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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment.

Banana Grade Standards—Efficiency in Industry.

"I HAVE a responsibility as Minister for Agriculture to the people of Queensland, and that is to see that our primary industries are developed and placed on the most efficient basis possible." That was the text on which Mr. Forgan Smith based a strong reply to a deputation representative of Queensland banana growers, and which recently discussed with him certain matters relating to the enforcement of the new grade standards for bananas. Continuing, the Minister said, *inter alia*, that Australia is definitely a nation that has adopted high standards of living. The inevitable corollary of that was high standards of efficiency in all sections of industry. In short, they could not maintain a white man's standard on faulty methods of cultivation or production in industry. That fact was apparent to every investigator and any one with only an elementary knowledge of economics. The banana industry was one that particularly engaged their attention in Queensland. It was suitable to their climatic and soil conditions in different portions of the State. It was an industry peculiarly suited to closer settlement—a very important thing in a State like Queensland—and, because of that, it was necessary to build it up and foster it in every reasonable way. The Government of the Commonwealth had agreed with those principles and had imposed a tariff amounting to an embargo against bananas grown outside of Australia. That protection was of great benefit, enabling the Queensland industry to be carried on under the white man's standards of which they all approved. With protection of an industry, a responsibility was cast upon those engaged in that industry to do their part in justice to the rest of the people of Australia. In other words, a protected industry, for which the tariff impost was adequate, owed an obligation to the people of the Commonwealth to

supply them with a commodity high in quality and of sufficient quantity to meet their demands. That positive statement of the position could not be combated by any reasonable citizen. By means of the Banana Cultivation Act they had endeavoured to keep the cultivation of the banana in the hands of their own people; and as a result of that legislation and the Federal fiscal policy the banana industry had expanded. The degree of their success in banana production might vary with climatic or soil conditions, or as between individual and individual, but, generally speaking, banana growing in Queensland had expanded as a result of the policy to which he had referred. Unfortunately, in the course of the last year or two, the industry had faced many difficulties due to disease and other causes. Certain areas, where formerly fruit of high quality had been produced, had gone out of cultivation, only temporarily it was hoped, on account of bunchy-top infestation. In other cases, owing to the selection and cultivation of unsuitable land, or to faulty methods of cultivation, a fruit of lower than average quality had been produced and offered for sale, and, as a consequence, a serious agitation had developed in the Southern States which provided their chief markets. No trade could be placed on a permanently satisfactory basis unless that business was carried on with a reasonable degree of efficiency. As a result of communications received by the Government, investigations into the position had been made in the South. He had personally investigated the matter and had come to the conclusion, on the evidence he had seen himself and on the evidence placed before him by officers of the several Departments of Agriculture whose duty it was to see to those things, that the banana industry was being seriously menaced by a certain section of growers who were seriously retarding the progress of the whole industry. While he remained a member of the Government he would not allow a small percentage of growers to depreciate the value of that industry to the State and neutralise efforts made to win and maintain for it satisfactory markets. Seventy-five per cent. of the bananas going to the South were of quite good quality, but the remaining 25 per cent. left very much to be desired. He had been shown cases of bananas graded in a manner that was no indication of the contents of the case at all, fruit of all sizes being packed in one case, and in others fruit too small in size to be of any marketable value.

The Minister went on to particularise other cases of faulty grading and wrong description of consignments, and made some illuminative observations on some of the ripening methods in vogue in the South.

Queensland Bananas in the South.

IN the course of his inquiries in the southern capitals, Mr. Forgan Smith informed the deputation, he found Queensland bananas of high quality being sold as the product of Fijian plantations. The best bananas he saw in Melbourne came from the Byfield district in Central Queensland, and they were being exhibited in fruiterers' windows as Fiji bananas. On inquiry, the explanation was that they were of the type that were formerly procured from Fiji. One vendor put it rather humorously to him. "We are not," he said, "contending they were grown in Fiji but they are of the type or quality of Fiji bananas—just, for example, as Scotch shortbread is sold on the market, but is not claimed to be made in Edinburgh." However, it was interesting to note that bananas of good size and quality brought a ready market. The Byfield bananas to which he had referred were being readily retailed at 3d. each. The fruiterers told him that there was no limit to the quantity of that type that could be sold. There was a greater demand and a better price offering for the large fruit. All the things that he had mentioned indicated the necessity for immediate action in placing their marketing arrangements on a much more satisfactory basis. It was the responsibility of the Government of the State to see that no section of an industry was allowed to injure its whole trade or destroy one of the important sources of wealth production in Queensland. In addition, attempts had been made to market fruit that was of no quality at all. They saw on his table some rejected bananas offered since the Regulations came into force,

marked as "special" and "standard" that were not of the quality of any of the grades admitted to be adequate or fair. The exhibits were a fair indication of the average of the contents of the cases from which they had been taken. Having regard to the position as he saw it in the Southern States, and having regard to the quality of the bananas that were grown and could be grown in Queensland, it did not appear to him that the prescribed standards were unduly high if they desired to keep their markets and extend them on a satisfactory basis.

Queensland Grades Accepted.

ALL the States of Australia to which Queensland bananas have gone, said Mr. Forgan Smith, have approved and accepted the proposals made by the Queensland Government. The New South Wales Government had even queried them on the ground that they were not drastic enough. However, the Southern Departments were prepared to give the Regulations a fair trial with a view to placing the industry on a satisfactory footing. It was his view that those Regulations should be given a fair trial, and that growers should endeavour to co-operate wholeheartedly with the Department to that end. It was his intention to recommend to the Government the introduction of a Bill in the next session of Parliament to deal more adequately with many other phases of the banana industry, the necessity for which had recently become so apparent. If it were necessary to reconsider the question of Regulations later on, it could be done when that Bill was before the Legislature. It was his desire and intention to recommend an amendment of the Banana Cultivation Act which would deal with the cultivation of bananas, the diseases to which the fruit was subject, and other related matters.

The Machine on the Farm.

THE coming tractor school at the Queensland Agricultural High School and College will serve, in addition to its other advantages, as an excellent illustration of the development of agricultural implements and machinery to meet the changes that are taking place in country conditions in Australia. The mechanisation of agriculture is proceeding apace, providing a ready means of adjusting high and rising costs of production. Though the engineer has not completely solved our agricultural problems, nor is he likely to, yet to his ingenuity we are indebted greatly for much of our progress towards that end.

The economic utility of the modern tractor with its speed and power is a case in point. Half the job in farming is to be able to get on to the land when weather and soil conditions are suitable and have the ploughing done as quickly as possible, and that is where the tractor proves its great advantage. Present developments in tractor design are in the direction of evolving a dual purpose type that will be as useful on the road as in the field.

Machinery, where its use is an economical proposition, is also helping to reduce the cost of harvesting and numerous other field operations. On the dairy farm mechanical milking is to-day vastly different from what it was even ten years ago; and improved types of machinery are now available which are not only efficient in their work as labour savers, but also ensure cleanliness in the product equal to that obtainable by the most hygienic manual methods.

The success of mechanised agriculture is, as in other things, made or marred by the human element, and that this fact is widely recognised is evident by the stress now laid on the importance of agricutural engineering in college courses. The power plant is now an indispensable unit of most farming outfits, and the mechanic is a new addition to skilled farm and station labour. In the world to-day there is an ever-widening field of opportunity before those who have a mechanical bent, and it is stimulating to see the extent to which the machine on the farm is engaging the attention of engineering genius. It is also good to observe the keen enthusiasm of the staff of the Queensland Agricultural High School and College in providing opportunities for farmers to study and use, under actual field conditions, the newest types of tractors and other modern agricultural machinery.

Bureau of Sugar Experiment Stations.

ENTOMOLOGICAL HINTS TO CANEGROWERS.

Too Late for Fumigating Cane Grubs.

Little or no opportunity for fumigating grub-infested land is likely to occur during this month (March), on account of advanced growth of the cane, which in most places has now become high enough to meet overhead between the rows, and by shutting out the sunlight, to prevent speedy evaporation of moisture from the soil. After commencement of the wet season it generally happens that successive heavy showers render such shaded land too wet for effective treatment, since the interstices or tiny air spaces between the soil particles remain continually filled with surplus water which has little chance of draining away or being removed by a brisk evaporation.

On very well-drained high lands of volcanic origin and excellent soil porosity it may still be possible to use paradichlorobenzene effectively on third-stage grubs of *Lepidoderma albohirtum* Waterh. before they have had time to seriously injure or kill certain stands of late-planted cane.

Prepare to Fight "Army Caterpillars."

Larvæ of our various species of Army or Grass Worms may suddenly invade canefields this month in more or less formidable numbers; so that it is well to be ready to meet any attack that may happen to demand prompt repressive action.

When an army of caterpillars chances to assume vast dimensions, it becomes advisable to at once communicate with the Entomologist at Meringa Experiment Station.

Ordinary outbreaks, however, can generally be effectively controlled by spraying the cane leaves with lead arsenate, in such manner as to form a poisoned strip or band of about three cane rows wide immediately in front of the line of advance taken up by the caterpillars. Use 2 lb. of lead arsenate in about 50 gallons of water; taking care to keep the mixture well agitated whilst spraying it over the leaves, in order to ensure and maintain uniform suspension of chemical in the water. Either of the following spray pumps will be found useful for such work; and no large cane farm should be without some such appliance—the "Rosebery" Hand Sprayer, No. 502, Buzacott and Company, Ltd., Brisbane and Sydney; Compressed air "Knapsack" Sprayers, Smellie and Company, Brisbane, &c.

Trapping Beetle Borers.

Amongst the various artificial methods practised for controlling the numerical increase of the weevil borer *Rhabdocnemis obscurus* Boisd., that of trapping the adult beetles deserves special mention, as being one of the simplest and at the same time most effective; one which costs nothing and is within the reach of every canegrower.

As already pointed out by us in different reports, a bait-trap of this kind consists merely of about twenty or more pieces of soft juicy cane stick about a foot long, split in half lengthwise and laid side by side in a compact heap with the cut surfaces downwards. These little heaps are placed at distances of about three chains apart along the headland of an affected field, under shade of the stools forming the edge of the cane block. They should be kept covered over with enough trash to exclude daylight and prevent the split cane from drying too quickly. These bait-traps should be visited every second day, and after collecting the weevils found in them the sticks must be replaced and covered over as before.

CANE PESTS AND DISEASES.

Mr. R. W. Mungomery, Assistant Entomologist, Bundaberg, has submitted the following report for the period January-February, 1929, to the Bureau of Sugar Experiment Stations:—

A New Sugar Cane Insect Pest (*Crambus malacellus* Duponcel.).

Recent scoutings for insect pests in the Isis district have revealed the existence of a new lepidopterous cane pest, which, hitherto, had not come before our notice. This new lepidopteron was found by Mr. G. Bates when investigating an outbreak of army worms in the Kowbi area during December last, when several "dead hearts" were noticed amongst the cane damaged by the latter pests. The insect under consideration is a caterpillar borer which eats into the central heart of the young cane shoots, causing the "dead hearts" formerly referred to. The damage resembles that caused by the Noctuid moth borer (*Phragmatiphila truncata* Walk.) in young cane, but the caterpillars differ noticeably in their structure and habits. Specimens were accordingly collected and bred to the moth stage, and Dr. Jefferis Turner, to whom the specimens were sent for determination, has kindly identified them as *Crambus malacellus* Dup. This moth belongs to the family *Crambidæ*, a group commonly known as "grass moths," and it is of interest to note that several important pests in other countries are contained in this family. In this connection might be mentioned the borer *Diatræa saccharalis* Fabr. of Louisiana, and *Chilo simplex* of India, both of which are representatives of this family and important cane pests in their respective countries, whilst several species of the genus *Crambus* are destructive to corn and grassland in North America.

In the area infested by this pest, young Badila ratoons were found to be damaged, shoots as small as 2 inches in height as well as larger ones up to 12 and 18 inches being injured. The larvæ have the peculiar habit of constructing silken galleries out of particles of earth, vegetable matter, and other debris which is webbed together, and from this vantage point, they eat right through into the central heart of the shoot. From this habit they have earned for themselves the name of "web-worms." Injury to the plant usually takes place on a level with the ground surface, but occasionally it is either a little above or below this point. Damage was estimated at about 1 per cent. of the total number of shoots in the infested field, but since all the shoots in a stool do not come to maturity, the real damage must be considerably below this figure.

