty-one and a-half hours, prior to packing, thus allowing twenty-five hours' shrinkage from time of cutting from plant to packing.

The hands during the night of the 14th June, were covered with corn sacks.

The weather conditions during the shrinkage and packing period were dull, humid, and chilly at night.

The separate details of each case was as follows:—Each case being branded with the following recognition numbers—Silk Bros., Sydney, C.O.D., and Silk Bros., Melbourne, C.O.D.

SYDNEY.

Case.

No. 1—Single Pack, 29.10 dozen. Packed by Mr. A. E. Gordon.

No. 2—Ellison Pack, 28.2 dozen. Packed by W. Ellison, junr.

No. 8—Ellison Pack, 31.10 dozen. Packed by W. Ellison, junr.

No. 3—Full Hand Pack (Up and Down), 25.3 dozen. Packed by Mr. A. E. Gordon.

MELBOURNE.

Case.

No. 4—Four Pack, 31.1 dozen. Packed by Mr. A. E. Gordon.

No. 5—Ellison Pack, 30.10 dozen. Packed by W. Ellison, junr.

No. 6—Full Hand (Up and Down), 26.1 dozen. Packed by Mr. A. E. Gordon.

No. 7—Ellison Pack, 29.1 dozen. Packed by W. Ellison, junr.

The Ellison was made up as follows:—

	No. 2. Dozen.	No. 8. Dozen.	No. 5. Dozen.	No. 7. Dozen.
Full Hand	19.2	23.6	19.11	19.7
Sixes	2.0	2.0	2.0	2.6
Fours	3.8	3.6	2.8	3.4
Twos	1.6	1.0	3.4	1.8
Singles	1.10	1.10	2.11	2.0
	28.2	31.10	30.10	29.1

The cases, which were of dried pine, in all instances were lined with double newspaper. The fruit after being packed was conveyed to Wamuran Station by motor lorry on Wednesday, 16th June, and cleared from that station on Thursday, 17th June; cleared in Wallangarra on Saturday, 19th June. On Saturday, 19th June, Mr. Gordon and I left Brisbane on the Sydney Mail, arriving Sydney at noon on Sunday. On Monday, 21st June, at 10 a.m., with Mr. Gordon and Mr. Chinn (Sydney representative of C.O.D.), I visited Messrs. Silk Bros.' store and inspected the Sydney consignment, which had then arrived. The "single" and the "Ellison" pack being opened showed tightness, but the "full hand" (up and down) showed slackness. Cases were again renailed and placed in Mr. I. Silk's charge, with instructions to place them in the ripening chamber, and have them, if possible, ripe

on our return from Melbourne on the 28th June. On the afternoon of the 21st and all day on the 22nd June, I visited different banana agents, who opened various consignments for my inspection. I saw bananas from the North Coast, South Coast, New South Wales, Northern Queensland, and also from Fiji. The fruit was in all stages—from green (prior to going into ripening chamber) to coloured. There was no uniformity in the packing; the majority, however, being in "singles." "Black-ends" were very pronounced in many instances when leaving the ripening room on fruit that had been broken (during dissection of bananas after dehanding but prior to packing). Where fruit had been cut with knife, leaving sufficient stem on the shank, "black-ends" did not show. The colour of the ripe fruit varied. This, in my opinion, being to a large extent due to the period allowed fruit remaining on the bunch prior to being dehanded. I questioned different agents on this matter of colour, and they stated that same brands varied in different weeks, but the variation of colour was more pronounced in summer than in winter; this however, is no doubt due to more sap in the summer than in the winter. Many brands opened up beautiful in colour and appearance. There was no attempt in very many instances to follow grading regulations. Cases marked "Special" and "Choice" contained bananas 5½ and 4½ in. respectively. The Fijian bananas were packed in "fours," "sixes," and also "singles." The "single" banana showing "black-end" very badly, also slightly on the "four" and "sixes." All the Fijian fruit had been broken and not cut prior to packing. The length of the fruit also varied considerably—from 4 to 8 in. being the length of fruit seen in a case closely inspected. The fruit, while well matured, showed signs of rust, and in the same case were overripe, ripe, coloured, and hard green fruit.

On the night of the 22nd June we left Sydney for Melbourne. On the afternoon of the 23rd, all day on the 24th, and the morning of the 25th, I visited different banana agents and examined 250 cases of bananas at their establishments. The packs varied from "singles" to "full hand," the same conditions, as regards broken fruit, were noticeable here as in Sydney, showing the same defects. The Melbourne agents were unanimous in their opinion and in favour of all bananas being cut and not broken prior to packing. On the morning of the 25th, in company with Professor Goddard, I visited a number of agents' ripening rooms and sections, and we noticed irregular grading and immatured fruit being marketed by Queensland growers. The test packs which had arrived at Messrs. Silk Bros.'s section, were inspected by Professor Goddard and myself. At 2.30 p.m. on the 25th ultimo, a meeting had been arranged by Mr. Fisher (Melbourne representative of C.O.D.). Mr. Davis, chairman of the Agents' Association, presided. There were thirty-one other banana agents; Mr. Gordon and myself in attendance. Mr. Fisher was also present. We stated that the object of the visit and test was to endeavour to obtain a standard pack agreeable to all parties, but pointed out that no finality could be reached until the full report and scientific investigations of Professor Goddard were given regarding "squirter," as the particular packs might have some bearing upon this trouble. Professor Goddard was unable to be present at that meeting, owing to the necessity of his returning to Queensland that afternoon. The packs were then opened and examined. No. 6 pack, "Full Hand" (Up and Down), opened up very slack, and was not considered by the agents to be a suitable pack. Cases No. 4, 5, and 7 packs, opened up very tight and showed no shrinkage. In the course of the discussion the agents stated that the buyer bought on appearance and quantity. The chairman then asked if the agents approved of a standard pack for bananas. On a vote being taken, a standard was approved of unanimously. The agents were then asked to vote upon the standard pack they preferred. They favoured unanimously the "four" pack—the "Ellison" pack being second choice. The "full hand" (Up and Down) and "single" packs did not meet with their favour. Upon my request, the chairman then took a vote upon the style of "four" pack required, and it was unanimously agreed that a double finger (two over two) "four" pack on the cross be adopted. The reasons stated for this decision were:—

(1) More bananas to the case.

(2) Visibility of contents.

(3) Admitted bananas ripened up better in full hands, but if any ripe fingers on hands upon arrival harder to replace than on a four pack.

(4) Fours looked tighter and better appearance for buyers.

(5) Less case marks on fruit. Some growers—who had packed the Ellison pack and full hand pack (Up and Down), their fruit showed more case marks than the four pack.

(6) Those packing fours arrived tighter than other growers, who had been attempting the Ellison pack.

(7) It did not comply with the Victorian Fruit Topping Act.

(8) Mixed grades, small fruit packed in centre and wing fingers not being cut off in many instances.

(9) Ninety per cent. of the fruit arriving on this market were not equal in pack to the test cases, or quality and grading of the Ellison and four pack exhibited. The agents admitted both were expert packing, and growers do not pack the Ellison pack as presented them in test cases, this either being for want of instruction or carelessness.

We left Melbourne on 26th June for Sydney. On the following Monday we attended a meeting of banana agents. Mr. Chinn (Sydney representative, C.O.D.) presided. There were present twelve of the principal agents of Sydney. After considerable discussion a unanimous vote was carried in favour of the standard pack, the test packs being opened. Cases branded Nos. 2 and 8 (Ellison pack) opened up tight and showed practically no shrinkage. No. 1 "single" pack opened slack, showing heavy shrinkage. No 3, "full hand" (up and down) was very slack, and was eliminated from the test by the agents. In cases Nos. 1, 2, and 8, the fruit in all instances opened up in a firm, ripe condition, and showed no waste, being a deep rich yellow colour. The agents then voted for the class of pack they wished standardised—voting, eleven for "single" pack and one for the "Ellison" pack. They were then told that the Melbourne agents had voted in favour of the "four" pack, and another motion was then moved, "That as the Melbourne agents had accepted the 'four' pack, they, the Sydney agents, were agreeable to accept it also in place of the 'single' pack," this being carried unanimously.

The reasons stated by the Sydney agents were somewhat similar to those set out by the Melbourne agents. They also stated that cases that had been arriving in the Ellison pack had been readily bought by shopkeepers to display the fruit for window show. Two agents in particular stated if the Ellison pack would minimise or eliminate "squirter," then they would be in favour of its adoption as a standard pack. I explained that nothing would be definitely decided until Professor Goddard's scientific tests had been finalised *re* "squirter." The agents congratulated me upon the pack. I agreed to carry out tests of any reasonable description for the agents as regards shrinkage, &c., or any other matter that affected the marketing of bananas which ultimately might be of benefit to growers.

Comments.

The following comments are in reply to the agents' reasons for asking for the "four" pack:—

(1) Regarding wanting the quantity to the case, the test carried out proved that there is very little difference, but to get fruit to arrive at its destination tight and eliminate defects, such as "wet end," "black end," and "squirter," came before quantity (dozens to the case).

(2) No pack will give complete visibility of the whole contents of a case of bananas; further, if packed on the cross pack, the spiking bananas used in the centre (if any required) do not show when the side is taken off the case for inspection.

(3) If growers will follow advice regarding cutting each ridge of bananas according to its merits of maturity on cutting days, and give the necessary period for shrinkage to notice fruit showing signs of springing, this trouble will be minimised. But if the centre-spiked bananas on the cross pack arrive ripe it will require the one half of the case to be pulled out to replace bananas in centre.

(4) The appearance may look better and fuller, but it is what the buyers are educated to see by efficiency of any pack that counts.

(5) Less case marks.—All packs show case marks, but each pack marks the fruit differently; further, the shrinking of fruit prior to packing again applies in this instance and will minimise the complaint.

(6) *Re* four arriving tighter than the "Ellison" pack. In some instances this is so, but if growers were given instruction and demonstrations and had been packing this pack for the same period as other packs there would be much improvement.

(7) Non-complying with Fruit Topping Act—Interstate. I visited the Chief Inspector of the Department of Agriculture, New South Wales, and was informed visibility had nothing to do with the Regulation, also the Ellison pack complied with the Regulation as much as the four cross pack. The Act states, "All contents of the case shall comply with the grade regulations laid down for that particular fruit and grade."

(8) Inclusion of small fruit.—This applies to any pack with respect to small fruit being placed in a case, particularly where spiked bananas are used to fill up the centre of a case on the cross pack.

Should a "four" pack be adopted, the question arises—Can it be made a uniform pack?—because, should fruit be over a certain length, it will not pack two sections across the case, which necessitates its having to be packed across and lengthways with the case. Therefore, the question of visibility arises here again. I am convinced, as far as a pack is concerned, that the "four" pack will suit the buyer, but the "Ellison," if properly packed, will suit both buyer and grower and minimise many defects; also, assist and make it easier for growers to grade better. The admission of the Sydney agents that this pack in certain instances was bought readily for window display of bananas proves that they arrive and ripen to the best advantage. Further, it will be of benefit to the grower by facilitating handling and packing, and it can be made a standard pack uniform fifty-two weeks in the year, irrespective of size of the fruit. However, I consider it unwise to recommend a standard pack at the present time, for, until Professor Goddard has completed his scientific tests in respect to "squirter," we have nothing concrete to work upon. When it has been decided to proclaim a standard pack it will be necessary to ask the Department of Agriculture of New South Wales to also adopt the standard pack.

EGG-LAYING COMPETITION.

MOUNT GRAVATT.

This competition commenced on 10th April. There are 192 White Leghorns and 6 Brown Leghorns in Section 1; Section 2 has 120 Black Orpingtons, 6 Silver Wyandottes, and 6 Langshans.

Following are individual scores averaging 16·9 per bird for the month:—

SECTION 1.

White Leghorns (except where stated).

Competitor.	A.	B.	C.	D.	E.	F.	Total.
E. V. Stuckey	62	60	59	55	61	54	351
P. U. Gooch	39	57	66	57	57	60	336
G. Pitt	60	63	59	55	43	54	334
S. L. Grenier	54	61	56	58	58	45	332
W. and G. W. Hindes	54	56	44	45	54	64	314
Mrs. L. F. Anderson	56	58	57	44	30	66	311
G. Brash	50	48	57	60	56	36	307
J. J. McLachlan	40	62	63	34	59	48	306
G. W. Cox	67	38	44	51	58	42	300
Mrs. R. E. Hodge	53	55	49	30	44	62	293
R. C. J. Turner	43	58	46	50	42	53	292
J. Harrington	57	52	40	63	32	47	291
Sunrise Poultry Farm	55	53	34	39	56	54	291
M. F. Newbury	61	21	59	55	55	35	286
G. Hanlon	52	46	57	35	36	56	282
J. E. G. Purnell	34	50	34	55	47	60	280
E. W. Ward	56	62	46	27	27	54	272
J. Earl	39	27	58	44	57	41	266
H. Fraser	58	4	38	57	34	64	255
J. Franklin	15	56	23	46	54	54	248
A. W. McMurtrie	36	60	59	38	15	24	232
Geo. Marks	28	40	29	45	60	27	229
B. Driver	50	48	44	40	18	23	223
H. Cutcliffe (Brown Leghorn) ..	13	62	50	33	12	41	211
W. Wakefield	61	2	25	29	54	30	201
W. E. Woodward	54	35	16	41	18	32	196
W. J. Boston	18	53	5	50	61	0	187
A. S. Walters	52	1	24	3	59	34	173
J. Columbine	12	33	34	34	34	6	153
M. F. Marsden	5	5	28	46	15	39	138
T. H. Craig	46	7	32	18	0	21	124
H. P. Clarke	6	74	2	9	12	26	109
R. M. Moore	3	0	11	40	2	30	86

SECTION 2.

Black Orpingtons (except where stated).

Competitor.	A.	B.	C.	D.	E.	F.	Total.
W. H. West	59	60	64	48	56	67	354
E. Walters	68	57	66	62	58	30	341
Eclipse Poultry Farm	45	59	62	50	73	36	325
J. Columbine	42	56	51	64	57	55	325
J. J. McLachlan	35	56	47	53	50	48	289
W. and G. W. Hindes	53	49	43	62	48	31	286
J. Potter	58	29	45	68	32	45	277
P. U. Gooch	51	65	50	28	42	39	275
E. W. Ward	56	52	33	34	46	50	271
W. J. Smith	56	50	39	40	33	43	261
R. Burns	36	47	52	31	54	36	256
Mrs. Potter	47	67	31	41	51	8	253
J. Hutton	62	30	54	19	30	58	253
W. T. Jones	59	50	33	9	29	67	247
G. Rodgers	22	42	24	43	63	44	238
W. R. Wilson	63	70	37	30	9	28	237
W. D. Melrose	23	26	15	33	65	52	214
E. C. Stead (Silver Wyandottes) ..	35	35	22	37	54	51	214
H. Cutcliffe	48	39	24	3	55	23	192
Mrs. A. E. Gallagher	37	57	26	36	30	0	186
E. A. Smith	30	25	22	16	26	22	141
Thomas and Shaw (Langshans) ..	45	4	5	3	28	28	113

THE STORAGE OF EGGS.

Compiled by P. RUMBALL, Poultry Instructor.

On the commercial scale eggs are preserved almost universally by means of cold air storage. For the small producer or consumer such a procedure is generally impracticable, and resort has been made to simpler methods, such as packing the eggs in sand, bran, ashes, salt, lime, &c. These methods have, however, now been abandoned in favour of storage in solutions in which the eggs are immersed and held until consumed or sold, states the Department of Scientific and Industrial Research, London, in a report on the "Storage of Eggs," a copy of which has been received by the Department of Markets and Migration. This report, which deals most exhaustively with all phases of the subject, may be obtained directly from H.M. Stationery Office, Adastral House, Kingsway, W.C. 2, or from Messrs. Gordon and Gotch, Limited, Little Collins street, Melbourne. The price is 1s. 3d.