General Description of the Various Stages of the Insect.

The larva or caterpillar is cylindrical and when full grown measures $\frac{1}{2}$ to $\frac{5}{8}$ inches in length (1.5 cms.). The head is of a pale yellowish-brown colour, with slightly darker irregular markings or blotches towards the vertex and sides. The cervical shield is darker than any other portion of the body, being a dirty black on the dorsal area and fading off gradually towards the lateral margins. The body is whitish, each segment bearing two rows of slightly raised dark spots or tubercles, which give the appearance of two interrupted transverse bands running from each side across the back, the anterior row of spots being larger than the posterior row. Each tubercle usually bears one seta or hair. The larva pupates in the soil within a silken web similar to that used as a retreat when eating into the cane shoot.

The pupa is about $\frac{5}{16}$ of an inch in length, being coloured pale brown. For some time prior to the emergence of the adult, the eyes begin to get darker, and immediately before, the darker pigment of the wings also becomes noticeable.

The moth is a small whitish species, with a wing expanse of $\frac{5}{8}$ to $\frac{3}{4}$ of an inch, the forewings bearing two pairs of silver longitudinal stripes. A small stripe runs along the costal margin broadening out as it approaches the tip, near which it is interrupted by four white lines intruding fanwise into the silver area. Parallel with this costal stripe is another which runs through the centre of the wing and which also widens slightly towards the outer margin. Between these two stripes, running parallel and near to the outer margin, is a thin silver band. A darkening is also visible on the inner margin of the wing.

The hind wings are white and semi-transparent, with a faint darkening along the outer margin and following the veins for a short distance inwards. The body is white with silver markings on the thorax near the junction of the wings, and the palpi which are large and snout-like, have their outer surfaces edged with silver.

Similar species of moths are frequently abundant in grassland and when disturbed fly in erratic short flights. When they alight, they are usually found resting along the length of a twig or grass shoot with their wings closely folded round their bodies. This gives them a cylindrical appearance and renders them less conspicuous.

Distribution and Economic Position.

The species *C. malacellus* Dup. is widely distributed, being found in such countries as New Guinea, Borneo, India, Africa, and Europe, whilst it has also been known in Australia for a considerable time, records extending from Sydney to as far north as Cooktown. Most likely it is indigenous to this country, and in addition to sugar cane, it probably feeds on various grasses. With reference to its economic position in sugar cane entomology, it is unlikely that this insect will ever be anything but a minor cane pest. This view is supported by the fact that this insect has been known to occur here for some time past, but up to the present time it has not been known to occasion any more than a little local damage, which is almost negligible. It therefore, appears to be kept under efficient control by several natural enemies, which prey on or parasitise caterpillars and moths. Also, although it occurs in other countries where sugar-cane grows, it has never been reported as causing injury to that crop.

CANE PEST COMBAT AND CONTROL.

Mr. E. Jarvis, Entomologist to the Bureau of Sugar Experiment Stations, has submitted the following report on some of the activities of the Meringa Experiment Station during the period January to February, 1929:—

Preventing Oviposition of "Greyback" Cockchafers

The advisability of attempting to deter egg-laden "greyback" beetles from ovipositing in canefields was pointed out by the present writer about thirteen years ago (1915), although it was not until six years later (1921) that initial field experiments in this connection were commenced on the "Carrah Estate," near Meringa. The various deterrents tested at that time, with a view to inducing cane beetles to avoid such treated areas, were—coal tar, naphthalene, chloride of lime, tobacco dust, and carbolineum emulsion; each experiment plot consisting of one-eighth of an acre, and being separated by suitable check areas. To avoid labour of emulsifying and spraying, the tar was prepared by mixing the quantity needed (2 gallons = 16 gallons per acre) with five kerosene tins full of dry sifted soil, so that the deterrent could be easily sprinkled in a demi-dry condition on each side of and between the cane stools, in a strip about 3 feet wide.

When examined twelve days later (0.15 inches of rain having fallen during this interval) the tarry odour was quite pronounced, and even after twenty-six days remained perceptible, although, perhaps, not sufficiently so to be repellent. The chloride of lime—which was also mixed with soil, and applied at the rate of 160 lb. per acre—maintained its odour nearly a week, but lost it about nine days after application. The naphthalene was administered at the rate of about 120 lb. to the acre, and kept its repellant odour longer than the lime chloride.

Unfortunately, owing to the scarcity of cane beetles on this estate during the course of these experiments, results were inconclusive, as no grub-infestation occurred on either the treated or check plots.

Although attention was drawn by the writer to the possibilities of paradichlorobenzene as a deterrent against egg laying, in the year 1915 ("Queensland Agricultural Journal," vol. III., p. 263), field tests with this chemical were not commenced

until the year 1923, when experiment plots were established at Woree and elsewhere. With a view to following up a question of such economic interest, additional field experiments with paradichlorobenzene were carried out last November at Meringa and Banna.

Paradichlorobenzene as a Deterrent against Oviposition.

The crystalline nodules of this fumigant—after being passed through a quarter-inch-mesh sieve—were applied to plots of one-tenth of an acre by means of a machine operating on the same principle as a corn planter, but which had been adapted by us for such work. These plots were treated about a week after the first appearance of cane beetles (*Lepidoderma albohirtum* Waterh.), by burying doses of one-eighth of an ounce (apoth.) about 3 inches deep on each side of the cane rows, at intervals of about 15 inches apart, and 7 inches from the nearest cane shoots. A special roller attached at the rear of the machine served to consolidate and level the disturbed soil above the line of fumigation.

Used as a deterrent, paradichlorobenzene is best applied to the soil between cane rows just after emergence of the beetles, in order that the ground may have ample time to become impregnated with the objectionable odour before invasion of a plantation by egg-laden female beetles.

Plots laid down this season (1929) were fumigated, as described above, at the rate of 120 lb. of paradichlorobenzene per acre. In addition to acting as a deterrent against oviposition of the beetles, the amount used would remain operative in the ground for a month or longer, so that in the event of eggs being deposited later on by beetles making a late emergence, these eggs, or any first-stage hatching from same would be destroyed. Early applications of this kind are often desirable on certain classes of soil, since they can be made well in advance of the wet season, at a time when the soil is thoroughly open to such fumigation.

Growers should Read the following Notes on Fumigation.

When fighting any kind of insect pest, the economic entomologist aims not only at discovery of the cheapest and safest remedy, but also seeks to administer the same in the simplest and least expensive manner possible.

In the case of paradichlorobenzene which is cleanly to handle, dry, and non-poisonous to human beings and domestic animals, the ideal method in which to apply this fumigant will, in the near future, be found to be by means of some suitable fertilising machine, of a type that will bury manure about 4½ inches deep, cover in the drill, and slightly consolidate the disturbed soil above the manure by passing broad-tyred wheels over same.

When giving the final dressing of manure, at a time when the cane is 4 to 5 feet high, the dry crystalline nodules of paradichlorobenzene—after being passed through a ¼-inch-mesh sieve—are thoroughly mixed with the fertiliser.

In this manner the two can be applied to the soil in the one operation, which is a part of the usual routine field work. Moreover, at such stage of growth of the cane the grubs will still be small, so can be destroyed before having had time to work appreciable or serious injury to the roots.

The fumigant should be mixed with the manure in a proportion that will ensure the administration of about 120 lb. of the former per acre.

A VALUABLE AID TO THE FARMER.

A Nambour farmer, renewing his subscription to the Journal for two years, writes (20th January, 1929):—"I eagerly await the monthly issues of the Journal, as each issue has something new and interesting to the man on the land, and, in my opinion, every farmer who wants practical hints and useful information as regards farming could not do better than subscribe to the Journal."

THE POTATO TUBER MOTH.

By ROBERT VEITCH, B.Sc., Chief Entomologist.

THE potato tuber moth (*Phthorimæa operculella* Zell.) occurs throughout the various States of the Commonwealth, and is generally throughout the various States of the Commonwealth, and is generally considered the most destructive insect enemy of the potato in this counry. It was recorded as early as 1854 in Tasmania, and Tryon discussed its ravages in Queensland in 1889. There is much controversy with respect to the native home of this pest, some writers believing it to be of North American origin, while others consider its home is North Africa. It is an insignificant moth belonging to the family Gelechiidæ.

Nature of Injury.

The injury inflicted by this pest is of a twofold nature, for it may attack the aboveground portion of the plant or it may attack the tubers. Injury to the former is due to the larvæ of the moth mining in the leaves and leaf stalks and tunnelling in the stems. This damage to the foliage and stems may be quite appreciable, but is not generally considered nearly so serious as the injury to the tubers. In the tubers this pest, in its larval stages, may burrow and tunnel to such an extent as to very greatly depreciate their market value.

Plants Attacked.

Among the plants recorded as being attacked by this pest are the following:—Potato, tobacco, egg plant, Cape gooseberry, and tomato. It is, however, of importance as a pest only on the first two mentioned plants. On the potato it is, as already indicated, referred to as the potato tuber moth; whereas, when attacking tobacco, it is more commonly called the tobacco leaf miner or the tobacco split worm. In addition to attacking the abovementioned plants of economic importance, it also feeds on a number of weeds belonging to the Solanaceæ or potato family, included among these being the common nightshade (*Solanum nigrum*).

Life Cycle Stages and Life History.

The oval-shaped pearly-white eggs are extremely minute, and can just be seen by the naked eye. They may be laid on the leaves or stalks or on the tubers, and may also be found on the sacks in which infested potatoes are stored. When laid on the tubers they generally occur in clusters, and are usually laid in the eyes or at a scar on the surface of the tubers. On the foliage they do not occur in clusters, but may be found occurring singly, generally on the underside of the leaf. In the open, egg-laying does not usually take place during the day, but it is believed that in dark stores it takes place quite readily at all hours. Life history studies in North America have shown that the moth lays from 150 to 250 eggs over an egg-laying period of from one to two and a-half weeks.

At the end of the usual incubation period the larvæ hatch from the eggs, and if these have been laid on the leaves the larvæ commence mining in the foliage between the upper and lower surfaces of the leaves. If the eggs have been laid on the tubers the larvæ eat through the skin and either tunnel under the skin or burrow towards the heart of the tuber, eventually forming tunnels which may be two or three inches long. Infestation is most serious when it takes the form of

burrowing towards the heart of the tuber. When full fed the larva is slightly less than half an inch in length, and is white in colour with a faint pink tinge.

The full-grown larvæ generally leave the tubers to pupate, although they may do so just within the entrance to their tunnels. The pupa is formed within a silken cocoon, and may be found on the outsides of the tubers or between folds of sacking, or indeed in any of at least half a dozen other situations. Pupæ formed by the larvæ that have been mining in the leaves and tunnelling in the stalks may commonly be found among the dead, withered leaves or under lumps of soil. The pupa is slightly more than one-third of an inch in length, and is dark brown in colour.

The usual transformation processes take place within the pupa, and eventually the insignificant greyish-brown moth emerges. It has a wing spread of about half an inch, and a body length of about a-quarter of an inch. The moths mate, egg-laying takes place, and so the infestation continues.

Control Measures.

Control measures should aim very largely at safeguarding the tubers —firstly when they are in the soil, secondly while they are being harvested, and thirdly when they are subsequently in storage. Tubers in the soil may be attacked by this pest, and hence it is desirable to adopt cultural practices that will minimise the danger at this stage. For this reason it is a wise precaution to plant as deeply as is practicable, and to keep the thoroughly pulverised soil well hilled up so that the tubers will not be exposed. Once the tubers are exposed infestation will become serious. As the common night-shade weed is a host plant of this pest it should as far as possible be destroyed.

At harvesting certain precautions should be adopted, among the more important of which are the following:—The potatoes should be bagged and removed as soon as possible after digging, and furthermore the bags should be sewn up as soon as they are filled. The tubers should never be left overnight in the field exposed to the attacks of the moths, because if that is done many thousands of eggs may be laid on them and subsequently severe losses will be experienced in storage when the larvæ hatch out of the eggs. Furthermore, the harvested potatoes should on no account be covered with the tops, because if these are infested the larvæ will desert the fast withering leaves and stems and burrow into the tubers. The potato tops, according to Australian authorities, should be burned as soon as practicable after the harvesting of the tubers. An American investigator, however, recommends that such a practice be abandoned because of the destruction of the parasites that may be associated with the tuber moth. The question of parasite control raised by this recommendation seems worthy of some further investigation in Queensland to determine to what extent useful parasite control exists in this State. The harvested tubers should, if possible, be kept in a storeroom to which access by the tuber moth is not readily obtainable. The not infrequent practice of leaving tubers heaped up in an exposed condition in an unclosed storeroom merely invites serious trouble.

Fumigation of tubers that have become infested with potato tuber moth larvæ has been recommended in the United States, carbon bisulphide being used at the rate of 2 lb. to 1,000 cubic feet, the duration of fumigation being forty-eight hours. It is said that, under American conditions, the treated tubers are not injured, and that the whole of the larvæ and moths and the great majority of the eggs and pupæ are killed. The fumigation may have to be repeated if infestation continues.

THE BUFFALO FLY.

MINISTERIAL STATEMENT.

The Minister for Agriculture and Stock, Mr. W. Forgan Smith, said recently in the course of a Press statement, that the presence of Buffalo Fly in Queensland was a matter of grave concern to the pastoral industry of this State and of the Commonwealth generally.

The fly was first detected in the Northern Territory many years ago. From the Territory it has already spread westward, and for some years past it has been a menace to the cattle industry in the northern portion of Western Australia.

In January, 1927, the attention of the Commonwealth Government was called to the possibility of the fly spreading from the Northern Territory into Queensland if an effort were not made to restrict it to the Territory, but in this connection, nothing in any way effective was done by the Commonwealth Government in preventing the spread of the fly eastward and southward of the coastline and across the border into the Gulf country of Queensland.

There is no doubt that the fly has come to Queensland from the Territory. The State Government, some time ago, approached the Commonwealth Government and suggested that the matter of bringing this pest under control should be treated from a national standpoint and that the action necessary to restrict the spread of the fly should be taken by Commonwealth authorities. Unfortunately, the latter have not definitely advised the State Government as to whether or not they are prepared to treat the matter as of national concern. This delay is much regretted, for it obviously increases the risk of infestation of Queensland herds. The State Government intimated to the Commonwealth Government its preparedness to co-ordinate with it in any reasonable way in regard to any investigations that may be considered necessary.

Biological Control.

It is now understood that definite arrangements have been made to carry out the necessary preparatory investigations with the view of bringing the pest under biological control. There is a possibility that this may be found a satisfactory means of checking the spread of the fly and reducing the seriousness of its menace to stock; but in the event of a suitable predatory insect being discovered, it will probably be some years before its influence may be manifested. It is, therefore, necessary that some method of restricting the extension of the fly should be made operative in the interim.

Action has been taken in this State to declare the condition arising from infestation by the Buffalo Fly a notifiable disease under the Diseases in Stock Act, and the stock crossing place near Wollogorang, has been closed, and in practice, this means that no stock may enter Queensland from the Territory north of Camooweal. The question as to whether or not the closure of additional stock crossing places shall be necessary to further protect the cattle industry of Queensland is now under consideration.

Additionally, all possible precaution is being taken by the State Government to keep the fly in check pending receipt of definite advice of the attitude of the Federal Government on the matter.

QUEENSLAND RAIN FOREST TREES.

By W. D. FRANCIS, Assistant Government Botanist.

The White Bean is a straight-stemmed tree which attains a height of about 100 feet and a stem diameter of about 2 feet. It is known to botanists as *Ailanthus malabarica*. Another botanical name, bestowed upon it by Ferdinand Mueller, is *Ailanthus imberbiflora*, but it is evidently the same species as the Indian one which is known as *Ailanthus malabarica*. The bark is grey or brown, often very finely scaly, and exudes an almost colourless resin. The wood is light in weight, pale in colour, and is not highly figured. It could be used for indoor work where lightness is required and there is no demand for ornamental markings. Dr Lauterer stated that the resin makes a good ointment for chronic ulcers. He also suggested that it might be used for softening hard and quickly-drying varnishes. The trees are found in the "brush" forests of Northern New South Wales (C. Moore) and in Queensland, as far north as Bowen. It is also found in India, Ceylon, and Cochin China.

Photo.: W. D. Francis.]

Plate 65.—The White Bean (*Ailanthus malabarica*).

A tree in the Imbil Rain Forest. A large Bird's Nest Fern (*Asplenium nidus*) is shown on the tree in the upper part of picture.

Photo.: Department of Agriculture and Stock.]

PLATE 66.—WHITE BEAN (*Ailanthus malabarica*).

A, portion of leaf; B, flowering bearing twig; C, fruit-bearing twig.

THE POULTRY INDUSTRY OF QUEENSLAND.

SOME ECONOMIC PHASES.

The economic condition of the poultry industry is at present the subject of close consideration by all interested in it. This article does not cover the whole range of poultry keeping (ducks, geese, pigeons, &c.); it rather analyses some phases of the business of egg production, and seeks to emphasise the necessity of the adoption of up-to-date methods by individual poultry keepers. There has been a tendency in some directions to take up poultry keeping with a lack of appreciation of what is involved. It has to be observed that haphazard and ill-directed poultry keeping cannot possibly be remunerative to those concerned, although the resultant egg production may menace the livelihood of those in the industry who are working along approved lines.

Consideration of the details of farm economics by the individual is therefore just as important as collective action by the producers generally in matters of major industry economics. It is principally the former phases that are herein examined. It would be preferable for anyone contemplating taking up poultry keeping to pause before doing so, unless he is prepared to employ only systematic methods, and to do so consistently and in every department of the business. Much disappointment would thereby be obviated.

Within recent years the purchase of day-old chicks as a rapid way of commencing business has become extensive. Consideration, however, should be given to the points emphasised in this article as to the use of stock of high producing strains. There has been a tendency to use eggs regardless of their source of origin, and it is important that purchasers of day-old chicks should appreciate this factor.

DOMESTICATION.

Poultry have not always been domesticated. The present farm flocks had for their progenitors the wild fowl of the jungle. These wild fowl were certainly not as prolific as the fowl we have to-day, and without the controlling hand of man the latter would revert to the habits of their predecessors. Continuous egg production is a feature which has been evolved in the breeding of domesticated fowls, and even then this is only possible when the birds are correctly fed.

IMPROVE EGG SIZE

by hatching only from eggs over 2 oz. in weight and by purchasing only day-old chickens from breeders who follow this practice.

Where reversion to natural type and conditions takes place, egg production becomes limited to the extent necessary for regeneration in the most favourable months of the year—the breeding season—when the birds are in good physical condition, and when the natural supply of food is most abundant. A plentiful supply of food, and the genial climatic conditions of the spring months, the natural breeding season, induce, in the first place, egg production and give reasonable assurance

of a supply of food for the young. The business of the poultryman is to adapt these characteristics to be of maximum use to man. He must maintain his stock in perfect physical condition for as long as possible throughout each year. To do this, every effort must be made to make the surroundings of the poultry approach, as nearly as possible, the genial conditions of spring, while, in feeding, animal food of some kind must be supplied, for insect life is largely the natural food supply of birds.

What are the poultry products which may with advantage be developed?

There is the flesh, which, properly served, is a valuable and most palatable food, but we in Queensland have a very large number of cattle, sheep, and pigs, and poultry flesh is subject to keen competition from these sources. Not losing sight of the possibilities of poultry meat, it would be as well to stress the value of the egg—the field peculiar to poultry—for which a more popular demand could be developed by the retention of its natural quality, as it is most nutritious, containing all the essential elements for the building up of bone, flesh, &c., necessary for our physical maintenance and development.

What of the Poultry Industry in Queensland?

On account of the genial climatic conditions and the general abundance of succulent herbage during the greater portion of the year, poultry raising is extensively engaged in throughout the whole of the State. Numerous farmers make poultry raising their sole source of income. Others engage in this industry as an adjunct to general farming, while the practice of the suburban householder to keep a flock is general.

BREED FROM VIGOROUS STOCK.
Healthy, vigorous breeders produce strong chickens.

On poultry farms where producers specialise in the industry, the production per bird is greater than when it is carried on as an adjunct to other work; also the product reaches the consumer in a much fresher state and therefore commands higher values.

The mixed farmer may obtain, by systematic breeding and feeding, production equal to that of the specialist. By forwarding his eggs to market twice weekly during hot weather and once weekly during the winter, he obtains values very little, if any, below those received by the producer within easy reach of the market. By regularly placing on the market an article of reliable quality, he will assist in increasing the per capita consumption, and thus reduce gluts.

What, then, are the factors of success in poultry raising?

In the rearing of his stock the poultryman must pay heed to the natural processes, and to avoid losses he must provide against unfavourable conditions.

In the commercialising of the main poultry product (eggs) he must maintain the health and vigour of the bird that is natural to the mating and breeding season, by judicious housing and proper feeding.

In the study of marketing, he must cater for the consumer by producing eggs of standard size, and delivering them to the markets in a fresh and clean condition.

Generally, then, the essentials of successful poultry keeping may be summarised as follows:—

(1) Proper housing to afford protection from unfavourable weather conditions, and to ensure virile stock.
(2) Economy and efficiency in rearing young stock.
(3) Birds of suitable type with heavy producing capacity and laying standard-sized eggs.
(4) Close attention to market requirements to ensure remunerative prices. (See page 221.)
(5) Feeding to induce maximum production.

Housing.

A survey of many farms indicates that one of the principal causes of impaired health and high mortality is due to inadequate housing. It is not the case only that the housing accommodation is too small, but that it is of the wrong design and does not lend itself to the easy maintenance of those sanitary conditions necessary to health and vigour. Elaborate and costly houses are not necessary, but they should be of sufficient size for easy access, and the floors should be as impervious as possible, such as concrete, so as to permit of thorough cleaning at definite periods. Buildings are generally erected for a definite number of birds, but it is found that, as the flock increases, the tendency is to use these buildings for greater numbers than those for which they were originally designed. This evil is not only noticed with reference to the accommodation of adult stock—where the least harm is caused—but it is more pronounced in the accommodation used for the rearing of young chickens and growing stock.

HATCH CHICKENS EARLY.

Early hatched chickens (July, August, and September) produce the greatest number of eggs when values are high.

The success of a poultry raiser is dependent firstly upon the number of chickens that are reared to maturity, and, as overcrowding is one of the principal causes of mortality amongst chickens, the consequences of insufficient accommodation become most serious as a poultryman extends his business. It has also to be borne in mind that the loss through overcrowding does not end in the death of chickens. Others may survive improper treatment, but their health and vigour are so impaired that their potential egg yield is greatly decreased.

SYSTEMS OF ACCOMMODATION.

There are three practices commonly adopted, viz.:—

(1) Intensive, where the birds are kept entirely under cover;
(2) Free range, where a house is erected to provide sleeping accommodation and unrestricted liberty permitted; and
(3) House and yard, where a house is provided for sleeping quarters and liberty is restricted by the erection of a run.

Under the intensive system the birds are kept entirely under cover, and are thereby afforded the maximum protection from climatic conditions, ensuring greater stability in production. The health and condition of the birds are readily observed by the farmer. Further, it is possible to thoroughly free the house from excreta at regular intervals.

Under the free range conditions, soil contamination from the excreta of the stock naturally takes place, but owing to the unrestricted range and the feeding on the soil by plant life, soil contamination does not become serious. The birds are, however, exposed to climatic variations, and the egg yield is not as stable as under the intensive system. There is, however, the compensation in the reduced cost of feeding, as birds obtain a good deal of their natural food supply by foraging.

The yard and house system has the disadvantages and none of the advantages of both the intensive and free range systems. The addition of the yard adds to the cost of accommodation. The birds are exposed to climatic conditions as much as they are under the free range system. Egg production is not stable, nor are the birds in a position to gather any of their own food requirements. The most serious disadvantage, however, of this system is soil contamination. A good many of the highly contagious diseases of poultry, and internal parasites, are transmitted from bird to bird through the excreta. Many organisms of the common diseases of the fowl will lie dormant in the soil ready to cause infection on the first favourable opportunity. Although the excreta may be scraped regularly from the surface of the poultry yard, many of the minute organisms and worm eggs are below the surface, and it is only necessary for favourable conditions to arise before infection takes place.