Continuing, the report states that the choice of a suitable solution is determined by certain considerations. The shell of the egg and its adjoining membranes are permeable to water and certain dissolved substances, and care must be taken that the preserving solution does not contain any ingredient likely to pass into the egg, thereby affecting its flavour or contaminating it in some way. Various substances have been tried and discarded for different reasons, so that at the present the two solutions most commonly used are a solution of sodium silicate, better known as water glass, and lime water, to which salt is usually added.

Fundamentally the preservation is still one requiring a certain degree of cold, and although for satisfactory results constancy of temperature is not required, it is essential that the eggs should be stored in a cool place where, if possible, the temperature should always lie in the range of 33 deg. to 45 deg. Fahr.

From their investigations the Board of Agriculture and Fisheries recommend the following specific solutions:—

(*a*) Water Glass.—A strong solution containing approximately equal parts by weight of sodium silicate and water is sold commercially. It is very viscous and has a specific gravity of 1.7. A 5 per cent. solution of this is a convenient concentration to use.

(*b*) Lime Water.—Four parts of finely slaked lime are mixed with twenty parts of cold water, and the whole well stirred for several days to ensure saturation. One part of salt is then added and the clear solution decanted and poured over the eggs which should be placed in suitable wooden, cement, or galvanised iron containers.

If the containers are open to the atmosphere the carbon dioxide in the air reacts with the solutions, giving a white precipitate. In the case of lime water it is simply a precipitate of calcium carbonate, whereas with the water glass silica itself is precipitated, due to the neutralisation of the alkali. It is therefore advisable, in order to maintain the solutions at the required strength, to cover the containers and so limit the ingress of carbon dioxide. An alternative method is to cover the liquid surface with a layer of oil, such as liquid paraffin or olive oil.

In both cases the eggs to be preserved should be clean and new-laid, and should not at any time have been subjected to a temperature much higher than 60 deg. It is therefore advisable to candle the eggs and discard cracked ones or any departing from this standard of freshness. Most investigators claim that water glass in the more satisfactory solution. Using the solutions described above, and, in addition, storing the eggs at a temperature of 32 deg. to 35 deg. Fahr., eggs have been preserved in the course of experiments by the Department for twelve months in both solutions with good results. The taste of the eggs stored in water glass was excellent, the air chamber was the same size as before storage, and the white had all the consistency of a new-laid egg. The eggs fried and poached, but nearly always cracked on boiling unless the shell was first pierced at the broad end. The only other point was that the shells had a slight crusty deposit which was not removed on washing with water.

The eggs stored in lime water were not so good, although the flavour was excellent. In all cases the air chamber had completely disappeared and the white was more fluid and tended to spread when the contents of the egg were emptied into a dish. The shell in every case was markedly thinner and appeared rough and amorphous. In general, the shell cracked on boiling, even though it was first pierced. Presumably, the action of the lime water was to make it very brittle.

The role played by the water glass in preserving the eggs is very simple. Being a colloid it does not pass through the egg membrane, and, indeed, Hendrick has shown that the silica content of eggs is not increased after two years' immersion in water glass. Further, Berger has shown that within three to seven days the water glass is deposited in the pores of the shell, completely sealing it. This, of course, is the reason why the shell has to be pierced prior to boiling. Once the egg is sealed it suffers no change resulting from external causes such as mould or bacterial invasion.

Commercial water glass is very alkaline, and some controversy has taken place as to whether a neutral sodium silicate would give better results. A certain amount of alkali is necessary to dissolve the silica, but it is claimed that the excess alkali affects the flavour of the egg. This fear, however, appears to be groundless in view of the fact that with water glass the egg is so quickly sealed. It is possible, however, that the alkali concentration influences the extent of the action of the water glass on the shell surface.

With lime water it would appear that the egg is never completely sealed, and therefore permits the passage of water through the shell, which fills the air chamber. This is rather striking, in that the solution in the present experiments (containing 5 per cent. sodium chloride) had a much lower freezing point, and, therefore, greater osmotic pressure than the white of the egg. The solubility of lime in water is small (approximately 1 in 700), and the freezing point of the lime solution will, therefore, be very approximately that of a 5 per cent. salt solution, *i.e.*, 3 deg. C. One would therefore have expected water to pass from the egg to the lime solution, thereby giving rise to an increased air chamber. That it does not can only be explained by supposing that the lime attacks the egg membranes, destroying their permeability, just as it attacks and wears away the shell.

The efficiency of water glass and lime water as a means of preserving eggs is without question. Used in conjunction with a rough system of cold storage (*i.e.*, paying no particular regard to constancy of temperature, but merely temperature limits) either method gives excellent results, with the preference, so far as the present experiments show, in favour of water glass. The cost of the water glass is small, and apart from the extra labour involved—*e.g.*, the washing of the eggs on removal from the solution—the only disadvantages are that the surface of the shell is marred, and there is every possibility of the shell cracking on boiling. It would seem, however, that further research might remove these objections. Moreover, there appears to be no reason why, if clean eggs alone are used, the same preserving liquid should not be employed for several storage seasons. Lime water possibly has the advantage in this respect, as it is definitely antiseptic and is less likely to suffer from mould and bacterial contamination than water glass under the same conditions.

YOUNG JUDGES' COMPETITIONS AT AGRICULTURAL SHOWS.

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

Each year at the Royal National Show at Brisbane, at the Royal Show at Toowoomba, and at many provincial and country shows throughout this State, young judges' and novice judging competitions are scheduled, these contests covering the Horse, Beef and Dairy Cattle, Pig and Dog Sections.

That the contests are increasing in popularity is demonstrated by the liberal entry and the enthusiasm shown, and that they are not lacking in financial backing is proved by the fact that on every occasion donors come forward with attractive and equally liberal cash or trophy awards, while the societies themselves take an active part—first in providing the classes and in endeavouring to make them of more educational value, and secondly in making additional awards and arranging all the necessary detail to be observed in carrying them through.

At the Royal National Agricultural Show again this year Colonel Donald Cameron, M.H.R., has donated £50, representing first prizes to the value of £4 and second prizes £2 in six different sections, with an additional second prize of £2, while in the Illawarra milking shorthorn class the "Andrew Moles" memorial plaque is being presented in memory of the late Mr. Andrew Moles, an enthusiast in these movements. Medals and trophies form the prize money also in the section in which novice judges adjudicate on dogs.

A New Scheme.

However, it has become necessary, owing to the increased entry and to the somewhat unsatisfactory nature of the way in which previous contests were arranged, to introduce a new system—a system aiming at greater accuracy and of more practical value to the competitors, at the same time of greater educational value both to those actually engaged in the contest and to the onlookers, whether they be farmers or not.

A special sub-committee, of which the writer was one, have therefore submitted the scheme outlined herein, and which has been approved by the Council of the Royal National Agricultural and Industrial Association of Queensland for trial at the August Show, 1926.

Useful Hints for Young Judges.

The following suggestions have been prepared, not as the "sum total," as all young judges should note, but as indicating a number of special qualifications which fit a person to undertake the selection of animals or to act as a judge, no matter on what occasion or whatever the class of stock or product he has placed before him. The hints were in the first instance suggested for the young judges in the Pig Section in which two Berkshire boars were adjudicated upon, but being of general interest are published for the benefit of readers, one and all.

Note the Nature of the Useful Hints.

1. Be confident. Judges of any class of stock or product must know their business; they must understand the standard of excellence aimed at and the comparative value of each point on which the animal or product is judged.

Remember: The world makes way for the man who *knows*, the man who *knows* he *knows*.

2. Knowledge of your business inspires confidence. Young judges should not be afraid to ask questions on points on which they are not quite certain.

3. Be punctual in answering questions submitted to you by the judge, for judging is not guess work. If you give incorrect answers it is the duty of the judge to put you right. We live to learn.

4. Study the animal or the object you are to judge, and compare the respective points alongside those referred to in the standard of excellence.

5. Be prepared to undertake the judging of any other animal or class the judge may select to test your ability. You should practise judging and watch other judges at work as opportunity offers.

6. Study the list of disqualifications or objections to which reference is made in all standards of excellence. Judging is largely a matter of discovering faults or imperfections, and of comparing the seriousness of these faults with the increased value allowed for perfection. Some imperfections develop into disqualifications, some have hereditary tendencies, and tend to reduce the commercial value of the animal or product, some are of a less serious nature, and are not likely to influence the

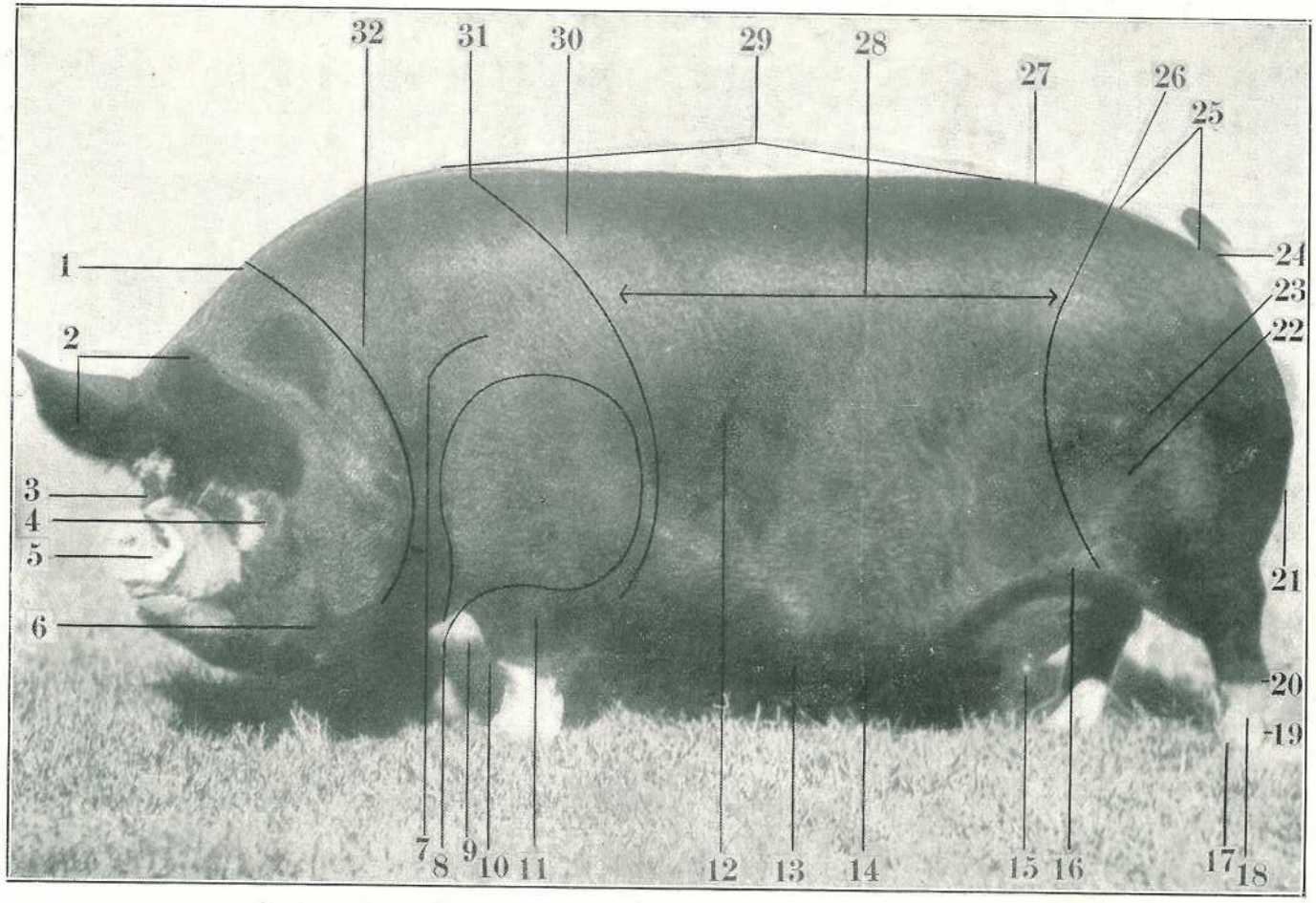


PLATE 32.—THE POINTS OF A PIG.

Description of Plate 32.

Principal Points of the Pig.

1. Head.
2. Ears.
3. Eyes.
4. Face.
5. Nose or Snout.
6. Cheek or Jowl.
7. Shoulder.
8. Shield or Shoulder in Males.
9. Chest.
10. Knee.
11. Forearm.
12. Side and Ribs.
13. Belly.
14. Site of Sheath in Males.
15. Teats.
16. Flank.
17. Foot and Hoof.
18. Pastern.
19. Dewclaws.
20. Fetlock with Hock Joint close to the Fig. 21.
21. Site of Testicles in Males.
22. Stifle.
23. Ham.
24. Tail.
25. Rump.
26. Hindquarter.
27. Loin.
28. Middle Piece.
29. Back.
30. Top of Shoulder.
31. Forequarter.
32. Neck.

animal's value for show or stud purposes, but it is the animal whose scale of points approaches perfection who realises the highest value, and for whom there will be keenest competition if offered for sale.

7. Be careful in filling in your award cards, and be accurate with your figures. Officials of the society and representatives of the Press will inspect your cards.

8. Be prompt in attendance, and if unsuccessful in gaining the coveted awards, be a good loser and come up smiling again next time.

9. Carefully note the following:—In judging and selecting pigs, the following points should be specially noted:—

(*a*) Constitution as noted by general healthy appearance of animal, the quality of its skin and hair, the width between the eyes and ears, the width and depth of chest and body, the strength of the legs and feet, and by the animal's vigour.

(*b*) Pedigree.—For stud purposes, it is essential that the animal's pedigree should indicate careful breeding, that the parent stock were of reliable, vigorous, and profitable strains, and that, in the case of a sire, he be unrelated to the dams to which he is to be mated.

(*c*) Type and Quality.—Type is important, as indicating the result of careful selection of the parent stock. Quality counts for much in the commercial world. Quality stock always realise top prices; they pay handsome dividends.

(*d*) Temperament.—Contentment and docility indicate the temperament of the animal. Note the appearance of the eye; a white streak in the eye is regarded as a sign of bad temper.

10. Value Your Animal.—A judge is quite within bounds in asking the approximate value of an animal or of its products. Practical experience and knowledge of the commerce of the animal is invaluable.

The Aim of These Competitions.

Young judges' competitions aim principally at one special objective—viz., that of training judges, not only for the purpose of judging at agricultural shows, but more particularly in training them to become efficient in the selection of any class of stock they may be called upon to handle in the ordinary routine of farm work, and to know type, quality, and value when actually selecting stock for their own purposes on the farm, for there is no more important initial step in taking up stock raising than in being able to act on one's own initiative in inspecting and in purchasing breeding or store stock. It is important also when once stock have been produced that the breeder should be able to determine their commercial value and to know whether they are worth retaining in the stud or not. It is the desire of the promoters of these competitions that, as a result of the knowledge gained in taking part in them, contestants will seriously consider following the matter up with a view to some day being appointed a judge in some one or other section of agricultural or other show activities, for certain it is that we need to train judges competent to undertake this important phase of agriculture. It is advisable for young judges to become associated with the agricultural society in the district in which they reside, as well as with the larger district and Royal shows. Junior farmers should also consider the advantages of becoming members of the Breed Societies controlling the interests of the breeds in which they are most interested, and to become subscribers to one or other of the Agricultural Journals specialising in or devoting space to these breeds.

The Department of Agriculture and Stock, as well as the Agricultural Societies, are prepared to supply any further information required at any time.

The Breeds of Stock to be Adjudicated Upon.

Competitions at the Royal National Show for young judges cover Clydesdale stallion, Shorthorn cow, Hereford cow, Ayrshire cow, Jersey cow, Illawarra Milking Shorthorn cow, Friesian cow, Guernsey cow, Berkshire boar, Tamworth boar, Fox Terriers, and Cocker Spaniels.

As this article deals principally with the judging in the Pig Section, the standards of excellence and other information for the Berkshire and Tamworth breeds of pigs only are given. Standards for any of the other breeds to be adjudicated upon would be supplied direct by the Royal National Association.

The standards of excellence are worthy of careful note. The standards should be used as a guide when practising judging and be preserved for use when actually selecting stock in these breeds. They are the official standards recognised by the societies controlling these breeds.