When the house and yard system is adopted, two yards should be erected for each house. This enables one yard to be spelled, planted with some crop suitable for green feed, and the soil thus sweetened.

For the specialist poultry keeper, where large numbers of laying stock are to be kept, the intensive system of housing is most suitable. For the farmer who raises poultry as an adjunct to other rural pursuits, the free range system offers many advantages.

CARE OF GROWING STOCK.

In the housing of growing stock the pens are only occupied throughout six months of the year, and as egg production does not enter into consideration, the exposure to climatic conditions is not so material. Likewise, soil contamination is not pronounced. To obtain the maximum development, exercise must be provided. The free range system answers admirably for the purpose of the development of growing stock, but as several hundred pullets of different ages have to be reared, it is necessary to erect netting fences for the separation of the various lots. These runs should be made as large as the land will permit, allowing not less than 6 square yards per bird, and the number in any one pen should not exceed one hundred.

BROODING OF CHICKENS.

There are numerous systems of brooding chickens. The system to be adopted depends largely upon the number to be handled, the personal inclinations of the farmer, and the capital to be expended. The subject of brooding is too extensive for full reference in this bulletin, and farmers are advised that additional information may be obtained from the Department of Agriculture on this subject.

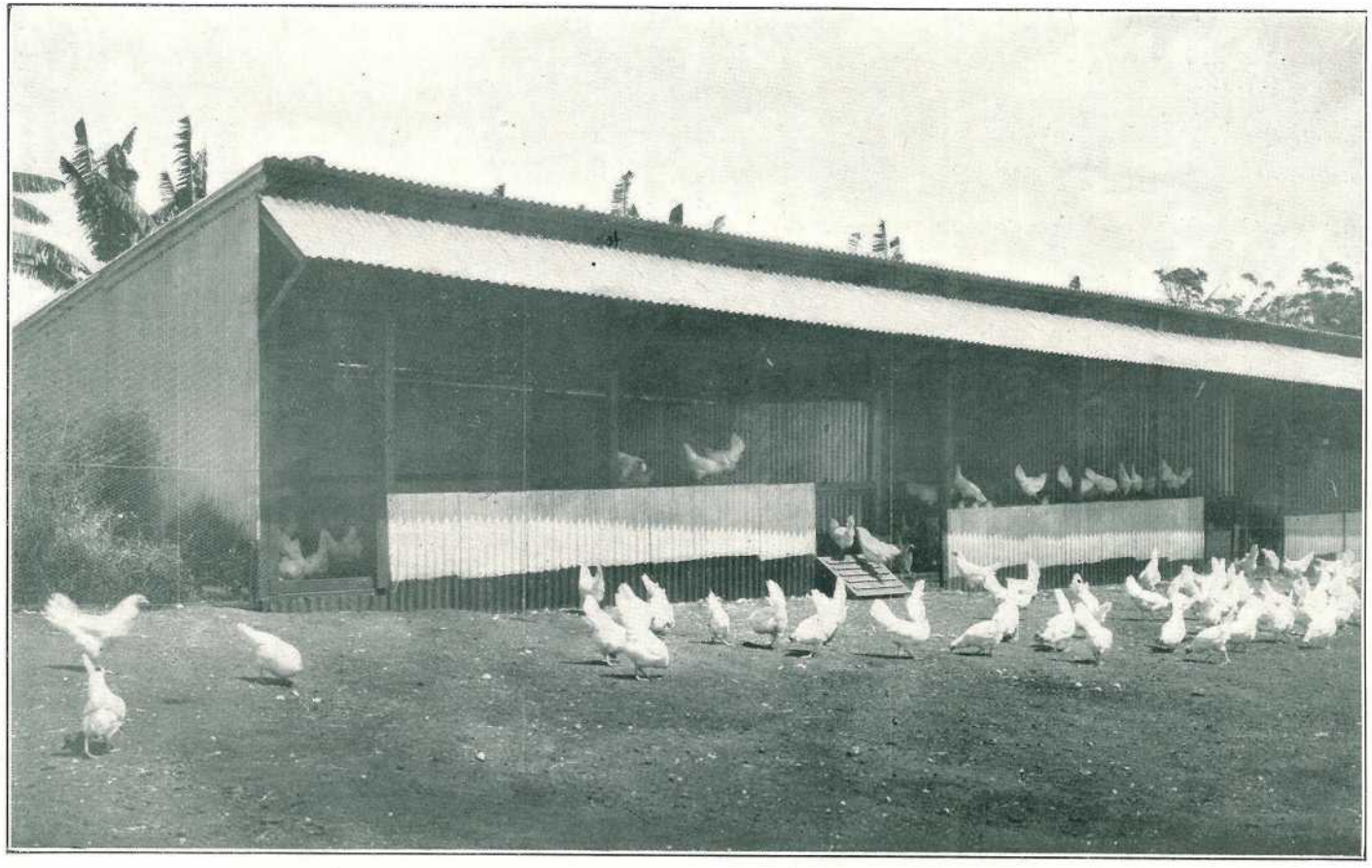


PLATE 67.

A good Poultry House constructed from plans supplied by the Department of Agriculture and Stock. Housing under the intensive system allows 3½ to 4 sq. ft. of floor space for each bird; under the free range system, 2 sq. ft. are sufficient.

The Cost of Rearing.

It must be pointed out that, however ideal the brooding and rearing conditions are made, without suitable foods being used throughout the growing stage, unthrifty stock will be the result. To arrive at the cost of the chicken, the value of the breeding stock, breeding pens, feed consumed by breeding stock, incubators, fuel, results obtained from incubation, and labour have all to be taken into consideration. These items vary considerably on different farms, but exclusive of labour and the value of stud stock, the cost of a chicken should not exceed 5d.

This cost is arrived at on the following basis:—

	Rate per Chick.
	d.
10 per cent. interest and depreciation on a 1,000 chick-plant valued at £60	1·44
Two eggs per chick at 1s. 6d. per dozen (cost based on poultryman using eggs produced by himself)	3·00
Cost of fuel	·55
Total	4·99

Note.—Proportionate cost of males is not taken into consideration. One male may sire 240 chickens and last two years. The proportionate charge would be ½d. per chick for every £1 value of the bird.

A larger plant and better hatching would reduce this cost; both are feasible.

Assuming that a chicken one day old costs 5d., the cost of rearing to maturity, allowing for mortality and the cost of rearing the male birds, can be determined. Many producers state that the food alone, to produce a pullet, costs 5s. This figure is probably on the high side, and various tables have been prepared from experiments conducted, showing the consumption of food and its cost at prices within the reach of every poultry-raiser:—

TOTAL FOOD CONSUMED IN FORTNIGHTLY PERIODS ACCORDING TO AGE.

Age.	White Leghorns.	Rhode Island Reds.
	Lb.	Lb.
2 weeks	·22	·24
4 weeks	·79	·81
6 weeks	1·71	1·85
8 weeks	3·11	3·42
10 weeks	4·88	5·37
12 weeks	6·86	7·63
14 weeks	8·97	9·94
16 weeks	11·24	12·56
18 weeks	13·84	15·70
20 weeks	16·64	18·91
22 weeks	19·31	22·34
24 weeks	22·13	25·77

Many feeding tests have been conducted, the results of which support the foregoing table, and it is therefore possible to estimate fairly accurately the consumption of food necessary to rear chickens to maturity. A working basis would be from 20 to 25 lb. for Leghorns and light birds generally, and 25 to 30 lb. for the heavy breeds most common to Queensland.

In every batch of chickens there are generally 50 per cent. of cockerels. These birds are sold by many breeders as soon as the sex can be distinguished, while others retain them until greater development has been made. It is questionable if many breeders give consideration to the actual costs of cockerels when they are disposed of, and with the object of guiding breeders, the following table is prepared. The mortality that occurs among chickens is based at 12 per cent. and spread over the first six weeks, as it is considered that losses which occur after this stage are largely due to faulty management. The chickens at the outset are valued at 5d. each, being cost on leaving the incubators.

The total feed consumed per chick is taken from the previous table, and is valued at 14s. per 100 lb. No allowance has been made for labour or interest on plant:—

COST PER CHICK ALLOWING FOR ORIGINAL COST WHEN HATCHED (5D.), FOOD CONSUMPTION AT 14S. PER 100 LB., AND 12 PER CENT. LOSS DURING FIRST SIX WEEKS.

Age.	Light Breeds.	Heavy Breeds.
	s. d.	*s. d.*
2 weeks	0 5·59	0 5·62
4 weeks	0 6·77	0 6·80
6 weeks	0 8·68	0 8·91
8 weeks	0 11·03	0 11·54
10 weeks	1 2·00	1 2·81
12 weeks	1 5·33	1 6·60
14 weeks	1 8·86	1 10·48
16 weeks	2 0·67	2 2·88
18 weeks	2 5·03	2 8·15
20 weeks	2 9·73	3 1·54
22 weeks	3 2·21	3 7·30
24 weeks	3 6·94	4 1·06

The marketing of surplus cockerels at the stage most advantageous to the grower has a direct bearing on the cost of pullets. Breeders who market these immediately the sex is determinable (that is, after four weeks old) may obtain from 3d. to 6d. each for the cockerels. From the table it will be seen that the cost to this age has not been recovered. At the same time, the loss is not excessive, nor is it necessary to have an extensive plant which is used only for a few months in the year for rearing cockerels. There is great fluctuation in market values for light

breeds such as Leghorns. The table of costs has been compiled for poultrymen who specialise in the industry, to enable them to study market values and dispose of the surplus cockerels to the best advantage. Breeders of birds of heavy varieties will find it profitable to retain the cockerels until they have made good development—say, to the age of twenty weeks—but it is necessary to point out the rapidity with which costs increase. Lower values are also received for birds which have made full sexual development and have become staggy.

The cost of a matured pullet depends upon the policy pursued by the individual. There must be brought into consideration the value received from the sale of cockerels, for with some varieties of stock, cockerels are always reared at a loss, while with breeds of heavy varieties cockerels return a fair profit, exclusive of labour, over costs. The progressive poultry-keeper with the assistance of the table given on page 217 can readily ascertain the costs for himself according to the plan he is following.

Egg Production.

Poultry-raisers have, independently of breed, two classes of stock from a production point of view—namely, birds during their first year of laying (pullets) and older birds (first and second year hens). The average production that is obtained from either class differs considerably. There is also great variation on different farms between the average production obtained from each section. There are farmers who obtain an average of 200 eggs per bird from some pens of the pullet section of their flocks, while others only obtain 140 to 150 per bird. The production obtained per bird is the final determining factor to success in poultry raising, and farmers should take as their objective an annual average of 200 eggs for pullets.

As an illustration of the variation in production between pullets and hens, the following figures of tests carried out in three successive years may be quoted:—

Pullet, average annual egg yield (White Leghorn)	195·7	..	219	..	208
Hen, average annual egg yield (White Leghorn)	160·8	..	165·4	..	147·9

In these tests only the best first-year producers were retained, otherwise the average production of the hen section would not have been so high. *Therefore only the best of a flock for second or third year production should be retained.*

INCREASE FLOCK AVERAGE

by culling—

1. **Old hens as they cease to lay;**
2. **Excessively fat hens;**
3. **Birds that show no signs of wear.**

From the above it will be seen that there is an average of approximately four dozen eggs per annum in favour of the pullets over the hens. With eggs at an average price of 1s. 6d. per dozen, and the cost of rearing a pullet at 3s. 6d. to 4s., some breeders may come to the conclusion that when the value of the carcass of the hen is taken into consideration, it would be more profitable to keep only pullets for the purpose of egg production. This is not so, for, to put this theory into practice, a most extensive incubator and rearing plant would be a first essential. Pullets, when about to come into production, are also very susceptible to climatic change and moult. The moult materially reduces the expected egg yield, therefore it is better for the producer to cull the older birds rigidly, and only make the necessary annual replacement to maintain the flock at a specified number.

Seasonal Fluctuation.