The score card for Boar and Sow pigs with the scale of points have been specially adapted for use in these competitions; they are not set out in the same way as an official scale of points would be, as for this purpose the more detailed scale of points would be unnecessary. This particular scheme has been adopted to enable the young judge to calculate the comparative value of the points to be allotted to each animal. These score cards will not be used on judging day; they are for practice and for reference only. The only card the young judge will have to fill in is the examination card (see page 148) to which reference is made below.

Plate 33.

Facsimile of Gold Medal presented at Toowoomba Show, 1926, in the Young Judges' Competition (Pigs) and won by Mr. "Bert" Whittaker, Broxburn Stud Piggery, Broxburn, Darling Downs, Q.

Score Cards for Boar and Sow Pigs.

Scale of Points.

(*a*) *General Appearance*—

1. Action—Distinguished, smart, active.
2. Skin—Smooth, pliant, scurfless, and free from wrinkles.
3. Hair—Plentiful, fine, short.
4. Form—Deep, broad, long, compact, standing squarely on legs.
5. Breeding organs in boar—Sheath free from inflammation and testicles medium size and evenly placed. 25

(*b*) *Head and Neck*—

1. Ears—Thin, pricked, and inclined slightly forward.
2. Head—Medium-sized, broad between eyes, eyes bright and kindly.
3. Jowl—Full, clean, running well into neck.
4. Neck—Muscular and broad, evenly set on shoulders, medium length. 20

(*c*) *Forequarters*—

1. Shoulders—Broad, deep, full, and compact.
2. Chest—Wide, deep, and full.
3. Girth—Good depth and width around heart.
4. Legs—Straight, short, strong, pasterns upright. Feet compact and medium size. 25

(*d*) *Body*—

1. Back—Long, straight, and slightly arched.
2. Sides—Deep and well let down, with well-sprung ribs, level underline.
3. Belly—Full and thick with at least 12 teats.
4. Loin—Full and wide, powerful, and not drooping.
5. Flank—Thick, well back, and reaching down on to leg. 30

(*e*) *Hindquarters*—

1. Rump—Long, wide, evenly fleshed, and not drooping.
2. Hams—Broad, long, deep, and fleshy down to hock.
3. Tail—Fine tapering, short, and set well up, nearly level with back.
4. Legs—Straight, short, strong, pasterns upright. Feet compact and medium size. 30

Total 130

Note.—In individual breeds the Form, Head, Ears, and Colour, &c., vary somewhat, hence the above is only a general description.

The following are all regarded as objectionable features in either a Berkshire or a Tamworth boar.

Action—Sluggish and clumsy.

Hair—Coarse, curly, bristly, or maney.

Form—Predominance of certain points, especially heavy shoulders or forequarters generally, weak loins and light hams.

Breeding Organs—Boars: Rupture, one testicle only down.

Sows: Deficiency in, or very irregularly placed, or blind teats, injured or diseased udder.

Head—Narrow between ears.

Shoulders—Coarse, heavy, or wide and open on top.

Chest—Narrow, with both forelegs apparently coming from almost the same point.

Legs—Crooked, weak, pasterns down, feet flat or splayed.

Back—Weak and hollow when pig is standing at rest.

Sides—Shallow or not well let down; flat or short curved ribs.

Belly—Flaccid, or wanting in muscle, or gutty.

Loin—Narrow and weak.

Flank—Thin and not well let down.

Rump—Short, narrow, or drooping.

Hams—Narrow, wanting in depth.

Tail—Coarse or set low.

The Examination Card.

ROYAL NATIONAL AGRICULTURAL AND INDUSTRIAL ASSOCIATION OF QUEENSLAND.

YOUNG JUDGES' COMPETITION.

Examination Card.....

1. Place the animals before you in their order of merit, giving halter or pen numbers.

First.....

Second.....

Third.....

2. How does the animal you have placed first compare with the highest standard you have in your mind?

.....

.....

.....

3. State the outstanding points in the animal you have placed first.

.....

.....

.....

4. State where the animal you have placed second fails in comparison with your first choice.

.....

.....

.....

5. State where the animal you have placed third fails in comparison with your first choice.

.....

.....

.....

.....

Name.....

Date.....

The young judge will be requested to fill in the details asked for on the Examination Card, and after having judged the boars and having placed them in the order of merit he considers they should occupy, should sign and hand the cards in to the steward in charge of the competitions. Care should be taken to write plainly and to keep the cards clean.

Colour, type, conformation, character, and general appearance vary with different breeds. Males should be distinctly masculine and females distinctly feminine in character, irrespective of breed. The pig is a quick-growing, early-maturing animal, hence size and condition for age count for much. Other important characteristics are:—Constitution, temperament, pedigree, quality, prepotency, prolificacy, and adaptability.

Standard of Excellence for Berkshire Pigs.

As adopted by the Council of The Australian Stud Pig Breeders' Society.

Colour—Black, with white on face, feet, and tip of tail.

Skin—Fine, and free from wrinkles.

Hair—Long, fine, and plentiful.

Head—Moderately short, face dished, snout broad, and wide between the eyes and ears.

Ears—Fairly large, carried erect or slightly inclined forward, and fringed with fine hair.

Neck—Medium length, evenly set on shoulders; jowl full and not heavy.

Shoulders—Fine and well sloping backwards, free from coarseness.

Back—Long and straight, ribs well sprung, sides deep.

Hams—Wide, and deep to hocks.

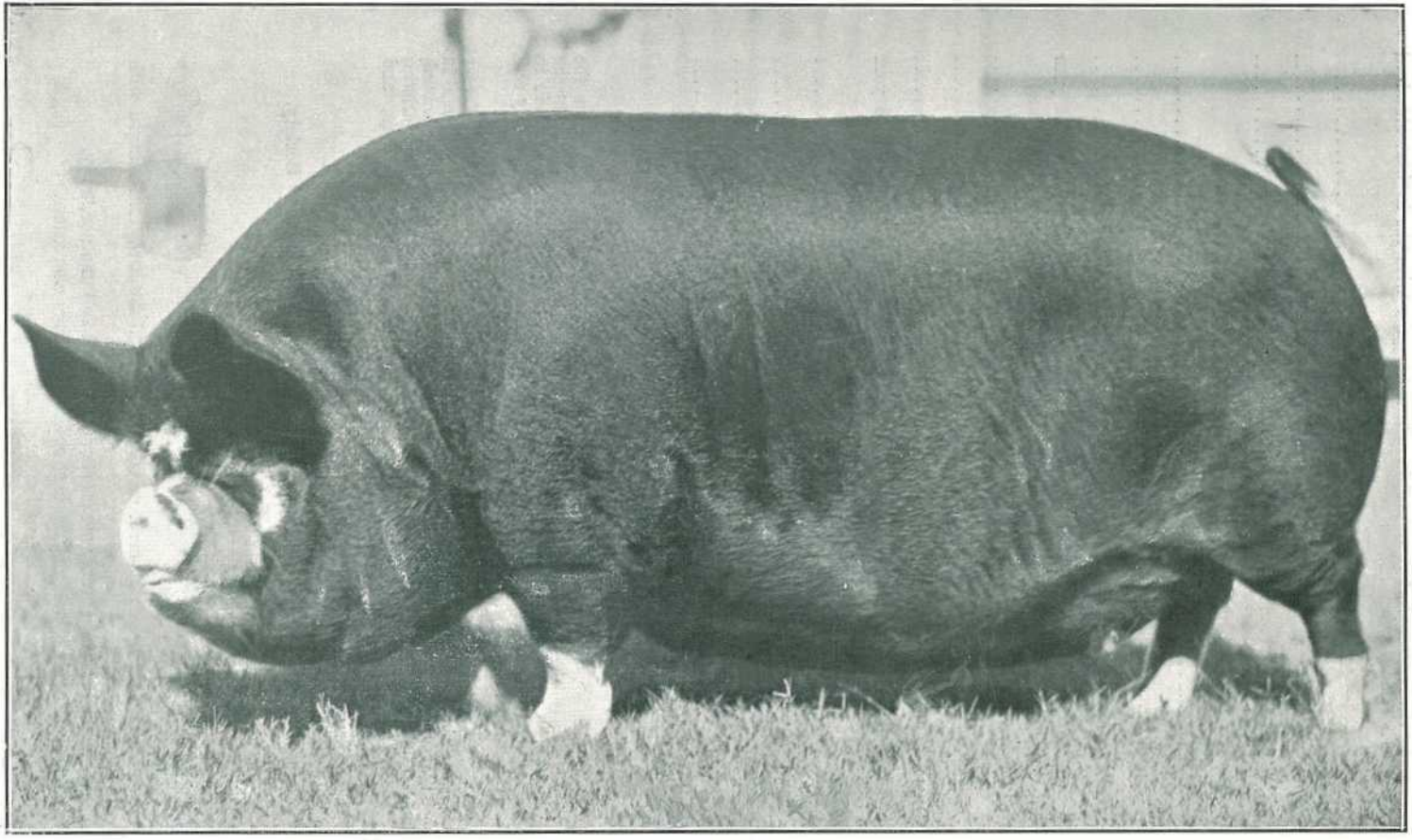


PLATE 34.—A VICTORIAN-BRED BERKSHIRE SOW, "TOPSY OF YARRA" (3702).
Her progeny have been consistent prize-winners. She also won many prizes at Victorian and New South Wales Shows. She represents a very desirable type of the Berkshire breed.

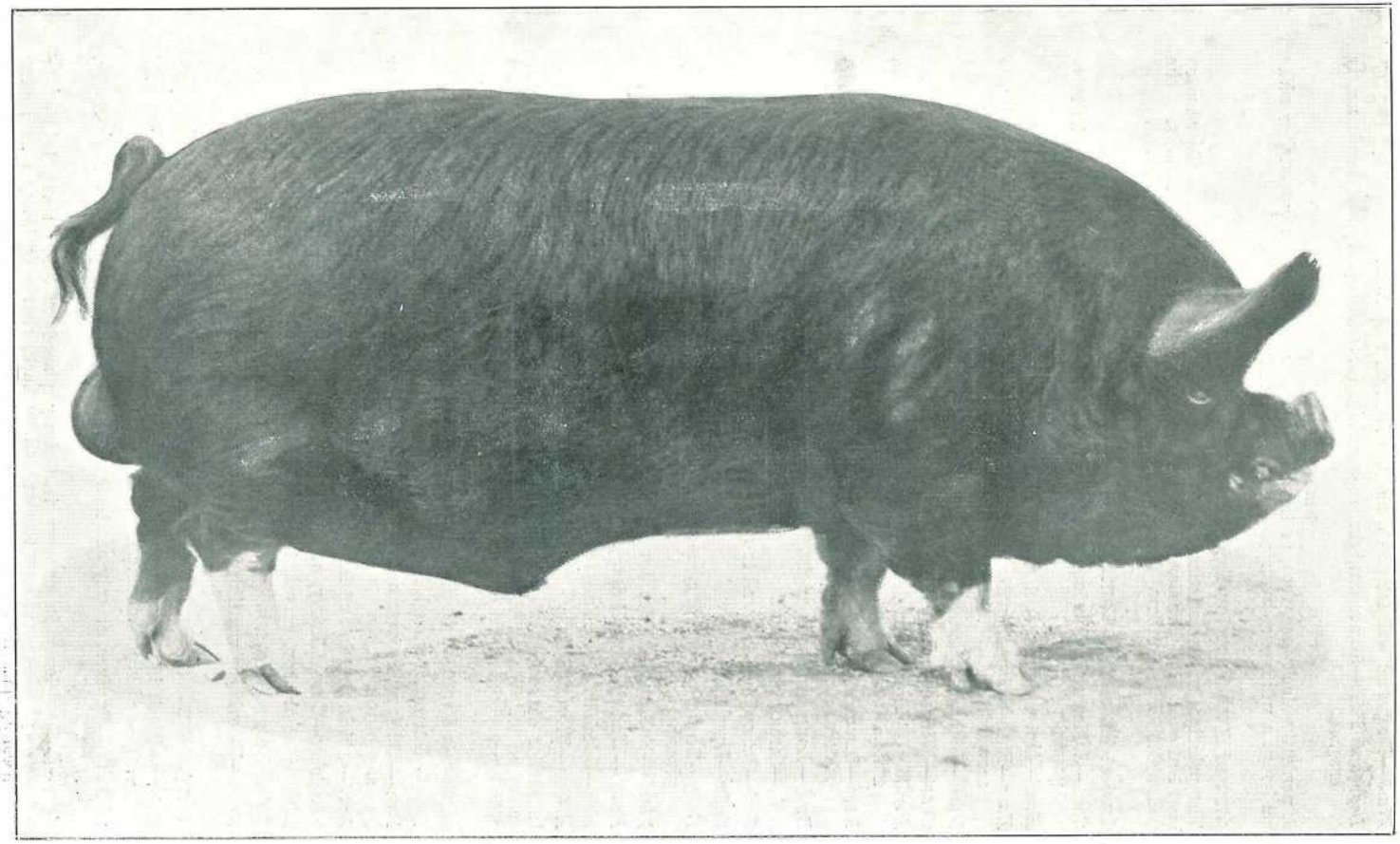


PLATE 35.—TYPICAL BERKSHIRE BOAR "WILCANNIA SPECIAL" (3709).

Property of Mrs. E. M. Lennie, a noted Victorian breeder. This boar has a wonderful prize record, and his progeny have a record of which any stud breeder might well be proud. His markings are characteristic of the breed, while he is of excellent type and conformation.

Tail—Set high and fairly large.

Flank—Deep and well let down, making straight underline.

Legs and Feet—Short, straight, and strong, set wide apart, and hoofs nearly erect.

OBJECTIONS.

A perfectly black face, foot, or tail; a rose back; white or sandy spots, or white skin on body; a white ear; a very coarse mane; and inbent knees.

Standard of Excellence for Tamworths.

The principal characteristics of the breed, as set out in the standards adopted by The National Pig Breeders' Association of England, are as follows. The Australian Stud Pig Breeders' Society have a similar standard for this breed.

Standard of Excellence, Tamworth Boar or Sow.

Coat—Golden red, abundant. straight, and fine, and as free from black hairs as possible.

Head—Not too long, fact slightly dished, wide between ears, jowl light.

Ears—Rather large, with fine fringe, carried rigid, and inclined slightly forward.

Neck—Light, medium length, proportionately and evenly set on shoulders.

Chest—Wide and deep.

Shoulders—Light, free from coarseness, and in alignment with forelegs below, and with side as seen from in front.

Legs—Strong and shapely, with good quality bone, and set well outside body, pasterns short and springy, standing well up on toes.

Back—Long and level, slightly arched traversely above shoulders.

Loin—Strong and broad.

Tail—Set on high and well tasselled.

Sides—Long and deep.

Belly—Straight underline, and in a sow a fair number of sound teats evenly placed.

Flank—Full and well let down.

Hams—Well developed, deep, full to hocks, and giving a tense appearance.

Skin—Flesh coloured, free from coarseness, wrinkles, or black spots.

Action—Firm and free.

In earlier standards of excellence several objectionable features in Tamworths were referred to. We list them here for the benefit of breeders not fully conversant with this type.

Objectionable Features in Both Boar and Sow.

Head—Narrow forehead, kinked or upturned nose.

Ears—Thick and coarse or drooping too far forward; loose and lopped ears are also objectionable.

Jowl—Thick, coarse, and heavy.

Shoulders—Coarse, heavy, or wide, and open at the top.

Ribs—Flat or short curved, light back ribs.

Loin—Narrow or weak.

Belly—Flaccid, or wanting in muscle, gutty or podgy.

The Disqualifications Included—

Colour—Black hairs or patches on the skin. (It will be noted these are still considered objectionable.)

In Boars—Rupture, or only one testicle let down, vicious temper, coarse, wrinkly, or ungainly.

In sows—Deficiency in or very irregularly placed or blind teats, injured or diseased udders, vicious temper, hollow back, coarse or heavy mane; poor breeding qualities.