Another important factor is that the average profit per bird is largely influenced by the period of the year during which production takes place. The following table is prepared, showing the relative position of a flock averaging 155 eggs and one averaging 204. These figures are taken from tests which have been conducted during recent years, and are therefore a fair average of the position with respect to the proportionate values of the produce of the hen and pullet sections of flocks:—

Month.	Average Market Value 1st grade eggs.	Flock Average, 155 Eggs.		Flock Average, 204 Eggs.	
		Production per Hen.	Value.	Production per Hen.	Value.
	s. d.	Eggs.	£ s. d.	Eggs.	£ s. d.
April	2 8	5·2	0 1 1·86	8·9	0 1 11·73
May	2 8	3·8	0 0 10·13	16·2	0 3 7·2
June	2 4	6·3	0 1 2·7	16·7	0 3 2·96
July	1 6	12·4	0 1 6·6	18·4	0 2 3·6
August	1 4	18·3	0 2 0·4	21·5	0 2 4·66
September	1 3	19·6	0 2 0·5	21·0	0 2 2·25
October	1 2	20·0	0 1 11·33	21·5	0 2 1·08
November	1 4	17·9	0 1 11·26	19·8	0 2 2·4
December	1 8	17·3	0 2 4·82	17·0	0 2 4·3
January	1 8	12·8	0 1 9·33	16·4	0 2 3·3
February	2 3	12·3	0 2 3·67	13·6	0 2 6·6
March	2 3	9·5	0 1 9·37	13·1	0 2 5·47
Totals ..	..	155·4	£1 0 11·97	204·1	£1 9 7·55
		Average price per dozen, 1s. 7·5d.		Average price per dozen, 1s. 8·9d.	

From the table it is observed that heavy-laying flocks are producing freely during the period of the year when prices are highest, while low production is taking place from poor flocks. In the spring period, when prices are invariably low, the poor layer is probably laying equally with the heavy layer, but the latter class of bird scores over the former during all other periods. The prolificacy of the bird, therefore, has a definite money value to the poultry-keeper over and above the value of the actual excess number of eggs produced.

PARTIAL MOULTS REDUCE EGG YIELD.

Do not move pullets after they commence laying, nor make drastic changes in their ration, and so assist in the prevention of partial moults.

Comparing two farms each having 400 birds, one with good laying stock and the other with birds of medium quality, the position could be set out as follows:—

GROSS INCOME.

400 good birds produce 6,800 doz. eggs at 1s. 8·9d. = £592 3s. 4d.
400 medium birds produce 5,166⅔ doz. eggs at 1s. 7·5d. = £419 15s. 10d.

Taking a dozen eggs as a basis, the average price received from a flock of medium producers as compared with that of a flock of good producers, is not very pronounced, but when it is spread over a period of twelve months on a flock of 400 birds, it grows to the extent of £172 7s. 6d.

PLATE 68.—A PEN OF TYPICAL WHITE LEGHORNS.

Size of Egg.

This is a most important factor in commercial poultry-raising, and from an industrial and a monetary point of view, the size of the eggs means almost as much to the breeder as numbers. Collectively, if the size of egg is not maintained by producers, it will eventually mean that satisfactory markets cannot be secured for the surplus production. At present it is mainly by export that any surplus can be disposed of, and if this avenue is restricted by the production of undersized eggs, local values will sink to such a level as to make poultry-raising unprofitable. Small or second sized eggs realise throughout the year from 2d. to 5d. per dozen less than the standard 2-oz. eggs. An illustration has already been given, which emphasis the great financial loss sustained from a variation in price of less than 1½d. per dozen on a flock of 400 birds, and from this breeders can readily estimate what a loss of 2d. to 5d. per dozen will amount.

It occasionally happens that a hen laying small eggs produces large numbers. The unsound policy of using the progeny of this hen for breeding purposes has been largely practised. An erroneous impression exists that as the size of egg decreases numbers increase. This is not so. Egg-laying competitions have demonstrated time after time that it is not necessary to employ a layer of small eggs to obtain high production.

Every effort must be made by poultry-raisers to eliminate the hen producing undersized eggs. To do this, never use for breeding purposes hens laying small eggs, and use males which are the progeny of a large-egg hen. It is not sufficient to select the breeders on the question of size of egg when fully matured. A strain of bird should be built up which will commence early in life to produce a standard egg, and it is from that class of bird that poultrymen should select their future breeding stock.

FARM FACTORS INFLUENCING MARKETING.

The question of marketing has to be considered in relation to—(1) The egg; (2) table birds, including birds specially reared for table purposes, stock that have ceased to be profitable, and young males; and (3) poultry manure.

The latter product is not of great importance at present, as the demand for it is very limited, and in many instances it is found more profitable to use it as a fertiliser for the growing of green feed than to sell it. At the best sales possible, it little more than covers the purchase price of material used for scratching purposes.

Marketing, particularly in the first stage, is most certainly a function which definitely concerns the individual poultry-keeper. It is not merely the task of the Egg Board or the commission agents. The poultry-keeper considerably influences the ease of marketing by the retention of the quality of the egg. If every consideration is not given to the preservation of the quality of the egg as laid, the task of marketing is made most difficult. Producers should therefore remember that the earlier the egg reaches the consumer after being laid the better.

The principal factors influencing successful marketing are—

(1) The production of unfertile eggs.

(2) Clean and ample supply of nests. (Eggs when laid are moist, and dust and other matter readily adhere.)

(3) Gathering at frequent intervals to prevent eggs becoming soiled.

(4) Collecting in clean and dry receptacles.

(5) Storage (pending marketing) on the farm in cool quarters free from draughts and foreign odours.

(6) Regular and frequent despatch to market—twice weekly during warm weather; once weekly during winter.

(7) Using dry, clean fillers, and cases free from moulds when packing for market.

Some eggs are lowered in quality to such a degree, owing to improper care, that they only realise two-thirds of the value of the choicest article. The seriousness of this will readily be recognised. It is a direct financial loss to the producer, while at the same time poor quality eggs seriously restrict consumption. It is not difficult for the farmer to maintain in wholesome condition the product of his birds; *common sense methods of handling and cleanliness are all that are required.*

Study the production cost of cockerels and market accordingly.

In the marketing of table poultry, producers must consider three primary features; the grading of stock as to age, as to size, and as to condition.

There is a correct time for marketing stock, whether they are young birds or old. Every day they are kept on the farm after reaching that period is adding to the farm cost. Old hens should be disposed of immediately they cease to lay. This not only reduces feeding costs, but assures the stock being marketed with as few pin feathers as possible, a matter of considerable importance to the poulterer.

Among the numerous hens that a farmer has to dispose of on account of low production, a few will be in poor condition. This class of bird should not be marketed, as its inclusion with other birds lowers the value of the whole consignment. An attempt to fatten such birds usually proves unprofitable, and therefore should not be undertaken. If cockerels are specially reared for market, they should be well grown and in good condition. For market purposes the most economical development and condition are obtained by liberal feeding. In crating the stock that are to be marketed, thought should be given to the comfort of the birds and to the facilities afforded to buyers for inspection. This will ensure that the birds will be as attractive when they reach the markets as when they left the farm, and that the buyer will have the opportunity of definitely ascertaining what he is buying.

MARKETING STATISTICS.

The Queensland Egg Board, the growers' organisation which was formed under the Primary Products Pools Act, has played an important part in the marketing of eggs during the last five years.

PLATE 69.—On a Queensland poultry farm. The intensive system adopted wholly for laying stock.

Since the Board began operations in 1923, a pronounced expansion of the industry has taken place, as the following figures will demonstrate:—

——	Quantities of Eggs handled. Dozens.	Exported. Dozens.	Cold Store. Dozens.
1924	932,000	..	77,000
1925	1,041,000	12,000	94,000
1926	1,736,000	189,000	120,000
1927	1,865,000	236,400	103,000
1928	2,747,963	823,890	..

The quantity of eggs supplied to the floors of the Board during the current year (1928) shows an increase of 48 per cent. over the 1927 figures, and 195 per cent. when compared with the quantities handled in 1924.

During the week of peak production (24th to 29th September, 1928) supplies were 70 per cent. greater than for the corresponding week of 1927.

These figures demonstrate the rapidity with which the poultry industry of this State has expanded under organised marketing.

FEED LIBERALLY.

The dry mash hopper can be used to ensure liberal feeding—an essential to high egg production.

Egg production has outstripped the local consumption at present, and producers must make every effort to encourage a greater demand by the careful attention to the quality of the egg, as quality plays the most important part in demand. It is economically unsound to continue to produce eggs in excess of the ability of the market to absorb.

FEEDING POULTRY.

Because some particular class of food happens to be produced on the farm and has a low market value, it does not necessarily mean that it is profitable to feed it to the fowls. In fact, no one class of food will give the best results. For instance, on many farms maize is produced for the purpose of feeding poultry. This grain is a good poultry food when fed in conjunction with some food rich in protein, such as milk or meat, but by itself will not produce eggs in any quantity, nor will young stock make the desired development when it is the sole source of food supply. The foregoing remarks apply to all foods, and it is therefore important for the subject of feeding to receive attention if poultry are expected to be profitable.

From feeding tests which have been conducted from time to time in various States of the Commonwealth, it is found that birds laying on an average 180 to 200 eggs per annum consume from 90 to 100 lb. of food each. Of the total food consumed by a hen, at least three-fifths goes towards the maintenance of the bodily functions. It has been found

by experiment that a hen may be maintained in perfect physical condition on a given quantity of food, and produce not one egg. This, then, emphasises the necessity for feeding in excess of bodily requirements.

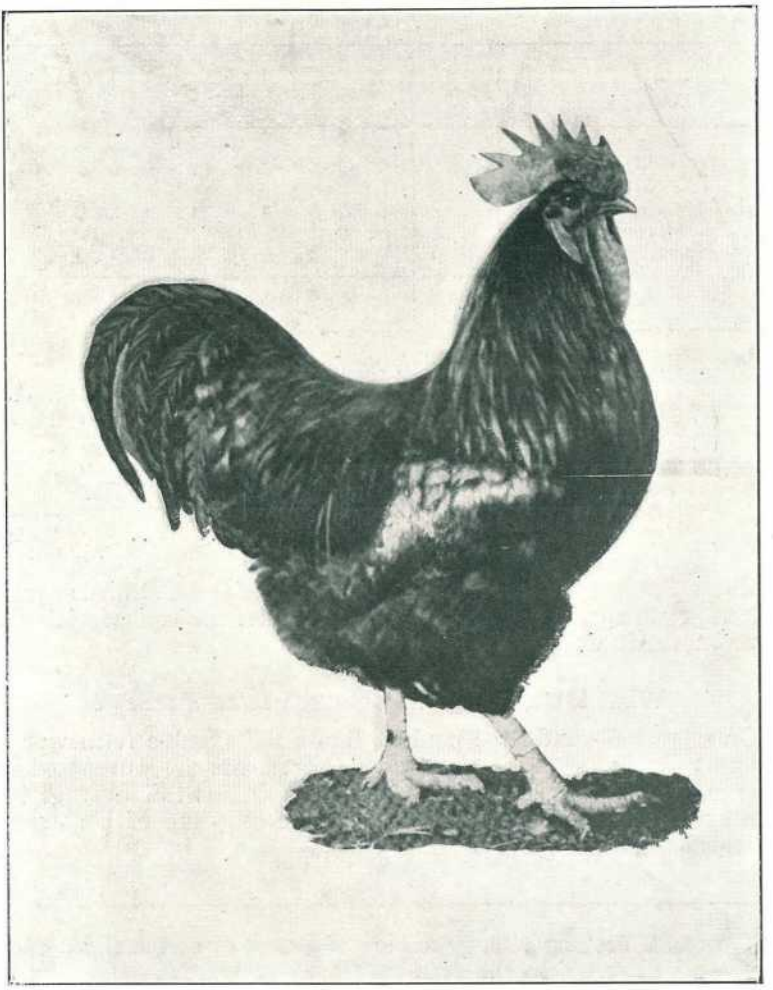


PLATE 70.—A GOOD TYPE UTILITY ORPINGTON COCK.

RETURNS OVER COST OF FOOD.

Experiments indicate that hens 3 to 5 lb. in weight laying approximately 200 eggs consume 90·3 lb. of dry matter per year, and that hens neither laying nor moulting may be maintained in perfect physical condition on a food consumption of 56·94 lb. All food contains moisture, but for the purpose of comparison it is sufficient to estimate the food consumption of a hen laying approximately 200 eggs per year at 100 lb., and to maintain a hen 60 lb. is consumed.