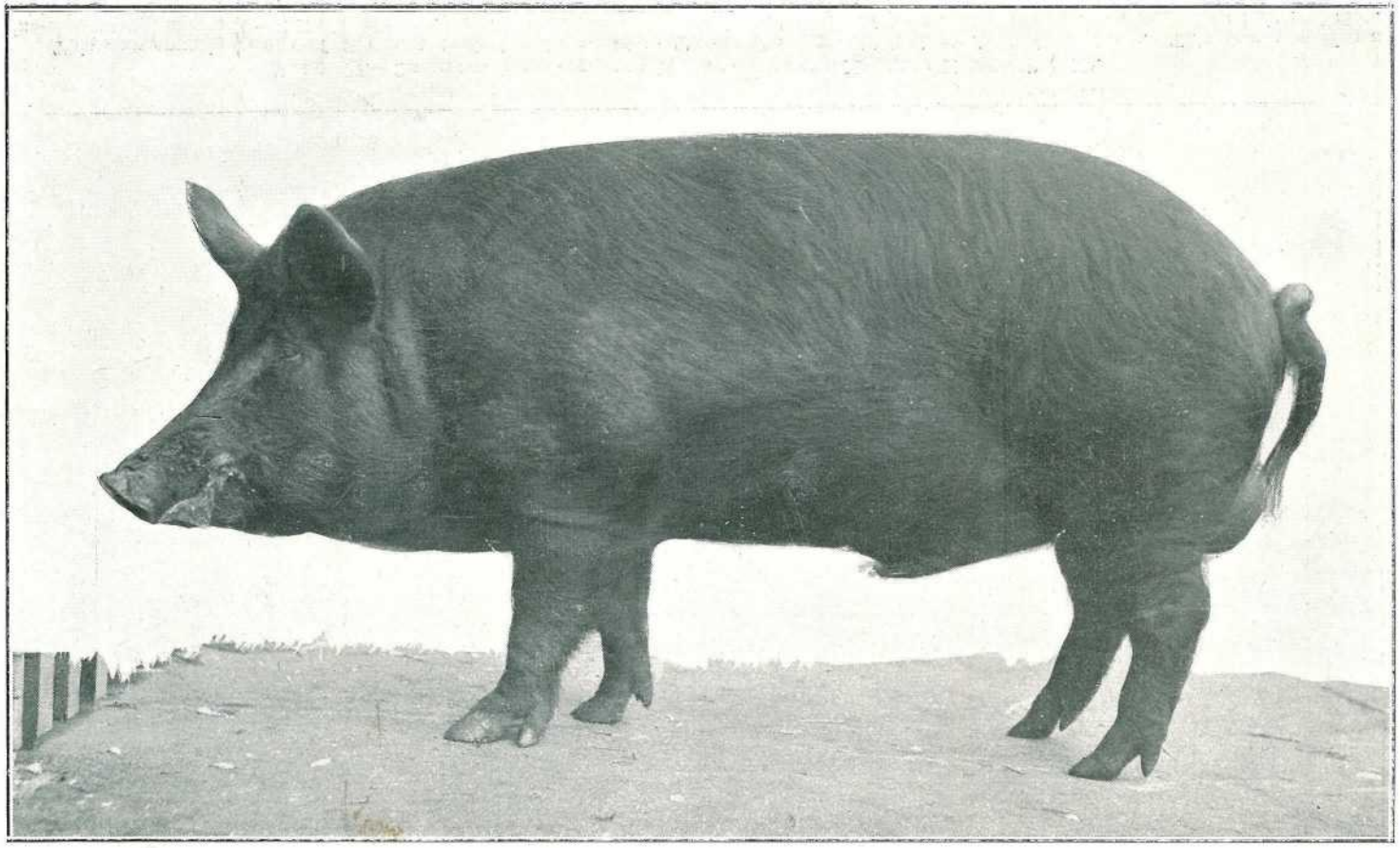


PLATE 36.—TYPICAL TAMWORTH BOAR "BLAKENEY SYDNEY" (389).

Property of Mr. F. Ebbun, of Kelso, N.S.W., winner of First Prize and Champion, Sydney Show, 1926 ; also First and Champion, Bathurst (N.S.W.), 1926. A neat attractive type of Tamworth, full-fleshed and well-developed, yet not coarse.

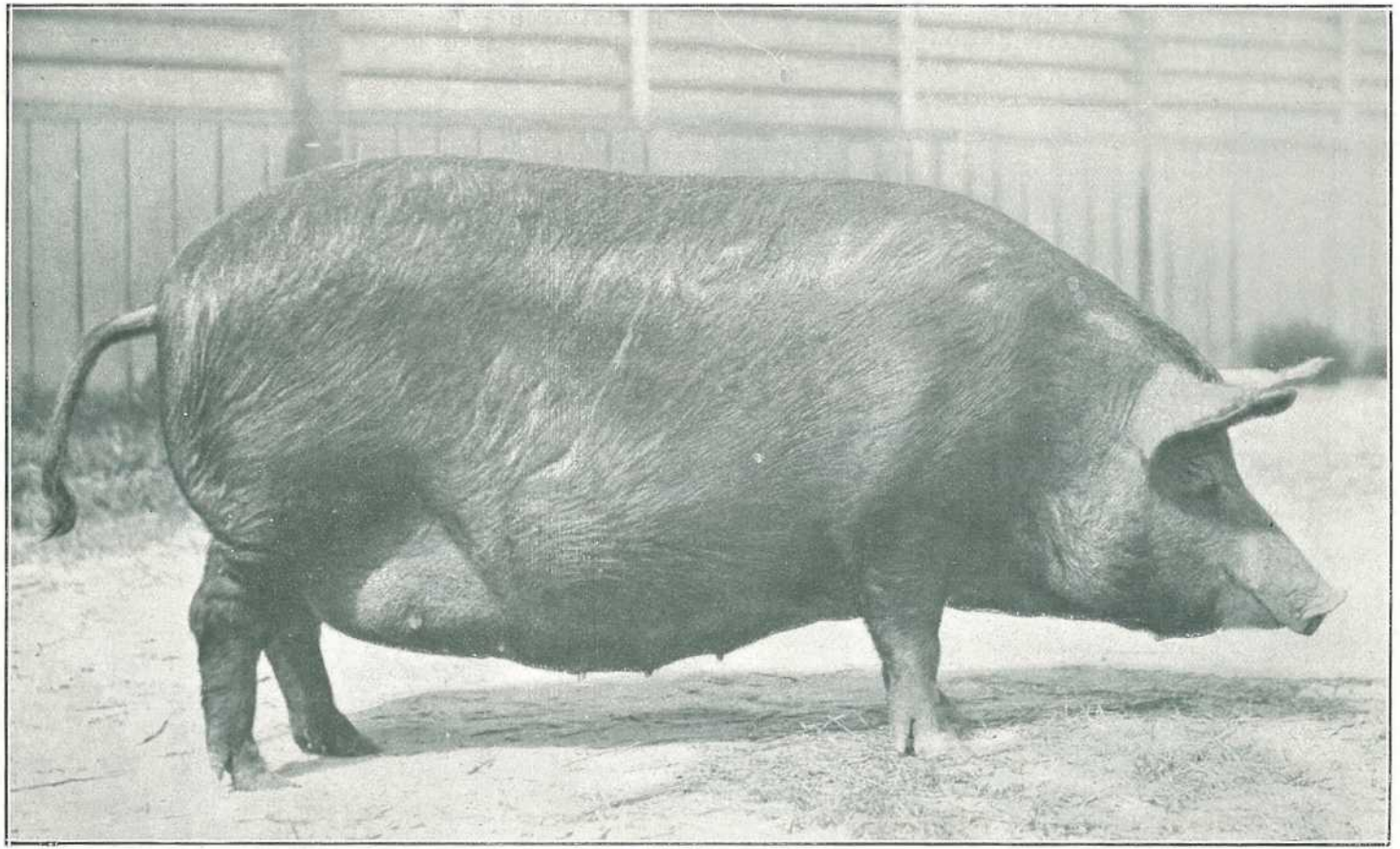


PLATE 37.—CHAMPION PRIZE-WINNING TAMWORTH SOW "MANNING ELNORA" (243).
This sow appeals as one of the most typical and up-to-date Tamworths yet exhibited at Australian Shows. This sow was also

JUDGING PIGS—A FEW USEFUL HINTS.

It is a great advantage to be systematic in judging any class of product or animal in order to do justice to each point and to make sure that no essentials are overlooked. Judges should be consistent, too, in regard to type and conformation. Production records are important and should be inquired for as the judging proceeds.

A good plan is to approach the animal from the front.

Front View.—Here observe the width of back and uniformity of width throughout, remembering that the most productive and valuable animals are those that are specially well developed in the back, loins, and hindquarters; the width and smoothness of top of shoulders, the evenness with which the neck connects to the shoulders, the width of the head, its length and shape; width between eyes and ears and the shape and set of the ears should then be noted. The presence or absence of wrinkles, dish in the nose, the face, clearness of eyes, which should be bright and kindly, and the facial markings are important. Look for tusks and overgrown teeth in aged pigs; they are objectionable.

Next move to the side of the animal.

Side View.—From here observe the dish of the face, trimness of the jowl, the way the jowl carries back along the neck, the length and appearance of neck, presence or absence of a coarse, heavy mane along top of shoulder and neck, the depth and width of chest, the strength of the topline and straightness of underline. Far too often there is a droop just back of the shoulders, sometimes even forming a crease (called a "devil's grip") at this point. The topline should rise gradually from the neck to the loin, then slope away very slightly to the tail, thus giving a very strong, slightly arched back. The presence of wrinkles in the skin along the side should be noted; they are very objectionable. Some pigs are almost like a concertina in this regard. Note the length of the middle piece, the depth of the sides, the length and fullness of the rump, the width and depth of the ham, and the degree to which the flesh develops forward towards the stifle and downwards towards the hocks; hams should be deep and fleshy to the hocks. A "cut up" flank is objectionable; it gives a very undesirable appearance to the hindquarters, besides reducing the amount of meat on the ham. The straightness and length of both fore and hind legs should be carefully noted; many pigs are very weak in the forelegs; the length of the pasterns and the way in which the pig stands up on his toes, for pigs are not flat-footed creatures. The type and conformation of the animal will be noted from a side as well as from a front or rear view.

Rear View.—From behind the pig observe the width and evenness of the hindquarters and the filling down between the hams (the crutch as it is called in sheep). Note the general uniformity of width; the back must be broad and nearly level or, as stated, slightly arched; any sign of roach or razor back or of a hollow back to be accounted a fault. Stepping slightly to one side, though still behind the animal, the straightness with which the side carries down to the belly is to be observed. Here also in the female a good view will be obtained of the belly and teats, the latter to be specially noted, as from twelve to fourteen in number, evenly placed, clear, and distinct. Many sows have dummy or blind and very small undeveloped teats; in some cases the teats are not placed evenly along the line of the belly. In the male it is equally desirable that he should have a good line of teats, though in his case they are purely an indication of the prolific nature of the strain or otherwise. Note should be made that in the male there be no sign of enlargement at the point of the sheath and no sign of umbilical hernia (rupture of the navel). It is wise to note this in the sow also, as it is a common weakness. Now note the straightness of the hind legs to see that they are not cow hocked or turned in at the toes. Overgrown toes are objectionable, as are large, flat, splayed feet. The opposite side should now be surveyed for much the same points as already noted. In the male note should be made of the testicles and of the scrotal sac. The testicles should both be of even and medium size, be evenly placed in the scrotal sac, and should hang free, not tucked up or very tight. There should be no sign of rupture (in this case called scrotal hernia). The way in which the tail is set on the body should be noted; it should be fine and evenly set nearly on a line with the level of the back, and be well tasselled in the case of the Berkshire, having a distinct white flag or switch of hair. The hair and quality of the skin should be carefully noted, and in order to ascertain degree of fineness or coarseness the animal should be handled freely. Quality is noted by fine silky, glossy hair and a mellow skin, free from scurf or scale. The mellowness of the flesh may be largely determined in this way, while the condition of the animal will be noted. A final survey should be made to note colour markings and any special features, like shape and set of ears, &c. Be very careful to note that undershot or crooked or very short lower jaws are objectionable, while a protruding tongue is highly objectionable. Special head characteristics always, of course, demand consideration. If one practises a systematic method in going about

the routine of judging there will be but few points overlooked, and as one has experience it is not so difficult to select the superior and to reject the inferior ones. For final selection the first four or five animals should be brought as close together as possible and their respective points considered and compared. The most typical and the one showing the best markings would then be selected for first place, the others being ranked according to order of merit. Fancy breed points must always receive very special consideration, but should not be allowed to outweigh the more important points of conformation, type, quality, and prolificacy.

The writer is never afraid to ask for or to recommend a lengthy prize list, first, second, third, highly commended, and commended, with a very highly commended place in a large entry, and always remembers to place a reserve championship for both boar and sow.

There is no reason why prize money and conditions and the allocation of printed ribbons should not be inquired into by the pig judge, for the more interest he displays in the animals and the section in which they are exhibited, the better the result from the standpoint of all concerned.

CONCRETE FEEDING FLOOR FOR PIGS.

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

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

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

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

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

PIG RAISING PAMPHLETS.

Illustrated pamphlets on the subject of Pig Raising are available for distribution, gratis, on written or personal application to the Department of Agriculture and Stock, William street, Brisbane, as under:—

Feeding and Management of Pigs.

Feeds and Feeding, the Use of Mineral Mixtures, a Gestation Chart, Flushing the Breeding Sow, Dentition of the Pig, Pigs for Profit, Early History of the Pig.

Breeds of Pigs.

Berkshire, Tamworth. Other breeds are being dealt with now and their special qualifications featured. These pamphlets will be available shortly. They form a useful and attractive series.

Housing the Pig.

A series of pamphlets on the construction of sties and provision of paddock accommodation for pigs give details in regard to housing and accommodation. This series is being added to from time to time, is well illustrated with photographs and drawings, and should be in the hands of every farmer.

Marketing Pigs in Queensland.

Parts 2 to 8 inclusive. Note.—Part 1 being out of print has been rewritten and its contents included in the series. More articles on this subject are in course of preparation and will be available in pamphlet form later.

Pig Clubs for Boys and Girls.

The Pig Club pamphlet, descriptive of the organisation and development of Pig Clubs, is now in print and will shortly be available for distribution. Copies may be obtained with any other information relative to the scheme on application to the Instructor in Pig Raising, Department of Agriculture and Stock, Brisbane.

Diseases of the Pig.

Pamphlets dealing in a general way with diseases and with the Administration of Medicine to Pigs, Diarrhœa or White Scour, Paralysis of the Hindquarter, A Peculiar Disease of the Ear of the Pig, Hairlessness or Goitre. Leaflets on profitably feeding Iodine to Pigs and on other subjects are also available. They carry much useful information.

Pig Raising in Queensland.

Profusely illustrated and brought up to date. This pamphlet is in process of revision and will be available, gratis, shortly.

FLUSHING THE BREEDING SOW.

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

In perusing the pages of several of the older established text-books on "Animal Husbandry" one frequently comes across the term "flushing" as applied to "flushing the mare" or the ewe or the sow or cow or as the case may be, in each instance prior to the time the female is mated.

This "flushing" is not a common term in Australian live stock literature nor is it a regular practice on our farms, consequently an explanation of the term "flushing the sow" before mating will be of interest to readers of this Journal.

The term flushing simply means a general stimulation of the whole of the internal organisation of the animal, the object being to increase the number of pigs produced at farrowing time. The purpose is accomplished by increased feeding of grain or by the use of fresh or more succulent pastures than have previously been available.

The practice is understood and practised more by the sheep man than by the breeder of pigs or of most of the other classes of live stock; still it is a well recognised old time as well as modern practice. The sheep man follows it by turning the breeding ewes into a fresh succulent pasture just prior to "joining the rams," the time when the ewes are to be mated, the objective here being to secure a larger percentage of twins or a higher general average at lambing time.

There is no reason why the pig breeder should not adopt the same practice with his breeding sows, especially with sows that are advancing in age and that might otherwise produce rather unsatisfactory litters.

The most beneficial results are obtained when the flushing begins two or three weeks before the breeding season opens. Supposing that the sows have been running on pasture alone during the greater part of the "off" season; at the beginning of the breeding season or when the sows are about to be mated they should be turned into a fresh patch of rape, lucerne, or other green stuff that would furnish an abundance of the most succulent forage.

In the case of a single sow, the breeder might begin by feeding a slop composed of milk and barley or wheat or maize meal, &c., and give more than the usual supply of green food. The idea is to stimulate the whole system without putting on any great amount of fat. It is, of course, expected that the animals will begin to gain a little more rapidly in early spring or as the breeding season opens, and the majority of breeders will see to it that their stock put on flesh at this time, but it is important that the sows should be in medium breeding condition only and be gaining in weight and flesh at the time when they are mated. After the sow has been mated, continue the practice for a week or two before turning her out to pasture again.

All sows should, of course, be kept in good breeding condition during the gestation period, but there is no necessity that they should be "rolling" in fat.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JUNE, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING JUNE, 1926 AND 1925, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	June.	No. of Years' Records.	June, 1926.	June, 1925.		June.	No. of Years' Records.	June, 1926.	June, 1925.
North Coast.	In.		In.	In.	*South Coast—continued:*	In.		In.	In.
Atherton	1·58	25	1·57	3·22	Nambour	3·62	30	5 38	12·78
Cairns	2·90	44	1·15	6·77	Nanango	2·04	44	2·33	2·86
Cardwell	2·06	52	0·51	1·76	Rockhampton ...	2·21	39	0·65	5·07
Cooktown	2·01	50	3·03	1·21	Woodford ...	2·80	39	5·06	8·06
Herberton	1·02	39	0·36	2·02					
Ingham	2·36	34	0·52	1·49					
Innisfail	7·20	45	4·19	15·61	*Darling Downs.*				
Mossman	2·18	13	1·00	3·51					
Townsville	1·27	55	1·06	1·74	Dalby	1·68	56	1·54	0·60
					Emu Vale ...	1·45	30	1·54	1·56
Central Coast.					Jimbour	1·68	38	2·21	0·23
					Miles	1·89	41	0·83	1·28
Ayr	1·36	39	0·13	1·41	Stanthorpe ...	1·90	53	1·47	2·34
Bowen	1·61	55	0·32	2 02	Toowoomba ...	2·40	54	3·49	5·30
Charters Towers ...	1·29	44	0·18	1·39	Warwick	1·78	61	1·35	0·82
Mackay	2·72	55	1·43	3·28					
Proserpine	3·57	23	1·01	4 20					
St. Lawrence ...	2·49	55	1·36	3·74	*Maranoa.*				
South Coast.					Roma	1·69	52	0 76	0·86
Biggenden	2·07	27	2·23	3·95					
Bundaberg	2·80	43	1·17	7·92	*State Farms, &c.*				
Brisbane	2·77	75	5·32	7·32					
Childers	2 34	31	4·17	5·40	Bungeworgorai ...	1·63	12	0·94	0·59
Crohamhurst ...	4·09	30	6·56	15 09	Gatton College ...	1·83	27	2·30	2 99
Esk	2·12	39	3·66	3·83	Gindie	1·56	27	0·15	1·23
Gayndah	1 87	55	0·89	1·28	Hermitage ...	1·87	20	1·82	0·87
Gympie	2·62	56	3·60	7·70	Kairi	1·47	12	1·68	3·55
Caboolture	2·57	39	5·55	6·41	Sugar Experiment Station, Mackay	2·42	29	1 51	3·17
Kilkivan	2·15	47	2·43	5·63					
Maryborough ...	2·95	54	2·59	8·73	Warren	2·29	12	1·50	4·54

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for June this year and for the same period of 1925, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
Divisional Meteorologist.

Answers to Correspondents.

Itch in Horses.

A correspondent has a horse suffering from itch. He rubs against stumps and fences, and in summer, when the attacks seem more severe, he loses a lot of condition. Mange cures and powders have proved ineffective. The matter was referred to the Chief Inspector of Stock (Major A. H. Cory, M.R.C.V.S.), who advises:—Treat the affected part by washing well with warm water and soda. After the animal is dry, the following dressing should be applied once daily for three days: Sulphur, 4 oz.; creolin, 3 drams; linseed oil, 1 pint. Allow the dressing to remain on for three days after the last application, then thoroughly wash off and repeat dressing after an interval of a week. In addition to the treatment prescribed, it is advisable to give the horse 1 oz. of liquor arsenical in its food or drink-water once daily for seven days. This can be repeated after a fortnight's interval.

Stock Fodder—Bottle Tree—Cotton-Seed Meal—Grain.

F. H. N. (Capella)—

The sample of Bottle Tree was handed to the Agricultural Chemist, Mr. J. C. Brünnich, and following is his analysis:—

The pith of the Bottle Tree contains water, 78.6, protein, 0.8, fat, 0.2, starch and carbohydrates, 2.4, fibre, 16, and ash, 2 per cent., and is, therefore, a poor fodder deficient in nitrogenous matters (protein) and has a slightly better value than prickly-pear leaves, but poorer than pumpkins. Any meal like cotton-seed meal can only be fed in small amounts, 2 or 3 oz. per sheep, with other roughage. At the present market price barley is the cheapest food and better than maize.

BOTANY.

In the course of the month the Government Botanist (Mr. C. T. White, F.L.S.) addressed the following replies to correspondents, and which are of general interest:—

"Charlock" or "Wild Mustard" (*Sinapsis arvensis*).

E. J. B. (Columboola)—

Your specimen is "Charlock" or "Wild Mustard" (*Sinapis arvensis*), a common European plant now distributed as an agricultural weed over the temperate regions of the globe. It is a bad weed in the colder countries, including Victoria and Southern New South Wales, but in Queensland is usually seen as a stray plant or so in garden or field crops. It belongs to the cabbage and turnip family; the plant is harmless in its young stage, but the seeds are poisonous, causing inflammation of the stomach and intestines. In Europe stock have at times been poisoned by eating chaff and grain which contained charlock seed. Where the weed is bad is particularly in wheat fields; spraying with copper sulphate or sulphate of iron is usually resorted to; however, in Queensland the weed can usually be coped with by ordinary hand pulling.

Forestry Specimens Identified.

"Querist" (Brisbane)—

The specimens were identified as No. 117, *Xy'osma sp.*—A very interesting specimen. Only one species of this genus has been recorded from Australia, and the specimens sent seem distinct from this. The flowers sent in, with one exception, were all male, and it would be extremely interesting to obtain further specimens, especially fruiting ones.

No. 118, *Acacia Maidenii.*—Maiden's Wattle.

No. 119, *Pittosporum revolutum.*

No. 120, *Diospyros australis.*

No. 121, *Nephelium tomentosum.*

Tree Identified (*Erythrophloem Laboucherii*).

J.F.O'N. (Barabon, N.Q.)—

The tree is known botanically as *Erythrophloem Laboucherii*, and is common to North Queensland, the Northern Territory, and the northern parts of Western Australia. The genus contains about 125 species distributed

through different parts of the tropics of the Old World. *E. guineense* is one of the poisonous plants used by the pygmies of Central Africa in the preparations of arrow-poisons. An alkaloid called erythrophleine has been extracted from the tree and has been identified as the active poisonous principle. The Australian tree was examined chemically by Dr. James M. Petrie, of Sydney, in 1921, and he found the same alkaloid present. All parts of the plant are poisonous; sheep may be poisoned by eating the fresh green growth which sometimes springs up round the base of the trees, or in a dry spell may pick up fallen leaves from the trees. In Western Australia the tree goes under the name of "Camel Poison" from the fact that camels more than other stock eat the leaves. It is recorded in Western Australia that inhaling the smoke of the burning wood is superstitiously avoided by native women. Mr. A. Meston, writing of the tree, says that it is dreaded by the aboriginals and that "a splinter needs about the same treatment as snakebite."

"Cork Tree" (*Erythrina vespertilio*).

O.M.P. (Atherton)—

Your specimen sent is not *Duboisia myoporoides*, but *Erythrina vespertilio*, the Bat's Wing Coral Tree (so called from the peculiar shaped leaflet). The name Cork Tree is commonly applied to this tree in Queensland, perhaps more so than any other. *Duboisia myoporoides* and its ally *D. Leichhardtii* are also both commonly called "Cork Trees."

"Caustic Plant" (*Euphorbia eremophila*).

E.M.B. (Yaraka, C.Q.)

The specimen is *Euphorbia eremophila*, the Caustic Plant. It is widely distributed in Australia and is generally regarded as badly poisonous. Regarding the dry plants, the genus Euphorbia contains several species known to be poisonous to stock; drying is generally thought to reduce the toxicity, but not to eliminate it. Your last season's plants, however, are particularly old and dry, and without a feeding test a definite statement could not be made on them. Your query regarding the treatment of affected animals has been referred to the Chief Inspector of Stock.

Milky Cotton Bush (*Asclepias curassivica*).

J.L. (Townsville)—

The particular species of Asclepias you refer to is *Asclepias curassavica*. The plant is very common on coastal farms throughout Queensland, but is not generally eaten by stock to any great extent. A note on this plant appears in this issue of the Journal.

Plants Poisonous to Stock.

W.C.W. (Bowen)—Your specimens are identified as:—

(1) *Trema aspera* (Peach-leaf Poison Bush).—This plant is generally regarded as poisonous to stock; at times it develops a prussic acid yielding glucoside, and when eaten in this stage in quantity by hungry stock may cause death. I think, however, it is much overrated as a poisonous plant. A leaflet on the weed has been posted.

(2) *Solanum torvum* (Devil's Fig).—Nothing much is known about the properties of this plant; the green berries, if eaten in quantity, might prove harmful.

(3) *Crotalaria striata* (Rattlepod).—Poisonous. See leaflet.

(4) *Axlepias curassavica*.—This plant is poisonous, but is not usually touched by stock to any extent. A note dealing with it is published in this issue.

From the foregoing you will see that it is advisable to cut out all the above plants from the property. In scrub areas where is a good deal of undergrowth and weeds it is very often difficult to name any one plant as the cause of mortality in stock. In such cases it is advisable to brush out all suspected plants.

ROSENTHAL (Warwick)—

The specimens proved to be:—

A. *Acacia ixiophylla.*—A small wattle, not known to possess any poisonous or harmful properties.

B. *Myoporum deserti.*—Turpentine Bush, Ellangowan Poison Bush, or Dogwood Poison Bush. This shrub has long held a bad reputation as a poisonous plant, being particularly dangerous to travelling stock. In the absence of feeding tests we have very little authentic information on the plant, but it is supposed to be a slow poison, and the effects to be worse after rain.

C. Leaves only, and determination therefore difficult. It is evidently a member of the family Myoporaceae, and I think is *Myoporum acuminatum* (a Turpentine Bush). Very little is known about this plant, but the properties would no doubt be very similar to those of *M. deserti.*

"Tie Bush" *(Wickstroemia indica)*—Poisonous Plants.

E.D.L. (Yandina)—

The plant you send for identification is a species of "Tie Bush" (*Wickstroemia indica*). The local name is applied to this plant and some of its allies on account of the tough fibrous nature of the bark. The bush has been suspected at times of poisoning stock. In feeding experiments with heifers at Yeerongpilly the plant scoured them badly, but did not prove fatal. Two young heifers were fed for twelve days—on the fifth day scours were produced, on the sixth day scours with a trace of blood (temp. 102.4), at the end of the eighth day the condition improved somewhat, were slightly better the following day, and continued to the end of the experiment. The conclusion drawn was that "As the plant is one generally avoided by stock, the animals ate a great deal more than they would under ordinary conditions, and it appears to have had no other effect on them than to cause severe scouring. Had the feeding been continued, the animals would quite likely have died from scours and malnutrition, but stock would hardly ever eat sufficient of the plant for this to occur under natural conditions." I am inclined to look for the trouble elsewhere. The Tape Vine is a poisonous weed common on scrub farms on the North Coast. It has round heart-shaped leaves, glossy green above and pale beneath.

"White Apple" *(Eugenia cormiflora).*

F.K. (Innisfail)—

The tree is *Eugenia cormiflora,* a native of the "scrubs" of Northern Queensland; it is sometimes known as "White Apple" from the large white fruits borne on the trunks. Not very much is known about the timber, but it is reported to be close-grained and tough. Some of the same genus (*Eugenia*) yield timber of fairly good quality—*e.g.*, the Water Gum of the Atherton Tableland (*Eugenia gustavoides*) and the Eungella Gum of the Mackay District.

BREEDING, FEEDING, AND CARE OF PIGS.

Following are selected replies to correspondents by the Instructor in Pig Raising (Mr. E. J. Shelton, H.D.A.) in the course of the month, and which are of general interest:—

Rupture in Pigs.

W.E.J. (Nanango)—

It is evident from the tone of your letter that this trouble is an hereditary one due to some weakness in the breeding organs of the boar or to some distant hereditary influence in the sow. Rupture may, of course, be due to accidental causes, though it is not usual for more than one pig to suffer in this way. When numerous pigs show indications of either umbilical or scrotal hernia (rupture), it is usual to look for the cause in hereditary influence. We do not usually recommend castration of ruptured pigs; it is better to fatten them off as porkers and to sell to the local butcher or use them as food on the farm, for special knowledge is necessary in operating to ensure complete success, and unless you had a knowledge of the ordinary operation and had experience in carrying out this work we doubt whether it would be possible in the absence of illustrations to fully explain all the detail. A special pamphlet on the subject of castration is in course of preparation.

Linseed Meal for Pigs.

G.E. (Mount Larcom)—

Your assumption that linseed has almost double the feeding value of pollard for pigs is not altogether correct, though from chemical analysis it could be shown that both the protein and the crude fat in linseed are very much higher than in pollard. In practice, however, we find that it does not suit the animal's internal organisation to feed linseed and oil meals generally in the same way as we use pollard, nor does it pay to attempt to raise pigs on very highly concentrated foods like linseed or linseed-oil meals, in the absence of bulky, more fibrous, even if somewhat indigestible, foods. The addition of a comparatively small proportion of linseed-oil meal or a protein meal or meat meal (10 per cent. or 20) to the ration of pigs would, under your circumstances, be recommended, but the proportion of these concentrates can be reduced still further by substituting green foods and root crops if they are available.

It is certainly a very difficult problem looking for cheap pig foods during seasons like the present when maize is scarce and high priced and when pollard and similar meals hover around from £10 to £12 per ton. We have been recommending barley pollard at £11 per ton as superior to other foodstuffs at similar price; this can be obtained from Roma street merchants, while rice meal, obtainable from Robert Harper and Co., Brisbane, is also available. We forward one or two booklets with a number of pamphlets going to you; these have special reference to meat meal and protein meal. However, in the absence of these other meals we would still recommend keeping to pollard and adding, say, 10 per cent. of linseed-oil meal. Many feeders are using a proportion of molasses also, though this is only a heat and energy producer and does not contain any proteins; it tends to make coarser foods more palatable, and is in that respect worth while, though only 10 per cent. or so should be used.

Meggit's linseed meal, as you state, carries more bulk than most other oil meals, still it must be used very carefully in the absence of green foods, roots, or more bulky foods. The footnote in regard to caution in the use of linseed refers principally to its content of hydrocyanic acid and prussic acid yielding glucosides, and not to its high protein content.

We recommend growing all the green food and root crops you can in good seasons and making preparation for dry spells by conserving grain, even if otherwise high priced. While pork is comparatively low in price and feeding stuff very high, it needs very careful management in order to make pigs pay.

Pig Breeding and Feeding.