From these figures it will be observed that 40 lb. of food consumed in excess of bodily requirements produce 200 eggs, or for every 4 lb. of food twenty eggs are produced.

Assuming, however, that it takes 5 lb. of food to produce 20 eggs and 50 lb. for maintenance of the bird, the position may be set out as follows:—

TABLE SHOWING RETURNS OVER COST OF FEED OF HENS OF DIFFERENT PRODUCING ABILITY.

—	120 Egg Bird.	140 Egg Bird.	160 Egg Bird.	180 Egg Bird.	200 Egg Bird.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Value of eggs produced at 1s. 6d. per dozen	0 15 0	0 17 6	1 0 0	1 2 6	1 5 0
Less cost of feed at 12s. per 100 lb.	0 9 7	0 10 2	0 10 10	0 11 5	0 12 0
Balance	0 5 5	0 7 4	0 9 2	0 11 1	0 13 0

From the balance must be deducted—

	£	s.	d.
(1) The cost of replacement (per bird)	0	1	3
(2) The proportionate charge of interest on plant	0	1	4·2
(3) The proportion of cost of labour (one man caring for 800 fowls at £221 per annum)	0	5	6·3
Total	£0	8	1·5

These figures conclusively prove that a flock of 800 birds averaging 140 first-grade eggs per annum will not return the commercial poultry farmer the basic wage.

What Return may be obtained from Poultry?

On some well-conducted poultry farms the average return per bird (all ages) is 10s., after all the food requirements are purchased at the ruling market rates. The poultryman who obtains this average has an efficient plant, gives careful attention to the breeding of his stock, and feeds them to obtain the maximum result.

Poultrymen desiring information are requested to communicate with the Department of Agriculture.

To arrive at the net income from any flock, the cost of plant and the cost of the food consumed have to be set against the returns. The minimum cost for the erection of plant, as recommended by the Department of Agriculture, would approximate £35 per 100 head of birds. The value of 100 head of laying stock would be not less than £30. The outlay, exclusive of residence and land, would be £65 per 100 birds.

Interest at 5 per cent. on the outlay and depreciation on the plant at 10 per cent. would total £6 15s. per 100 fowls. Provision has to be made yearly for the replacement of 50 per cent. of the flock, but as an offset against this cost, there is the value of sales from the old birds. This replacement of 50 per cent. of the flock costs approximately £6 5s.

per year. Assuming the average profit over cost of feed per year on a well-conducted farm is 10s. per bird, the position can be set out as follows:—

	£
Revenue over cost of feed, per 100 birds	50
Less interest £6 15s., and cost of replacement £6 5s. ..	13
Net profit per 100 birds	£37

From the above it will be seen that a flock of 800 suitable birds is required to secure a return of £296 per annum. However, the control of the costs is in the hands of the breeder. Constant selection, careful

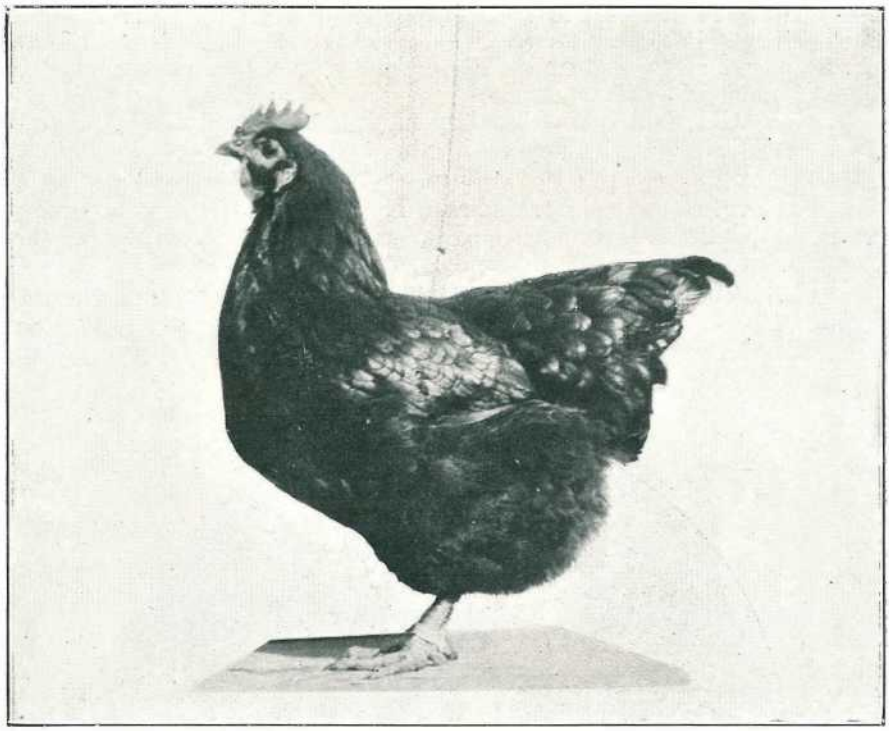


PLATE 71.—UTILITY ORPINGTON HEN—PRIZE-WINNER AT MANY SHOWS.

breeding, and attention to detail are at all times essential. The neglect of any one of these as before shown will have the effect of transposing the abovementioned return into an actual loss.

The dairy farmer, the fruitgrower, and the general agriculturist can obtain returns from his birds equal to that of the specialist by giving his methods of breeding and feeding close attention. It is uneconomic for the farmer to keep a greater number of fowls than he can reasonably care for. It is also uneconomic for the specialist poultry farmer to keep less than 800 laying fowls as otherwise he will not earn the basic wage. Such fowls also must return an annual average production of more than 140 eggs. If the poultry keeper finds it

impossible to hatch chickens at the most suitable period of the year (July to September), it would be much more profitable to purchase day-old chickens from reputable breeders than to rear stock hatched out of season, or which are the progeny of unsuitable breeding birds. Chickens hatched out of season are likely to be unprofitable to the individual and cause economic loss to the industry. Those hatched late in the year are slow in maturing and come into lay during the period of peak production. Those hatched early in the year mature rapidly and moult after a few months' production during the period of high supplies.

AIDS TO THE POULTRY-KEEPER.

The assistance rendered has taken the form of education, aid in efforts for orderly marketing, and in the procuring of well-bred stock. Instructors are attached to the Department of Agriculture and Stock, whose duty it is to address gatherings, visit farms, and advise farmers on all phases of the industry. Educational articles on various aspects of the industry appear regularly in the "Queensland Agricultural Journal," while bulletins on poultry subjects are issued free of charge on application. By the passing of the Primary Products Pools Act, poultrymen were enabled to establish co-operative marketing.

The provisions made for storage at the Government Cold Stores gives the poultrymen confidence so far as the further expansion of the poultry industry is concerned, as adequate storage is assured.

At the Queensland Agricultural High School and College, Gatton, many of the commercial breeds of poultry are maintained, and stud birds may be purchased at reasonable prices by established poultrymen or beginners in the industry.

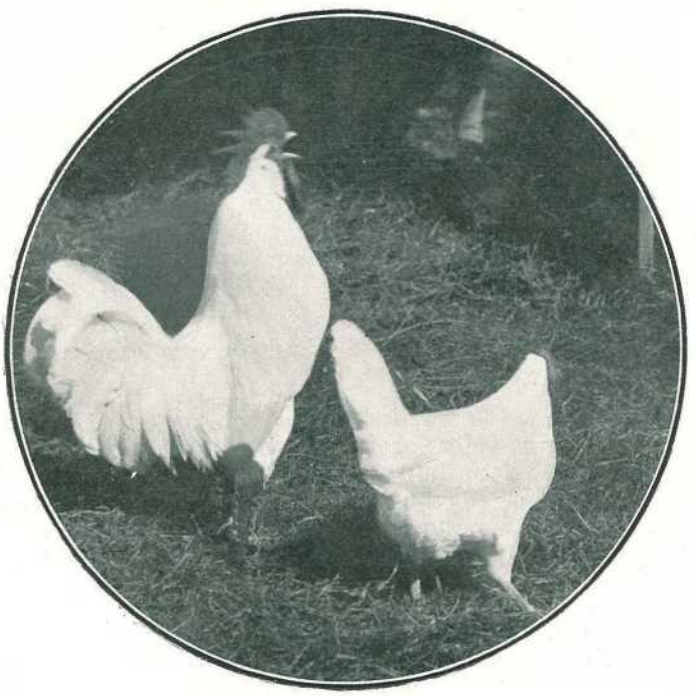


PLATE 72.—BRED FROM VIGOROUS STOCK.

CAPONIZING.

By P. RUMBALL, Poultry Expert.

The question whether caponizing is profitable or otherwise is best left to the individual producer is decide, as the features governing the commercial side of the proposition, that is cost of feeding and ultimate sale, are of a varying nature.

The capon, however, has advantage over the uncaponized bird in weight, quality of flesh, cost of maintenance, &c. The opinion frequently expressed that capons grow to a greater size than cockerels is wrong. When the reproductive organs are removed cockerels lose any fighting instinct and lead a lazy, inactive life, thereby putting on more weight or flesh but not size. It is possible also to retain capons until they

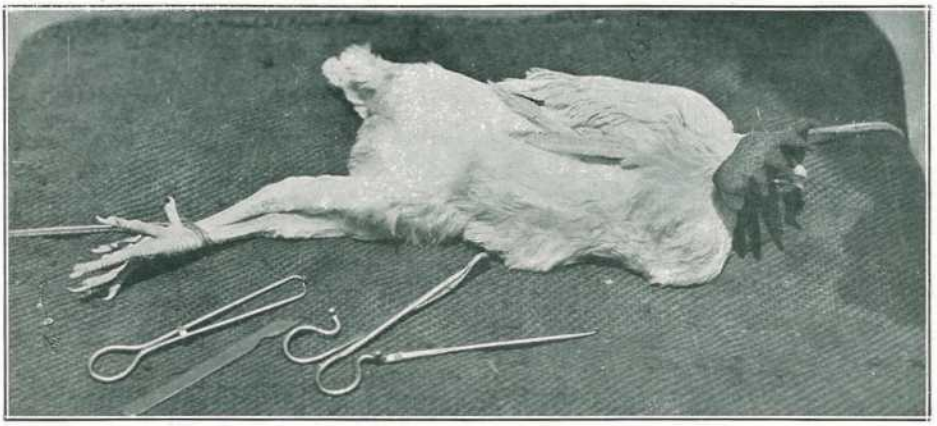


Plate 73 (Fig. 1).—Bird in Position for Caponizing. It can be Turned Over without Unfastening, which Facilitates the Operation.