F.J.P. (Dallarnil)—

It is difficult without inspection to determine definitely the actual cause of poor pig returns, but seasonal conditions generally have been bad. Perhaps you have been rather too liberal with concentrated foods, grain, &c., and have not had enough green food. Only good-conditioned stock that have well balanced rations, including an abundant supply of green food, can be expected to give best results. Essentials: Very careful attention to the feeding system, provision of green food, plenty of good drinking water, and a supply of charcoal wood-ashes, bone-meal, or burnt or charred bones. Limewater should be given in the food and a very small percentage of salt added, especially where there is a shortage of green stuff. Compel the animals to take liberal exercise. Keep the boar from the sow until actually ready for mating. The production of small litters may be due to hereditary influences. Boars or sows selected from small litters, no matter how well they may have developed, are likely also in turn to be shy breeders. The boar may be at fault if all the sows are failing to breed well. If only one or two sows are at fault the trouble may be due to some local disease or malformation, or to the sows being overfat or naturally shy breeders and poor milkers. If after altering your system or following up any advice we have given the conditions do not improve, we would suggest cutting out present stock and introducing a boar and sows from another stud where reliable records are kept and where you would have opportunity of selection. Treatment for lice is referred to fully in pamphlets "Administering Medicine to Pigs."

Care of Boar.

G. (Archer, C.Q.)—

It is difficult to diagnose definitely the actual cause of the trouble with your boar. It is probably due to the boar being in an overfat and lethargic condition and to his taking little or no exercise. Try reducing his condition as much as possible and then flushing him with feed for a few weeks as suggested in the leaflet discussing "Flushing the Breeding Sow"; this is sometimes effective. Surgical Supplies Ltd., 246 Queen street, Brisbane, could quote you for drugs aiming at invigorating the genitive organs.

Without inspection it would be quite impossible to decide whether the trouble is due to malformation or to injury, but apparently this is not the case from your description. It sometimes pays to run another young boar in the same run as the older boar with the sows, allowing them all to run together. The boars would probably fight for awhile, but if carefully watched would soon become accustomed to one another. Try a complete change of food for the boar and give him a course of teaspoonful doses of Epsom salts in his food every day for two or three weeks. Give as much green food as possible; compel him to take exercise, and see that he does not have too much grain or fattening foods. Green foods, clean drinking water, and mineral matters are a necessity.

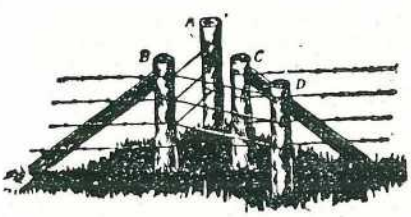
QUEENSLAND SHOW DATES, 1926.

The following is the official list of Queensland Show Dates for 1926, as issued by the Queensland Chamber of Agricultural Societies:—

Redcliffe: 4th and 5th August.
Sunnybank: 7th August.
Royal National: 9th to 14th August.
Crow's Nest: 25th and 26th August.
Coorparoo: 28th August.
Wynnum: 3rd and 4th September.
Imbil: 8th and 9th September.
Zillmere: 11th September.
Gympie: 15th and 16th September.
Beenleigh: 16th and 17th September.
Stephens: 18th September.
Pomona: 22nd and 23rd September.
Malanda: 22nd and 23rd September.
Esk (Camp Drafting): 24th and 25th September.
Melbourne Royal: 16th to 25th September.
Rocklea: 25th September.
Nundah: 1st and 2nd October.
Kenilworth: 7th October.
Southport: 9th October.
Enoggera: 9th October.
Balmoral: 16th October.
Brookfield: 23rd October.

A GATELESS FENCE OPENING.

In many places it is desirable to have an opening in the fence that a man can easily slip through without bothering with a gate, but through which horses or cows cannot pass. In the arrangement shown in the illustration, four posts are set, as shown. B and C should be braced. One side of the fence is stapled to B, the other to C. Branch wires are also carried from B to A and from B to D. These



No Need to Bother with a Gate.

should be made of wire without barbs to catch on the clothes, as it is not desirable to make the openings larger than necessary. If B and C are long enough—say, five and a-half or six feet above the ground—they can be braced to each other by a piece of strap iron across the top. If this is possible, then the other braces will not be necessary.—"Country Gentleman."

General Notes.

Citrus Packing Chart.

The Department of Agriculture and Stock has on hand a few copies of a chart illustrating the best methods of packing citrus fruit for export and the local market. Copies of this chart will be sent, upon prepayment of sixpence to cover packing and postage, to any *bonâ fide* citrus grower who applies for a copy. Only a limited number of copies is available.

Staff Changes and Appointments.

Constables James Rafter and Vincent Joseph Anglim have been appointed Inspectors under and for the purposes of "*The Slaughtering Act of* 1898" as from the 15th June and the 17th June, 1926, respectively.

Senior Sergeant George Sterne has been appointed Acting Inspector of Stock under and for the purposes of "*The Diseases in Stock Act of* 1915" as from the 15th April, 1926.

Music at Paling's for Exhibition Visitors.

Messrs. W. H. Paling and Co., Limited, of 86-88 Queen street, Brisbane, announce that special and adequate provision is being made for the comfortable and congenial accommodation of country visitors interested in music and musical instruments. They have arranged to hold informal Player Piano and Gramophone Recitals during the entire hours of business each day right throughout August. The Gramophone Salons are on the ground floor and the Player Piano Showrooms are located on the first floor. This news will doubtless be much appreciated by many readers, particularly those who propose taking back with them on this occasion something more tangible than the fragrant memories of beautiful music left behind. The instruments to which Palings particularly draw attention are the new "His Master's Voice" Gramophones and the Ronisch Player Pianos. It is claimed that amazing reproductions are derived from those instruments, and that the most critical listener will describe the results as a revelation.

Palings express a sincere wish that their many country visitors shall definitely accept the fact that there is no longer any real reason why they should be deprived of the musical pleasures of the city. A few years back this may have been so in cases where no pianist was available, but now that science and ingenuity have made their Players and Gramophones such wonderful artistic achievements the country home can and should be as cheery and bright a spot as any city home. The appeal of music is irresistible. Palings have requested us to extend through these columns a sincere and cordial invitation to all Brisbane visitors to call at their warehouse. They are assured of a hearty welcome and courteous attention.

Prohibition of Diseased Apple-Trees.

The Minister for Agriculture and Stock (Hon. W. Forgan Smith) stated, in the course of a recent Press announcement, that his attention had been drawn to a news paragraph regarding the prohibition of the introduction into Queensland of young apple-trees bearing symptoms denotive of hairy root or crown gall. The Minister stated that the action of his Border Inspectors was in accordance with a proclamation issued on the 28th April of this year, and which was a repetition of similar proclamations that had been in force for some years past. The existing proclamation provides for a strict prohibition against the introduction into Queensland of any plant affected with symptoms denotive of hairy root or crown gall, and was passed for the protection of apple growers, as experience has conclusively shown that under Queensland conditions young apple-trees affected with the symptoms of these diseases fail to develop, with a resultant total loss of time and energy to the orchardist. Southern nurserymen have been notified each year of Queensland's prohibition against apple-tree stocks so affected, and the Southern Departments were last month asked to warn their nurserymen to take every care to exclude, in parcels for Queensland, trees showing any abnormalities of the roots such as galls or hairy roots. The Department renders every assistance in facilitating the introduction of healthy nursery stock, but, of course, takes every precaution to exclude stock, the growing of which would only result in loss and disappointment to the Queensland orchardist. However, when parcels containing affected trees are inspected at the Border the nurseryman has the privilege of arranging for the picking over of the bundle so that the healthy plants may go forward to their destination.

Export of Opossum Skins.

Further regulations have been issued under the Animals and Birds Acts dealing with the disposal of opossum skins overseas and the payment of royalty on overseas consignments.

The English Egg Market.

Foreign eggs numbering about 2,500,000,000 are imported into Britain every year, and it is probable that before long each egg, as well as many other varieties of imported produce, will be required by law to be marked with their source of origin. Denmark is a sort of universal breakfast provider, and alone supplies Britain with bacon, butter, and eggs to the value of £45,000,000 in the year. Danish farmers believe that compulsory marking will be to their advantage. They claim that the average weight of their eggs per 120 is 17 lb., whereas the average for British is 15 lb. They say, also, that with their organisations for collecting and marketing, Danish eggs can be and are sold in the large cities of Britain within three days of their being laid, or less than the average age of the retailed home-produced new-laid egg.

The Live Stock of the State.

The Registrar-General (Mr. George Porter) has supplied the subjoined preliminary statement showing the number of live stock in the State on 1st January, 1926, together with the increase or decrease on last year's figures:—

Return of Live Stock in Queensland on 1st January, 1926.

	Horses.	Cattle.	Sheep.
Preliminary (1st January, 1926)	624,243	6,441,223	19,186,516
Actual (1st January, 1925) ..	660,093	6,454,653	19,028,252
Increase	..	..	158,264
Decrease	35,850	13,430	

Several returns are outstanding which when received may alter the decrease in horses and cattle.

The Dairy Cow.

"Feed is the source of milk, and the consumption of a large amount of feed on the part of the cow is highly essential," writes Professor G. C. Humphrey, Department of Animal Husbandry, University of Wisconsin. "A large body, more especially the barrel, in proportion to the size of the animal, indicates feed capacity. The deeper the cow is at the rear parts of her barrel, the wider she is between the hip points, and the greater the width at the points of the shoulders the greater will be her capacity for feed. Ribs that are well sprung and far apart, a chine that is open, a back that is wide over the loins, and a depression between the last rib and the hip point that is large, are all evidences of good feed capacity. A correlation may be established between the width of the forehead and the width of the body; between a comparatively long face and a good length of body; and between a broad muzzle, good-sized mouth, and long sinewy jaws, and a good feeder. These points may therefore be associated with feed capacity."

University Degree for Dairying.

Professor H. A. D. Neville, Dean of Faculty of Agriculture at the newly-chartered University of Reading, announces that a degree course in dairying—the first of its type in England—will be instituted at the beginning of next session.

"The importance of milk and its by-products as staple foods, and the growing demand for and increasing supply of clean milk," Professor Neville says, "necessitate the employment of a large number of highly-skilled scientific men and women whose training has accustomed them to the problems of dairying, and this degree course will fill the gap. Dairying is no longer a third-rate trade, but an important profession."

The course, open to all matriculated students (men and women), will be of three years' duration. Successful students will receive the degree of B.Sc. (Dairying). The details of the course have yet to be passed by the Senate of the University, but the general lines have been decided on.

The first year will be devoted to pure science, including chemistry, botany, zoology, and another subject, the most favoured being physics. The second year will embrace the subjects of dairying, including building construction, live stock, and dairy farming, bacteriology, mycology, and practical dairy farm work. The final year will be devoted to dairying generally, including dairy hygiene and legislation, and advanced science.

Levy Regulations.

Regulations have been issued under the Primary Producers' Organisation Acts empowering the Council of Agriculture to make levies for the year ending 30th June, 1927, on all agricultural and pastoral industries except grazing. These regulations are practically the same as those for the year that has just ended.

The general levy to be made for the year ending 30th June, 1927, has been based on an estimate to yield a sum not exceeding £21,000.

The Preservation of Eggs.

The good housewife can be relied upon to realise the importance of the following advice on the subject of pickling eggs. A lime pickle recommended by the Ministry of Agriculture (U.K.) consists of four parts by measure of finely-slaked lime, with twenty parts of cold water, and the subsequent addition of one part of salt. This solution is prepared by first mixing the lime and the water, and thoroughly stirring daily for a week. The salt is added on the fourth day, and at the end of the week the clear solution is poured off for use, leaving the sediment. Waterglass (silicate of soda in solution) is obtainable in different strengths, which should be ascertained at the time of purchase in order that it may be diluted sufficiently by the addition of boiling water to bring the mixture to the proper proportions. Experiment has shown that while a 5 per cent. solution may be used, a 3 per cent. solution is sufficient to ensure good results.

Eggs for pickling should be produced by healthy stock, should be infertile, clean, free from cracks or blemishes, and absolutely new laid. It is desirable to make frequent collections from the nests to avoid soiling, to cool the eggs if still warm, but to immerse them in the solution without undue delay and without exposure to heat or storage in a draughty place. It is better to test any eggs about which there may be the slightest doubt. If the conditions are correct, and the eggs are covered by the solution, they will keep for six months, or longer if necessary. If sold at the end of the pickling period they must be properly described as "preserved eggs."

Selecting a Tank Site.

Very careful consideration should be given to the selection of a site for a tank.

The most important point is a good catchment, and this, on some holdings, is almost the sole determining factor. In undulating country catchments are generally good, and no difficulty is experienced, but in the level country of the western plains a new settler would do well to secure the advice of a more experienced man. Very often shallow watercourses exist, and the tank should be located on or near these. Roads provide good catchments, and a good flow of water can be obtained off the hard, bare patches which exist on the plains. In selecting catchments attention should also be given to the nature of the country; for instance, a drain running over hard, compact soil will carry more water into the tank than one running over black soil, which develops large cracks during drought periods, and which absorbs a large amount of water before any reaches the tank.

Although the experience of old settlers is of great value, even they make mistakes sometimes. Land often appears level when it has a fall of several inches, and in very level country it is often well worth while to have levels taken before fixing the site.

While preference must be given to the catchment, it is important that the tank should be located in a central position to save the stock from much travelling to and from water. If possible, the site should be near a belt of green timber, as stock come to water in the morning and like to linger around in the shade, taking frequent drinks before moving off in the afternoon. If shade is not available they probably take only one drink in the day, and consequently do not do as well as they otherwise would.

After locating what is apparently a good site, the nature of the soil should be ascertained. On some country a tank will hold well almost anywhere, but in other classes of soil some considerable difficulty is experienced, and recourse must be made in some cases to puddling. The nature of the timber is usually indicative of the character of the subsoil, but it is not always reliable. Occasionally the country is patchy; while the subsoil in portion of the tank is good, a band of a porous character may be struck which will cause a leakage. Before sinking is commenced trial shafts should be sunk to the depth it is proposed to excavate the tank, and if it is considered the country is patchy two or three should be put down. An experienced man can tell by the nature of the subsoil whether or not it will be "good holding," but if there is any doubt a test should be made by partly filling the shaft with water, so that its holding capacity can be ascertained.

The Royal Society of Queensland.

At the last ordinary monthly meeting of the Society in the Geology Lecture Theatre of the University the President, Dr. J. V. Duhig, M.B., was in the chair. Mr. W. D. Francis read a paper entitled "The Development of the Corrugated Stems of Some Eastern Australian Trees." Two classes of corrugated stems are recognised: fluted or grooved stems (exemplified by *Villaresia Moorei*), and wrinkled or finely corrugated woody cylinders (exemplified by *Arytera Lautereriana*). The development of the stems of these two species and the anatomy of the wood connected with the grooves and wrinkles are described and illustrated. In addition, the anatomy of the wood associated with the wrinkled woody cylinders of *Sarcopteryx stipitata*, *Cryptocarya corrugata*, *Canthium latifolium*, and *Casuarina inophloia* is described and illustrated. Messrs. H. Tryon and D. A. Herbert commented upon the paper.

Mr. E. Ballard, B.A., delivered a lecture on "A Journey Up the Markham Valley, New Guinea." The head waters of the Markham and its tributaries are little known. The floor of the valley slopes gently to the west, and rises gradually from sea-level to an elevation of 1,250 feet. The valley about half way up changes direction abruptly through a few degrees, and runs rather more northerly than north-westerly. It is generally supposed that the Markham Valley owes its origin to a fault, and that at one time the Huon Peninsula was an island. During this time the sandstones and conglomerates which form the foothills of the valley were formed. The subsequent uplift was very rapid, and the valley passed from sea strait to estuary to its present status of a valley. Messrs. C. T. White, B. Dunstan, C. Massey, H. Tryon, H. A. Longman, E. W. Buhot, and Dr. E. O. Marks took part in the discussion on the lecture.

Dr. W. H. Bryan exhibited a specimen of green banded jasper containing remains of radiolaria from New England, New South Wales. Mr. H. Tryon commented upon the exhibit.

The Australian Dairy Council—Minister's Reply to Criticism.