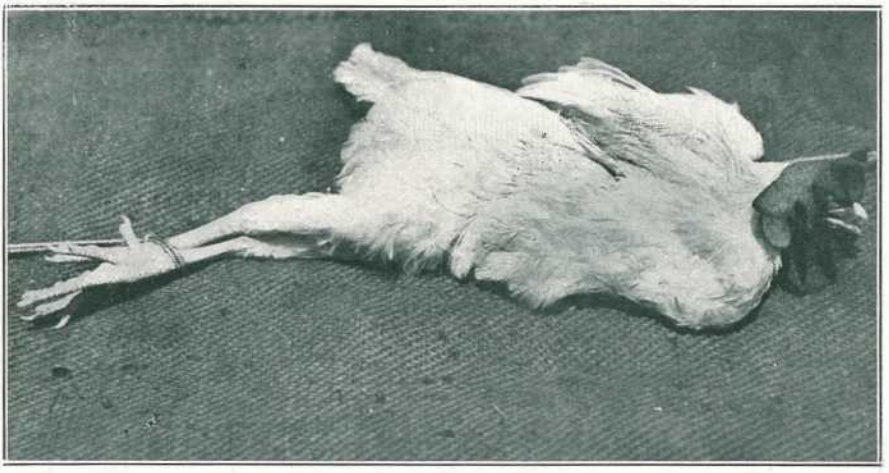


Plate 74 (Fig. 2).—Clearing the Feathers in Front of Hip Joint and Holding Others Back by Damping.

are fully developed and to market them as desired. This is not so with cockerels, as they become troublesome and lose the quality of flesh. The inactive life a capon leads, naturally reduces food consumption, and so it is kept at greatly reduced

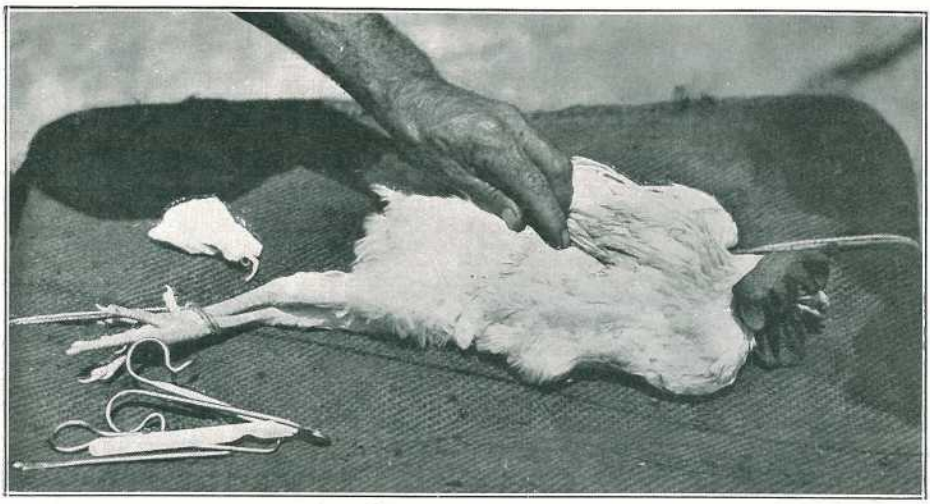


PLATE 75 (Fig. 3).—ASCERTAINING THE CORRECT POSITION FOR OPERATION BY LOCATING THE LAST RIB WITH THE FOREFINGER.

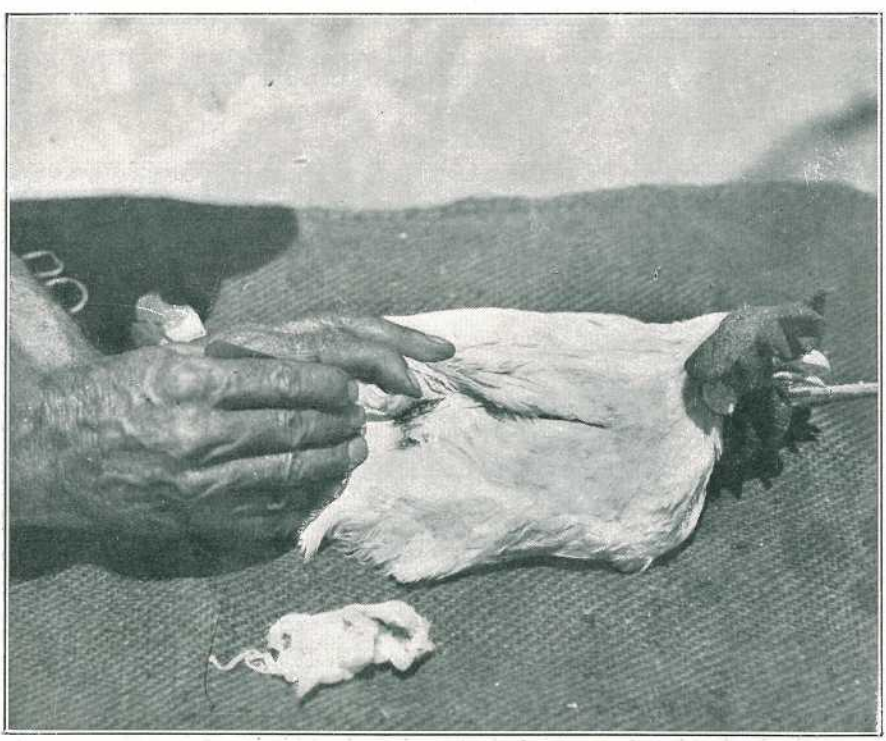


PLATE 76 (Fig. 4).—DRAWING SKIN BACK WITH FOREFINGER AND MAKING INCISION BETWEEN LAST TWO RIBS.

costs, which materially assist a producer in catering for a regular supply of poultry. To the mixed farmer, however, capons should appeal most, inasmuch as they can be allowed to range with the farm flock. There is no necessity of segregating sex, and by being sterile the egg product is in no way injured.

Appearance of a Capon.

The comb and wattles of a capon do not develop and the head remains small and colourless, having the appearance of unhealthiness. The pointed feathers of the neck and those in front of the tail and large sickle tail feathers grow profusely, and in countries where capons are recognised in their true value as table birds these feathers are left on the bird in dressing and serve as a trade mark.

PLATE 77 (Fig. 5).—INSERT SPREADER, ENLARGE OPENING AND TEAR MEMBRANE WHICH COVERS INTESTINES.

Marketing.

At present the caponizer should cater for regular customers, but if his supply is greater than demand the marketing of the surplus should take place when young birds of quality are scarce, which happens annually from March until early cockerels are on the market—say September. Cockerels of any breed may be caponized, but breeds of the light or small varieties, such as Leghorns, are not as suitable as the larger varieties, such as Orpingtons, &c., although in this article Leghorns have been used for illustration purposes.

The age at which the operation is to be performed naturally varies with development and various breeds, but generally speaking the correct period is between eight and twelve weeks when the chickens are about 2 lb. in weight. The next point which the caponizer must keep in mind is light. A good light (sunlight) is essential, especially to the inexperienced operator. With practice he can operate under indifferent conditions, but for a start the position of the various organs must be

thoroughly understood. The third requirement is to refrain from feeding and watering the bird for at least twenty-four hours—thirty-six would be better. Under such treatment the intestines become empty and will of their own account fall away from the side where the incision is made, and, as well as lessening the chance of injury, permit of the reproductive organs being seen much easier.

The Operation.

In addition to knife, spreader, probe, and forceps, a table and two pieces of soft cord with a running noose at one end and two half bricks attached to the other, with a basin containing a weak antiseptic solution, are necessary. The table may be an old packing case or barrel, or the operator may prefer to make a more elaborate and possibly convenient bench. The bird is fastened down by means of the cord and bricks, one noose being placed around its legs, and the other around its wings, close to the body, and the bricks allowed to hang down on either side. The correct position is illustrated in Fig. 1.

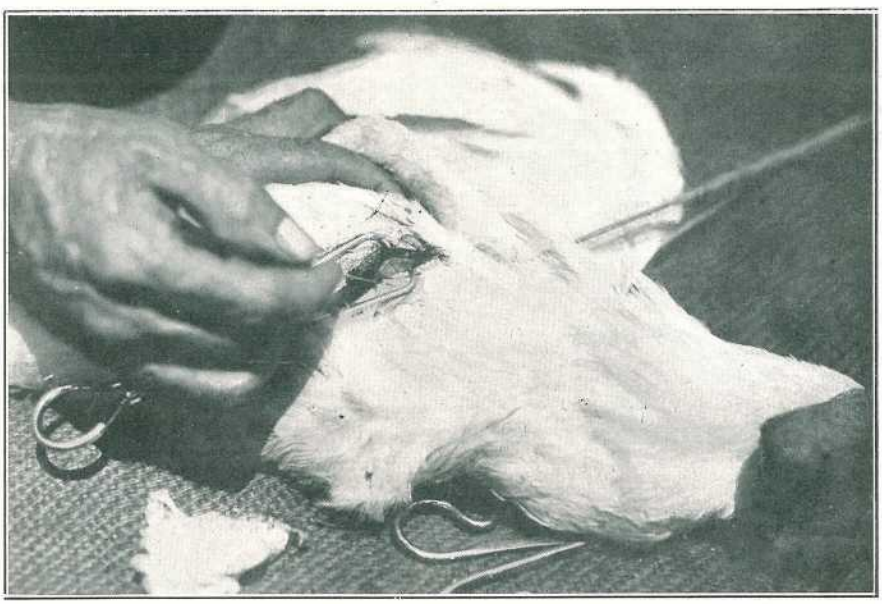


PLATE 78 (Fig. 6).—CLOSE-UP VIEW, SHOWING POSITION OF TESTICLE.

The next move is to pluck a few feathers off the seat of operation, which is just in front of the hip joint. In a bird of the correct age very few feathers will need removing and those that are lying in the way can easily be held aside by damping them with the antiseptic solution which should always be used to cleanse the position to be operated on. The clear space obtained by doing this is illustrated in Fig. 2. Having done this the correct position to make the incision must be ascertained. This is best done by placing the thumb on the hip joint, gradually moving the forefinger along the body until the last rib is felt, as shown in Fig. 3. It is between the two last ribs that the incision has to be made, but before doing that draw the skin as far back as possible with the forefinger as shown (Fig. 4) so that when the operation is completed and the skin goes back to its natural position the wound in the skin and abdominal cavity are not directly opposite. Having made the cut insert spreaders, enlarge opening to about 1½ inches, and gently spread the ribs as shown in Fig. 5.

When this is completed a thin membrane will be noticed covering the intestines. This has to be removed, which is done by means of the probe, as shown in Fig. 5, before the testicle can be seen. The testicle is easily noticed if the bird has been properly starved. It is yellowish-white in colour, runs parallel with the backbone, and in birds of correct age about three-quarters of an inch long and a little thicker

than a plump grain of wheat. The position of this is shown in Fig. 6, although somewhat enlarged due to the advanced age of the bird operated upon. With the forceps take hold of the testicle, being careful not to grasp the large artery which runs parallel with and close to it. Withdraw the instrument, as shown in Fig. 7, with testicle attached with a twisting motion, and after appendages have been twisted up and pulled out, cut them about 1½ to 2 inches from testicle to make certain that no portion of the organ remains.

When the operation is completed on one side turn the bird and repeat the process. Some operate from the one side only, but this method carries more risk, and saving in time is doubtful.

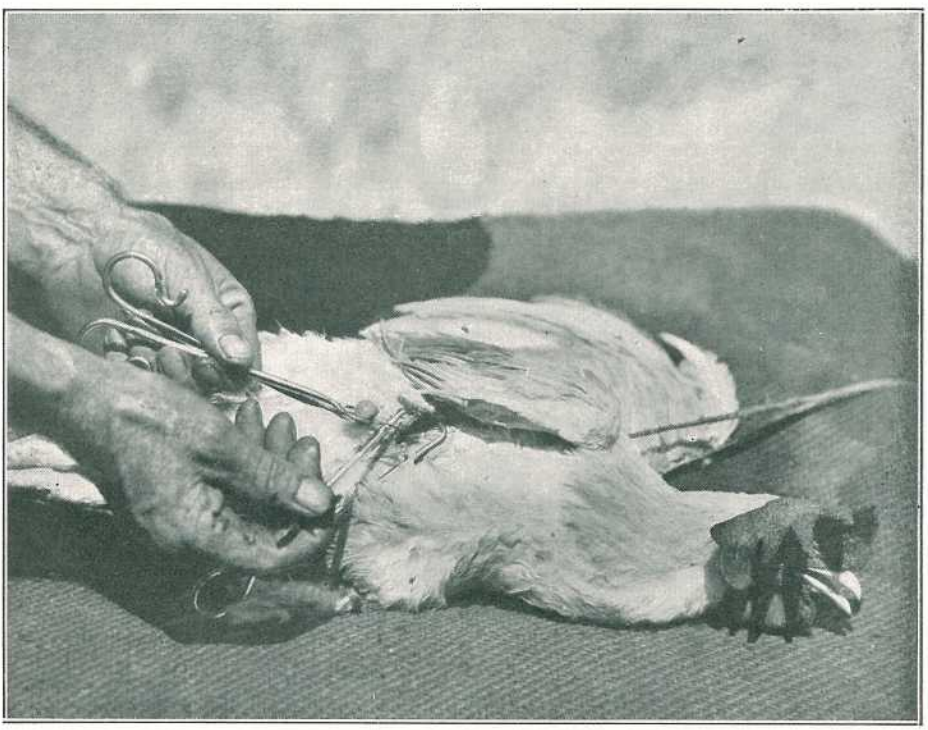


Plate 79 (Fig. 7).—Severing Appendages after Removal of Testicle.