The Minister for Agriculture (Hon. W. Forgan Smith), at the request and on behalf of the Ministers of Agriculture attending the recent Interstate Ministerial Conference, said, in the course of a Press statement, that they regretted that Mr. Rankin, of the Australian Dairy Council, had seen fit to again raise the question of the attitude of the Ministers to the proposals of the Dairy Council. Not only did Mr. Rankin not touch on the real point at issue—namely, the line of demarcation between the functions of the Dairy Council and the State Departments of Agriculture—but with the apparent object of clouding the issue had resorted to quoting only such portions of the 1922 Agreement or Constitution as appeared to suit his (Mr. Rankin's) purpose, and to suppressing the vital paragraphs which would have clearly shown how untenable was the position taken up by the Dairy Council. The so-called Constitution shows very clearly that the main functions of the Council pertain to marketing legislation, grading, and standards of quality as applied to dairy produce for export. This is emphasised by Mr. Rankin in the official report of the Council's operations issued last November, wherein he says that "the functions of the Australian Dairy Council include (*a*) To advise Federal and State Ministers in regard to administration of Acts and Regulations pertaining to the export of dairy produce, the standards of quality and composition of such produce, and the conditions under which an Australian brand denoting standard quality shall be applied; and (*b*) to secure uniform legislation and administration in all States." In this same report Mr. Rankin says that the scheme provides that all matters pertaining to production, manufacture of, and instruction relating to dairy produce are the definite functions of the State Governments. Mr. Rankin's own report showed that the 1922 conference laid down a definite line of demarcation between what was regarded as the legitimate functions of the Commonwealth and States in respect to the dairying industry. Unfortunately, however, persistent efforts had been made by a section of those interested to encroach on what were definitely laid down as functions of the State. Mr. Rankin says the proposals of the Council were in many ways misconstrued by State Ministers—a ridiculous statement to make in view of the very clear and definite statement that the Council was the proper body to co-ordinate the work throughout the various States in respect to improvement of production and the further proposal to appoint a special staff, presumably under the direction of the Dairy Council, to carry out these operations. What gives the members of the Dairy Council concern is that the Ministers understood and appreciated only too well what these proposals really meant. Mr. Forgan Smith added that Ministers regretted the necessity for joining issue with Mr. Rankin on the subject, but felt that it was their duty to set out in very definite terms their determination not to permit the Council to encroach on the functions which belong to the States, and which can be much more effectively and economically carried out by the trained staffs of their respective Agricultural Departments.

Milk and Minerals.

The recent revelation that Lord Astor's racehorses, which have been so successful on the course, are reared at Taplow, where the pasture is rich in minerals, has brought home to popular imagination the value of minerals in body-building.

Proteins, "energy value," and vitamins have engaged the public imagination so thoroughly that the importance of mineral constituents has been neglected; yet these are, in truth, the bricks with which young and old build up and repair their staying power, writes a medical correspondent of the "Portsmouth News."

There are ten mineral elements in the body essential as constructive material for growth. They are constantly being lost in the general wastage of the body, and they must be replaced. Their absence is well advertised by ill-health and poor condition.

The chief minerals demanded by the human body are lime (calcium) and various phosphates. Scientists have worked out tables of the contents of various foods, and so there is no difficulty in discovering if we are "starved." Wheat, bread, and potatoes are badly lacking in mineral constituents, but milk, cheese, and green vegetables are well supplied. We have the assurance of no less an authority than Professor Mottram, of London University, that if we take sufficient of these foods there is no danger of our being starved of lime and phosphates.

Milk is recommended as a staple in all diets, for, apart from supplying minerals, it is rich in fats and other essentials. Captain Elliot, Parliamentary Under Secretary of Health for Scotland, lecturing recently in Glasgow, took a step forward in emphasising the importance of mineral qualities in pastures for milk cows. He may rest assured that farmers will not be slow in devoting attention to such factors. Not only is the food of cows receiving careful scrutiny, but the milk itself is treated with scrupulous care. And so, despite all the new fads and fashions in diet, milk, the most primitive and natural, still stands unchallenged as Nature's well-nigh perfect food.—"The Dairy."

Crops Suitable for Silage.

To make good silage, it is essential that the material used should contain the right amount of sap. If it is too dry, it is likely to mould or char—that is, the heat generated, although not causing actual burning, will produce a charred condition of the material and render it useless. If, on the other hand, it contains too much sap, a mushy, evil-smelling product will be produced, which in some cases will be quite valueless.

While many crops can be used for filling the silo, the most suitable in regard to feeding value and ease of handling are maize, sorghum, Sudan grass, wheat, oats, and barley. In the coastal districts maize and sorghum are undoubtedly the best, as they give a big yield per acre, and are very easily converted into silage. Maize is the better of the two, being less subject to disease and producing fodder of higher quality. As a rule, the best crops for inland districts are wheat, oats, and barley, although in some localities, particularly in the north-west, maize is quite satisfactory. On the whole, however, for western districts preference may be given to the winter cereals, as the yield is more certain. There is not the slightest difficulty about making silage from any of these crops, provided the silo is of the right type, and the crop is cut at the right stage, and also that it is put into the silo immediately, and is well packed down during the process.

Black oats cut before the seed is formed makes splendid silage, so that it is possible for a farmer to clean his land and to conserve useful feed at the same time. Among natural herbage, trefoil and variegated thistles make good silage, but it is as well to let the material wilt a few days before putting it into the pits. It is doubtful whether very succulent herbage, such as crowfoot will make good silage. It contains so much sap that it would be risky, though if it were allowed to dry somewhat and could be mixed with drier material, it might turn out satisfactorily.

Rape cannot be converted into silage, owing to its excessive sappiness. Even stray plants of rape mixed with barley put into the silage pit at Coonamble Experiment Farm came out mushy and useless. Dry material, such as many western grasses when in flower, cannot be used, and it is not possible to utilise such weeds as star thistle, black thistle, &c.

To produce good silage the crops should be cut when they contain the maximum food nutrients in a condition that will make good silage.

Maize should be cut when the grain is glazed or well-dented, the lower leaves on the stalk yellowing, but the stalk itself full of sap. At this stage it will contain maximum food value, and at the same time sufficient moisture to pack well in the silo.

Sorghum should be cut when the heads are reaching maturity, and the seeds so hard that they are crushed between the finger and thumb with difficulty. Sudan grass should be cut when the seed is formed but is still in the milk stage.

Wheat, oats, and barley should be cut just after the ears are well out. Many farmers before cutting these crops for hay wait until the grain is well formed and the straw has become somewhat dry. Crops intended for silage should not be allowed to reach this stage, as plenty of sap is required in the plant to ensure a good product when the silo is opened up.

Maize and sorghum can be cut with the least labour with the maize harvester, but where that implement is not available, cane knives, short hoes, reaping hooks, or scrub scythes may be used. A slide fitted with a scrub scythe blade, and drawn by a horse, is used by some farmers.

Wheat, oats, and barley are cut with the reaper and binder.

Unlike hay, silage may be made at any time, irrespective of the weather. Rain causes inconvenience, but it need not delay the work.—A. and P. Notes, N.S.W. Department of Agriculture.

Peanut Production

Like all other cultivated crops, the peanut will readily respond to good cultivation; in fact, good cultivation is one of the essentials to success.

On typical peanut land, which is of a light friable nature, the preparation is comparatively easy, and beyond early ploughing and good cultivation no special preparation is required. The initial preparation of the land will be governed to some extent by the previous crop, but if possible it should be fallowed during the winter months so that at least a portion of the winter rains may be conserved. In some quarters, the value of even a short fallow is not fully recognised, for, apart from the fact that the moisture-holding capacity of the soil is increased, there are other important items that should not be overlooked. In districts of a good rainfall these may play an equally important part with the conservation of moisture. When the land is ploughed and allowed to stand for some time, the aeration results in a sweetening and enriching of the soil, due to the decay of organic matter and the action of frosts, rain, wind, &c. This results in the liberation of inert plant-food in a form in which it is more easily assimilated by the plant.

The disposal of all residues and weeds from the previous crop by decomposition is of importance, for it is necessary that the land be free from all such trash when the crop is planted, otherwise cultivation of the growing crop is rendered much more difficult, and the plant does not have the same opportunity of pegging freely.

A deep ploughing should be given during the winter as soon as practicable after the removal of the previous crop, and the land should then be allowed to lie in the rough until heavy rains fall, when it may be harrowed to stop evaporation and kill young weed growth. It is generally advisable to follow up with a shallow cross-ploughing or disc-cultivation from four to six weeks previous to sowing. From thence onwards until planting, every effort should be made to keep the surface soil in a medium fine, mellow, friable condition, to conserve moisture, and to induce the germination of weeds so that they may be killed by further cultivations. In average seasons the free use of the harrows will do all the work that is necessary, although if this does not prove effective the spring-tooth or disc cultivator may be used to advantage.

Peanuts should not be planted on the same land two years in succession, and to obtain best results one crop every two to three years is sufficient. If possible, the peanut should follow some cleaning crop, such as potatoes, cotton, or a summer fodder crop. When they are preceded by maize, early ploughing is essential so that the maize stalks and other residues may have time to decay before planting. Sweet potatoes are often grown on land suitable to peanuts, but on no account should peanuts follow this crop, for a good deal of trouble will be met with owing to the continuous sprouting of self-sown roots.

The principal points to be aimed at in cultivation are:—

(1) *Early preparation*, so that the moisture may be conserved and the decay of the residues from the previous crop encouraged.

(2) *Freedom from weeds.*—If planting is carried out in a dirty seed-bed, a considerable amount of trouble will be experienced in after-cultivation and chipping, which is expensive, and reduced yields will result.

(3) *Loose, fine, friable surface*, so as to ensure a good germination, without which a profitable crop cannot be obtained, and conditions favourable for the flower stalks to penetrate the soil easily and thus encourage a rapid development of the nuts.

Woman—The Pioneer.

"Man in the dawn of history was a thinker, and nothing else. Woman was always a worker."

THE FIRST ARCHITECT.

The Cave Man and his Woman, with their offspring, are travelling along the banks of a river. The woman, thinking of the babe, begins to wonder where they will shelter for the night. The river bank appears a very desirable place—so the man and woman, after talking things over, decide to stay there for a while. But there is no cave to serve as a home—what matter? She looks round at the tall reeds on the river bank—her man has the skins of wild beasts that he has slain—in a flash, a picture of a "home" stands out, completed in all its details.

So she plaits the reeds and strong thick grasses together for the walls, lays on top the crossed boughs of trees, and roofs it with the skins. When she has scraped up the earth to make a sheltering wall all around it, she has designed and built the first house.

THE FIRST CUTLER AND TANNER.

Next day, looking out, she sees her man striding along beside the river with a deer which he has killed hanging over his shoulder.

When he reaches "home" he throws it at his wife's feet. He then goes off to the shelter of the hills and, stretching himself on the soft turf, falls asleep. And while he dreams, and the baby whimpers, the mother sets to work on the deer. She strikes off a sharp flake of flint for a knife—by this act becoming the first cutler (the real "founder" of Sheffield). With this knife she carefully removes the skin, rolls up the hide, smokes it, curries it, breaks it with implements of stone and bone, and thereby becomes the first currier and tanner.

THE FIRST TAILOR AND DRESSMAKER.

Her fingers are very weary with her hard toil, but she has much yet to accomplish. Her poor tools are a needle of bone, a thread of sinew, and scissors of flint. There is no sign over the door, but in that primitive workshop the first tailor and dressmaker cuts and sews and makes the clothing for her lord and her family. Presently, she will stop sewing to cook the family dinner, after which the man sets off again (this time it may be to spear fish for a change); and then the busy wife and mother gets her work out again, for then, as now, "woman's work is never done."

THE FIRST DECORATIVE ARTIST.

This time, it is a different kind of work. She is going to make mats and screens, baskets, and sails for her man's boat. Very skilfully with her fish-bone needle she binds together the rushes and reeds and grasses that she has gathered on the river banks.

As she works with the baby asleep at her feet, it occurs to her that her toil is very monotonous. So, half absent-mindedly, she tries to arrange the different coloured grasses in some sort of pattern. Then she goes a little further—why not make some of the stitches different too, as well as the colours? So the first "chevrons" and "herringbones" are invented. And the first decorative artist was born, because of a woman's desire to vary the monotony of her day's work.

THE FIRST NURSERYMAN.

Then comes a day when, with one of her finished baskets strapped across her forehead, she goes off to the fields. With her "spade," which is a sharp, pointed stick, she digs up the roots from the earth, clears away the weeds from the plants which she has found are good to eat for food, and makes holes in the ground for the seeds she has carried in the basket.

Then "home" she comes with her basket again loaded—this time with acorns and various roots, which she crushes and rolls on a stone slab, and so becomes, as well as the first nurseryman, the "first miller."

And now Man has taken over this wonderful kingdom founded by Woman.

He has carried the inventions that she gave him to perfection.

The digging stick has become a plough.

The basket carrying the seeds for sowing and the roots for milling has become the railway train.

The stone crushing slab has become the roller mill.

The stone scraper for softening hides has become the tannery.

The world is often in danger of forgetting the debt it owes to woman—the discoverer of "arts and crafts."—"Vailima," in "Maoriland Worker."

The Guernsey Cow.

Lord Poltimore contributes an interesting article on "The Guernsey Cow" to the fourth official handbook and work of reference for 1926, of the East Devon Milk Recording Society.

It is often said of a Guernsey that she is "a rich man's cow," he writes. No! she is everyone's cow—be he a wealthy private individual, a big dairy farmer, or a small holder; in fact, she is particularly suited for the purposes of the latter in view of her invaluable dairy qualities, her docile disposition, and because she is naturally a very close grazer—a quality which she has inherited from her progenitors' method of existence for many generations in their native island.

Dealing with the history of the Guernsey, Lord Poltimore says it is evident that this cow was evolved with a view to—(1) A hard and thrifty constitution; (2) economic production of milk and butter.

"It used to be, and sometimes is still, asserted that Guernsey cattle are delicate. This is indeed a fallacy. On our own farm, situated on the very borders of Exmoor, 800 feet above sea-level, he adds, we have now kept Guernsey cattle for over seven years, and our experience has always been that the Guernsey will stand the almost unceasing wet weather—and cold wet, too—of which we receive more than our share, and will thrive on our bleak upland pastures infinitely better than will the heavier breeds of dairy cattle. I may add that this is also the experience of others who keep Guernseys in this district.

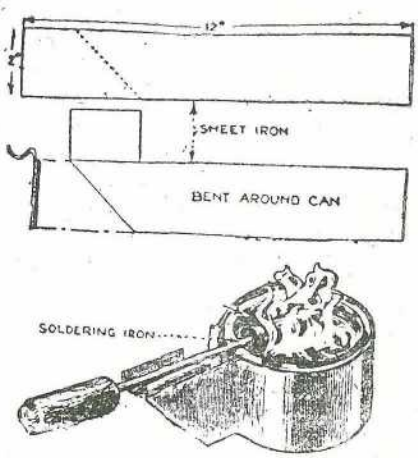
"Besides being of good constitution, the Guernsey is an exceptionally economical producer of rich milk and butter; in fact, you will obtain more milk and butter from a Guernsey in proportion to the food you put into her than from any other breed of cow.

"Do not get your Guernseys too fat, for a Guernsey, if wastefully fed for dairy purposes, will put on fat at an amazing rate; in fact, it is only the prejudice of the public against the yellow fat which prevents Guernsey beef from being more often seen in the butchers' shops. To overfeed a Guernsey is to ruin her.

"Some interesting statistics are given, and, alluding to milk recording, Lord Poltimore expresses the opinion that it is a grievous policy to attempt to force a cow beyond the 1,000-gallon limit."

HEATING AN IRON.

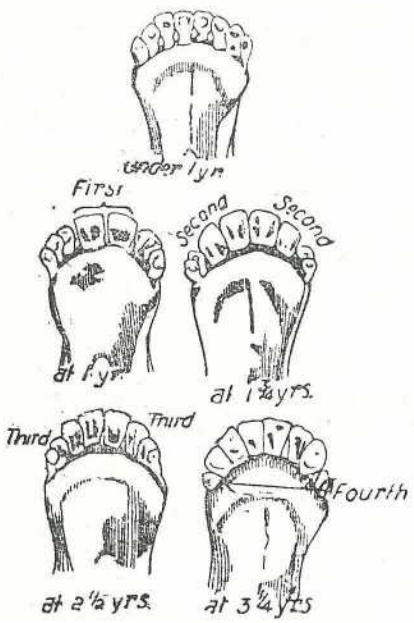
The illustration taken from "Popular Mechanics" shows how a small soldering iron may be quickly and conveniently heated. A sheet-iron stove, made as shown in the illustration, will give good results in heating a soldering-iron with saw dust soaked in methylated spirit as fuel. In the latter case a seamless can with a friction top should be used as a container for the sawdust, to prevent evaporation



of the alcohol and to provide a method of readily extinguishing the flame, which can be snuffed out instantly by replacing the cover. A sheet of asbestos, or an asbestos flatiron pad, should be placed underneath the stove to prevent burning the bench top. The pattern above the drawing shows the dimensions and the points where the sheet metal is bent.

DENTITION OF SHEEP.

A western district landowner, with little experience of sheep, has made some inquiries about the determination of ages, which is a most important matter in sheep keeping. Opportunely there is reproduced in the "Journal of Agriculture," Western Australia, diagrams showing the position of incisors by which the age is reckoned. Sheep have 32 teeth, eight incisors situated in the front of the lower jaw, and six molars or grinders on each side of both jaws. At birth a lamb possesses two temporary central incisors, and at the end of four weeks all eight temporary incisors are up with the three molars in each of the upper and lower jaws (first, second, and third, temporary molars). At three months the fourth molar is cut and is permanent. At the ninth month the fifth molar is seen. At eighteen months the sixth permanent molar is cut. The third temporary molar covers the top of the permanent molar, while the first and second permanent molars push off the temporary ones. Thus a sheep has all its permanent molars at from eighteen months to two years old. The



molar teeth are for masticating food, the surfaces being irregular and suitable for grinding. With the incisors, the first two or central permanent teeth make their appearance at from twelve months to fifteen months. The sheep is then known as a two-tooth or hogget. At about two years of age, the two temporary incisors on either side of the central teeth are replaced by two permanent teeth, when the sheep becomes a four-tooth. At about three years of age, two more permanent teeth make their appearance, and the sheep is a six-tooth. At four years of age two more teeth appear, and the sheep is full-mouthed. From about five years the central teeth show signs of separating in the middle, and as the sheep becomes older the other teeth will separate and may become broken. With age the teeth become worn down or lost and the sheep is said to be broken-mouthed. It is wise if only three or four teeth are left to pull them out and leave the sheep a gummy, as they will do better.—"Australasian."

Farm and Garden Notes for September.

With the advent of spring, cultivating implements play an important part in farming operations.

The increased warmth of soil and atmosphere is conducive to the growth of weeds of all kinds, particularly on those soils that have only received an indifferent preparation.

Potatoes planted during last month will have made their appearance above the soil, and where doubt exists as to their freedom from blight, they should be sprayed with either Burgundy or Bordeaux mixture as soon as the young leaves are clear of the soil surface.

Land which has received careful initial cultivation and has a sufficiency of sub-surface moisture to permit of a satisfactory germination of seeds may be sown with maize, millets, panicum, sorghums, melons, pumpkins, cowpeas, broom millets, and crops of a like nature, provided, of course, that the areas sown are not usually subjected to late frosts.

Rhodes grass may be sown now over well-prepared surfaces of recently cleared forest lands or where early scrub burns have been obtained, and the seed is sown subsequent to showers. More rapid growths, however, are usually obtainable on areas dealt with, say, a month later.

In connection with the sowing of Rhodes grass, farmers are reminded that they have the Pure Seeds Act for their protection, and in Rhodes grass, perhaps more than any other grass, it is necessary that seed of good germination only should be sown. A sample forwarded to the Department of Agriculture will elicit the information free of cost as to whether it is worth sowing or not.

Where the conditions of rainfall are suited to its growth, paspalum may be sown this month.

The spring maize crop, always a risky one, requires to be sown on land which has received good initial cultivation and has reserves of soil moisture. Check-row seeding in this crop is to be recommended, permitting as it does right-angled and diagonal cultivation by horse implements, minimising the amount of weed growth, and at the same time obtaining a soil mulch that will, with the aid of light showers, assist to tide the plant over its critical period of "tasselling."

Although cotton may be sown this month, it usually stands a better chance if deferred until October. The harvesting of cotton during the normal rainy season is, if possible, to be avoided.

The sowing of intermediate crops prior to the preparation of land for lucerne sowing should be carried out in order that early and thorough cultivation can take place prior to the autumn sowing.

The following subsidiary crops may be sown during the month:—Tobacco and peanuts, plant sweet potatoes arrowroot sugar-cane, and cow cane (preferably the 90-stalked variety), and in those districts suited to their production yams and ginger. Plant out coffee.

Kitchen Garden.—Now is the time when the kitchen garden will richly repay all the labour bestowed upon it, for it is the month for sowing many kinds of vegetables. If the soil is not naturally rich, make it so by a liberal application of stable manure and compost. Manure for the garden during summer should be in the liquid form for preference. Failing a sufficient supply of these, artificials may be used with good results. Dig or plough the ground deeply, and afterwards keep the surface in good tilth about the crops. Water early in the morning or late in the evening, and in the latter case, stir the soil early next day to prevent caking. Mulching with straw, leaves, or litter will be of great benefit as the season becomes hotter. It is a good thing to apply a little salt to newly dug beds. What the action of salt is, is not exactly known, but when it is applied as a top dressing it tends to check rank growth. A little is excellent for cabbages, and especially for asparagus, but too much renders the soil sterile, and causes hardpan to form. French or kidney beans may now be sown in all parts of the State. The Lima bean delights in the hottest weather. Sow the dwarf kinds in drills 3 ft. apart and 18 in. between the plants, and the climbing sorts 6 ft. each way. Sow Guada bean, providing a trellis for it to climb on later. Sow cucumbers, melons, marrows, and squash at once. If they are troubled by the red beetle, spray with Paris green or London purple. In cool districts, peas and even some beetroot may be sown. Set out egg plants in rows 4 ft.

apart. Plant out tomatoes 3½ ft. each way, and train them to a single stem, either on stakes, trellis, or wire netting. Plant out rosellas. Sow mustard and cress, spinnach, lettuce, vegetable marrows, custard marrows, parsnips, carrots, chicory, eschalots, cabbage, radishes, kohl-rabi, &c. These will all prove satisfactory, provided the ground is well worked, kept clean, and that water, manure, and, where required, shade are provided.

Orchard Notes for September.

THE COASTAL DISTRICTS.

September is a busy month for the fruitgrowers in the coastal districts of this State, as the returns to be obtained from the orchards, vineyards, and plantations depend very largely on the trees, vines, and other fruits getting a good start now.

In the case of citrus orchards—especially in the southern half of the State—it is certainly the most important month in the year, as the crop of fruit to be harvested during the following autumn and winter depends not only on the trees blossoming well but, what is of much more importance, that the blossoms mature properly and set a good crop of fruit.

This can only be brought about by keeping the trees healthy and in vigorous growth, as, if the trees are not in this condition, they do not possess the necessary strength to set their fruit, even though they may blossom profusely. The maintenance of the trees in a state of vigorous growth demands—first, that there is an adequate supply of moisture in the soil for the requirements of the tree; and, secondly, that there is an adequate supply of the essential plant-foods available in the soil.

With respect to the supply of moisture in the soil, this can only be secured by deep and systematic cultivation, excepting in seasons of good rainfall or where there is a supply of water for irrigation. As a rule, September is a more or less dry month, and when it is dry there is little chance of securing a good crop of fruit from a neglected orchard.

If the advice that was given in the Notes for August regarding the conservation of moisture in the soil has been carried out, all that is necessary is to keep the soil stirred frequently, so as to prevent the loss of moisture by surface evaporation. If the advice has been ignored, then no time should be lost, but the soil should be brought into a state of good tilth as quickly as possible.

Where there is a supply of water available for irrigation, the trees should receive a thorough soaking if they require it. Don't wait till the trees show signs of distress, but see that they are supplied with an adequate supply of moisture during the flowering and setting periods.

It is probable that one of the chief causes why navel oranges are frequently shy bearers in the coastal districts is that the trees, though they produce a heavy crop of blossoms, are unable to set their fruit, owing to a lack of sufficient moisture in the soil at that time, as during seasons when there is a good rainfall and the trees are in vigorous growth or where they are grown by irrigation, as a rule they bear much better crops. The importance of maintaining a good supply of moisture in the soil is thus recognised in the case of this particular variety of citrus fruit.

When the trees show the want of sufficient plant-food—a condition that is easily known by the colour of the foliage and their weakly growth—the orchard should be manured with a quick-acting, complete manure; such as a mixture of superphosphate, sulphate of ammonia, and sulphate of potash, the plant-foods which are soluble in the water contained in the soil and are thus readily taken up by the feeding roots.

Although the above has been written mainly in respect to citrus orchards, it applies equally well to those in which other fruit trees are grown. Where the land has been prepared for bananas, planting should take place during the month. If the plantation is to be made on old land, then the soil should have been deeply ploughed and subsoiled and brought into a state of perfect tilth prior to planting. It should also receive a good dressing of a complete manure, so as to provide an ample supply of available plant-food. In the case of new land, which has, as a rule, been scrub that has been recently fallen and burnt off, the first operation is to dig the holes for the suckers at about 12 ft. apart each way. Good holes should be dug, and they should be deep enough to permit the top of the bulb or corm of the sucker to be 6 in. below the surface of the ground.

Take great care in the selection of the suckers, and see that they are free from beetle borers or other diseases.

As a precaution it is advisable to cut off all old roots and to dip the corms for two hours in a solution of corrosive sublimate, made by dissolving 1 oz. of this substance in 6 gallons of water.

In old banana plantations keep the ground well worked and free from weeds and remove all superfluous suckers.

When necessary, manure—using a complete fertiliser rich in potash, nitrogen, and phosphoric acid, such as a mixture of meatworks manure and sulphate of potash, 1 of the former to 1 of the latter.

Pineapples can also be planted now. The ground should be thoroughly prepared —viz., brought into a state of perfect tilth to a depth of at least 1 ft., more if possible—not scratched, as frequently happens; and when the soil requires feeding, it should be manured with a complete manure, which should, however, contain no superphosphate.

Old plantations should be kept in a good state of tilth and be manured with a complete fertiliser in which the phosphoric acid is in the form of bones, basic phosphate, or finely ground phosphatic rock, but on no account as superphosphate.

The pruning of custard apples should be carried out during the month, leaving the work, however, as late in the season as possible, as it is not advisable to encourage an early growth, which often means a production of infertile flowers. If the weather conditions are favourable passion vines can also be pruned now, as if cut back hard they will make new growth that will bear an autumn crop of fruit instead of one ripening during the summer.

Grapes vines will require careful attention from the time the buds start, and they should be regularly and systematically sprayed from then till the time the fruit is ready to colour with Bordeaux mixture, in order to prevent loss by downy mildew or anthracnose.

Where leaf-eating beetles, caterpillars, or other insects are present, the trees or plants on which they are feeding should be sprayed with arsenate of lead. All fruit-fly infested fruit must be gathered and destroyed and on no account be allowed to lie about on the ground, as, if the fly is allowed to breed unchecked at this time of the year, there is very little chance of keeping it in check later in the season.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Where not already completed, the winter spraying with lime-sulphur should be finished as early in the month as possible. Black aphis should be fought wherever it makes its appearance by spraying with a tobacco wash, such as black-leaf forty, as if these very destructive insects are kept well in hand the young growth of flowers, leaves, wood, and fruit will have a chance to develop. Woolly aphis should also be systematically fought wherever present, as once the trees are in leaf it is much more difficult to treat.

The working over of undesirable varieties of fruit trees can be continued. The pruning of grape vines should be done during the month, delaying the work as long as it is safe to do so, as the later the vines are pruned the less chance of their young growth being killed by late frosts. Keep the orchards well worked and free from weeds of all kinds, as the latter not only deplete the soil of moisture but also act as a harbour for many serious pests, such as the Rutherglen bug.

Grape vines should be swabbed with the sulphuric acid solution, mentioned in the Notes for August, when the buds begin to swell and just before they burst, as a protection against black spot and downy mildew.

New vineyards can be set out, and, in order to destroy any fungus spores that may be attached to the cuttings, it is a good plan to dip them in Bordeaux mixture before planting. The land for vines should be well and deeply worked, and the cutting should be planted with one eye only out of the ground and one eye at or near the surface of the ground.

In the warmer parts which are suitable for the growth of citrus fruits, the land must be kept well cultivated, and if the trees need irrigating they should be given a good soaking, to be followed by cultivation as soon as the land will carry a horse without packing.

In these parts fruit-fly should be systematically fought, as it will probably make its appearance in late citrus fruits and loquats; and if this crop of flies is destroyed, there will be every chance of the early crops of plums, peaches, and apricots escaping without much loss.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

1926	JULY.		AUGUST.		MOONRISE. JULY.	MOONRISE. AUGUST
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					p.m.	a.m.
1	6·46	5·6	6 36	5·20	10·57	nil
2	6·46	5 6	6 35	5·21	11 57	12.51
3	6 46	5 6	6·34	5·22	nil	1·50
					a.m.	
4	6·46	5 6	6 34	5·22	12 58	2·48
5	6 46	5 6	6 33	5·23	1 58	3·45
6	6 46	5 7	6·33	5·23	2 56	4·37
7	6 46	5·7	6 32	5·23	3 56	5·26
8	6 46	5 8	6 31	5 24	4·53	6·11
9	6 45	5·8	6 31	5·24	5·48	6 53
10	6 45	5·9	6 30	5·24	6 41	7 29
11	6 45	5·10	6·29	5·25	7·27	8·5
12	6 44	5 11	6·28	5 26	8 14	8 37
13	6·44	5 12	6·27	5 27	9 5	9 8
14	6 44	5·12	6 26	5·28	9 29	9·40
15	6 44	5·12	6·25	5 29	10·4	10·13
16	6 43	5 12	6 25	5 29	10 36	10·47
17	6·43	5 13	6·24	5·30	11·6	11·24
						p.m.
18	6 43	5 13	6 23	5·30	11·40	12·18
					p.m.	
19	6 43	5·13	6 22	5·31	12·14	12 58
20	6·43	5·13	6 21	5 31	12·51	1·53
21	6·42	5 14	6·21	5 31	1·32	2·6
22	6 42	5·14	6 20	5·32	2·40	4·3
23	6·42	5 15	6·20	5 32	3·14	5·14
24	6·41	5·15	6·19	5·32	4·15	6·23
25	6·41	5·16	6·18	5·32	5·21	7·31
26	6·40	5·17	6·16	5·33	6·29	8 35
27	6·40	5 17	6 14	5 33	7·36	9·38
28	6·39	5·18	6·13	5·34	8·44	10·42
29	6·38	5·18	6·11	5·34	9·51	11·43
30	6·37	5·19	6·10	5·35	10·51	nil
						a.m.
31	6·37	5 20	6 9	5 35	11·51	12.42

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.

1 August	☽	Last Quarter	5 24 a.m.
8 ,,	●	New Moon	11 48 p.m.
17 ,,	☾	First Quarter	2 38 a.m.
23 ,,	○	Full Moon	10 37 p.m.
30 ,,	☽	Last Quarter	2 40 p.m.

The conjunction of Venus with the moon on the 6th at 12·5 p.m. should form an interesting spectacle, although the nearness of the sun on the right will detract largely from the beauty of the phenomenon. Venus will appear to be remarkably close to the moon, less than half its diameter above it, and should be observable to the naked eye if due precaution is taken to screen off the sun.

At midnight on the 7th Mercury will be in inferior conjunction with the sun—that is in the part of its orbit which is nearest to the earth.

Saturn will be in conjunction with the moon on the 16th at 7·25 p.m.

Jupiter will be in conjunction with the moon on the 23rd at 8·32 a.m., when it will be four diameters of the moon north of it.

The star Upsilon Aquarii will be occulted by the moon a little before 10·30 p.m. on the 24th. As the moon will be nearly full a pair of binoculars or a telescope will be necessary in order to detect this small star of magnitude 4, 5.

Mercury will be at its greatest elongation (18 degrees 20 minutes) west of the sun on the 25th, and will therefore be visible near the eastern horizon about an hour before sunrise.