In about a week it is a very difficult matter to find where the incision was made —a few wind puffs are occasionally met with, but they merely need to be pricked.

After the operation of caponizing turn the bird loose. If the operation has been correctly performed the skin covers the wound, and no dressing of any description is required. It is as well, however, to keep the capons in clean quarters and away from untreated birds for a few days, but beyond this other treatment is unnecessary.

POISONS IN RELATION TO STOCK.

Reference is made by the Chief Veterinary Surgeon of the New South Wales Department of Agriculture to the extreme carelessness frequently displayed by farmers in connection with poisons. It is well known that arsenic in almost any form and paint seem to have an attraction for cattle, and yet such material as sheep dip, cattle dip, prickly-pear poison, and other deadly poisons are often casually left in such positions that cattle may get at them. If a complete return could be obtained of all the stock in the State which die in a year as a result of this carelessness the figure would probably surprise many.

DIARRHOEA OR WHITE SCOUR IN YOUNG PIGS.

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

The following maxims have been compiled as golden rules for the breeder who wishes to ward off attacks of diarrhœa in his pigs:—

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

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

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

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

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

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

To summarise: Immediately there is any sign of scouring in one or more of the young pigs, reduce the sow's food supply by half; compel her and the suckers to take exercise; give powdered iron in the food as advised; move the sow and suckers to a clean, dry pen, and feed the sow very lightly for a few days. If the ailment persists, give the sow a second dose of medicine (the powdered iron should be dissolved in hot water before being added to the food); give each of the suckers teaspoonful doses of castor oil on the first day, and again next day if still scouring; sprinkle the floors and yards lightly with air-slacked lime and keep them scrupulously clean; add a cupful of lime-water to the sow's food every day, and be careful not only to use sweet clean food, but also to place it in a clean food trough in a clean pen. Later, when the young pigs begin to feed "on their own," give them some lime-water, too; it does them no harm as long as it is not used too freely. The lime-water is readily prepared by taking a tub or barrel, cleaning it out thoroughly, and soaking in clean water for a day or two. Then half-fill with clean rain water and put about half a bucketful of air-slacked lime in the barrel, and after stirring water and lime together, allow to settle for several hours. It will be noticed that a thin "scum" floats on the surface, and that the water is as clear as crystal. As long as this scum forms daily, the lime-water is good; and the barrel can be refilled after use. Stir the lime up occasionally, and it will be good for two or three weeks at

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

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

Boiled Rice as a Remedy for White Scour.

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

Further information in connection with this and other diseases of the pig and in connection with pig raising generally may be obtained in pamphlet form from the Department of Agriculture and Stock, Brisbane, at any time.

SIZE OF BREEDING PIGS.

L. A. DOWNEY, H.D.A., Instructor in Pig Raising.

On visiting many farms, one is surprised to see the small and inferior quality breeding stock being used to produce bacon pigs.

It is well known that one of the chief aims of the pig raiser is to get his pigs away to the bacon factories as quickly as possible in order to get quick and profitable returns.

The dressed weights for prime bacon pigs at the Queensland factories at present are 95 lb. to 120 lb.; that is approximately 140 lb. to 172 lb. live weight. If the farmer can get his pigs to this weight in five months instead of six months, it is quite evident that he will save one month's feed, labour, and risk on his pigs, and he will also have his returns one month earlier from each bunch of pigs sold.

It is quite possible to get pigs to these specified weights in five months. In fact, some of the prime baconers received at the Queensland factories now are less than five months old.

There are many factors which contribute to quick growth in pigs, the chief of which are:—Good quality breeding stock of large size and strong constitution; healthy and comfortable accommodation for the pigs; an ample supply of food of good variety and quality, together with proper management in breeding, housing, and feeding.

The point which seems to be most neglected on Queensland farms is the size of the breeding stock, both boars and sows. All other factors being equal, a small sow cannot be expected to rear such large and fast-growing pigs as a larger sow, although she may be just as prolific. Size will also be transmitted to the offspring by the boar. Therefore, if the farmer wishes to get the best results from his pigs, it is his duty to look to the breeders.

It seems quite a common practice of many farmers to mate their breeding sows when five or six months old; this practice alone is quite enough to spoil the chance of getting the best from their pigs.

The age at which to mate a sow will depend mainly upon her growth, but generally about nine or ten months is the best age, for a sow of this age is generally well developed and will grow into a large roomy sow.

The breeding age is not the only controlling factor in the size of the pigs, but the sow should be well fed while she is pregnant and while she is suckling her litter, for it must be remembered that at this stage she has to grow herself as well as feed her young.

The best age to breed from a boar is about the same as that of a sow, viz., nine to ten months, and the boar must be used carefully, only allowing him four or five services for the first six months.

The extra expense of keeping a sow on from six to ten months of age before mating her is negligible compared with the difference it will make in her offspring; this will be quite evident when it is remembered that a sow will rear approximately fourteen pigs per year for about six years, and all her pigs will be affected by her size.

It is sometimes argued that a particular sow which is very small is an exceptionally good breeder and good doer; in answer to that, it may be said that if that particular sow had all her present qualities with extra size she would be even a better pig.

It behoves the pig raiser to consider this important point and cull those small sows and boars which are all too common and replace them with well-bred pigs which have quality as well as size.

It must be borne in mind that early maturity is not everything in our bacon pigs. Other points to be considered in the ideal bacon pig are:—Weight, length and depth of body, good ham development, light development in the shoulder and jowl, fineness of bone, and firmness of meat, with a predominance of lean over fat.

INDIGESTION IN CALVES—SOME COMMON CAUSES.

Owing to the artificial manner in which most calves in dairying districts are reared, indigestion and its consequences—general unthriftiness, diarrhœa, and stunted growth—are very common. These troubles may be due to any one or combination of the following causes:—

Overloading the young animal's stomach through endeavouring to give sufficient nourishment to cause it to thrive in too few feeds.

Replacing full milk with skim milk or milk substitutes too early or too suddenly.

Giving the feed cold or only slightly warmed instead of at the normal temperature of milk fresh from the cow.

Sudden changes of food, as from skim milk to substitutes, and back again.

So feeding a bunch of calves that the little animals gulp it down as quickly as possible to prevent others from getting it.

Giving such a small ration that the calves are driven to eating rough forage and hay, &c., at a too early age.

In order to prevent disease in calves from improper feeding the following points require attention:—

Cleanliness in feeding, which should preferably be from metal receptacles which can be scalded out.

Separate feeding of the calves to ensure that each one gets a fair feed and is not unduly hurried.

Feeding the milk and other material at blood heat.

The gradual substitution of skim milk for whole milk, and the replacing of the nutritive material thus lost by meal obtained from cereals or other concentrated food.

Regularity in times of feeding and quantity of material used.

Gradual change of food when necessary, and gradual weaning.

The skim milk which is used should be as fresh as possible, since the longer it is kept the more likely it is to be contaminated and so cause diarrhœa. The skim milk, buttermilk, and whey obtained from creameries and factories is particularly dangerous, since the feeder has no control over the possible contamination of the material. It should be pasteurised before being used.

DINGO TRAPPING—AN EFFECTIVE LURE.

Mr. G. Herbert Merriman (Mount Lindesay) writes:—I was interested in your article on "The Dingo" in your February edition re trapping and decoying. The most successful trapper I ever met was on Galway Downs, west of the Cooper. He would get from ten to twelve dogs a night and his method was simple. He had a black dog which he had trained from a pup and he used to tie a tin on to the dog and the dog used to make water in this tin; he would then pour the urine into a large bottle with dogs' excreta, and would sprinkle a little of this where the trap was set, and I do not think he ever missed. He called the mixture "Raeus mirabillis," and I consider the name was fully justified, for he uncorked the mixture to show me one day; this was over twenty years ago and I haven't forgotten the perfume yet—and never shall. He had got over 300 dogs in the district then, he told me, and was shortly to leave for a spell. I have come across many dog trappers in my travels in the West, but I would certainly give the award to this one.

ADJUSTING PLOUGH DRAFT.

The accompanying diagram, illustrating some of the principles of adjusting plough draft, is well worth reproducing from a recently published leaflet of the John Deere Company.

In operating your walking plough, see that the hitch is right and the share has the proper "suck" to ensure penetration.

Drawing No. 1 illustrates the result of a too-short hitch. The "heavy-line horse" is hitched correctly—the plough running at an even depth. The dotted line represents the same horse hitched closer to the plough. Note that the line of draft has been changed, as shown by the dotted line. This naturally pulls up on the plough beam and raises the plough point to such an extent that the bottom may be lifted entirely out of the ground or not run the desired depth. In this case the clevis should be raised.

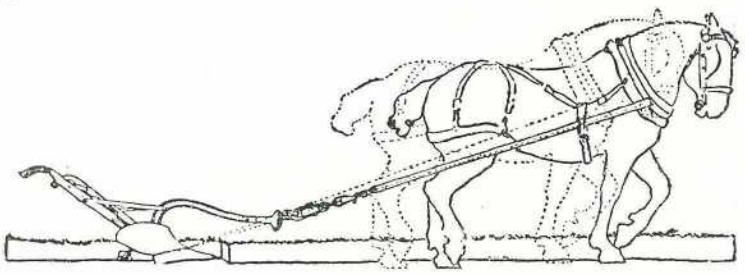


Fig. 1—Effect of too short a hitch.

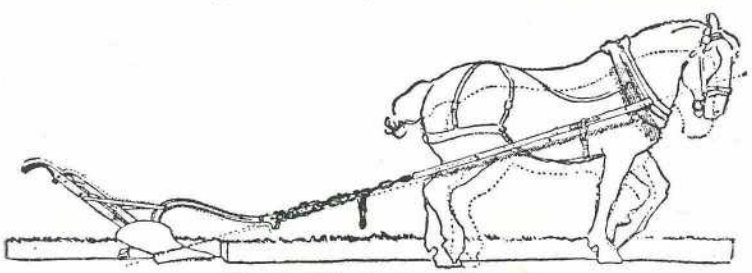


Fig. 2—Effect of small horses.

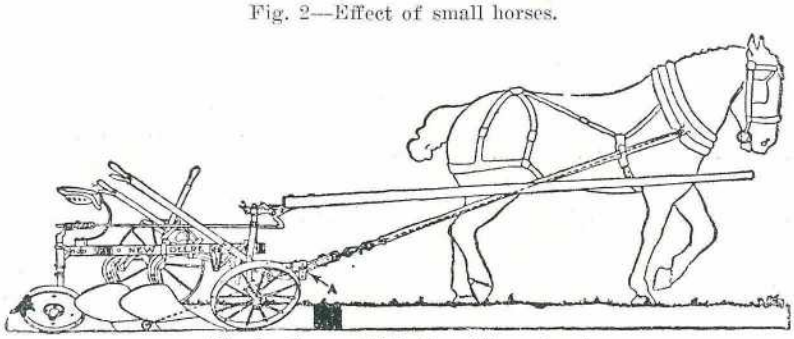


Fig. 3—Proper hitch for riding plough.

Too-long tugs will have an opposite effect. In this case the direct line of draft will be lowered proportionately to the length of the tugs, and the tendency will be for the plough beam to be pulled down. The result is a too-deep furrow. Lowering the clevis will remedy this condition.

Drawing No. 2 shows how horses of different size affect the work of the plough. The solid lines show the correct hitch. The dotted lines show the effect of a smaller horse with no change made in length of tugs. The line of draft is lowered at the horse's shoulder, as shown by dotted line, and there is a pulling down at the beam point. This makes the plough run deeper. Lowering the clevis will remedy this. Shortening the tugs also will correct the trouble.

A larger horse than the one shown by the solid line would have the opposite effect—there would be a tendency to pull the plough out of the ground—make it run too shallow or unevenly. Either lengthening the tugs or raising the clevis would correct this condition.

In addition to the preceding conditions that affect the running of the plough, very often the tugs are held up in the hip loops, thereby causing an uplift. Remove tugs from hip loops.

Attention to these matters will save trouble and will assure a good job of ploughing.

Getting the correct hitch is the most important adjustment on a plough. Be sure to read carefully the following instructions on hitching to a gang plough:—

Vertical Hitch Adjustment.

This refers to the up-and-down adjustment on the vertical clevis. (See "A" in illustration above.)

The correct hitch at "A" is the place where "A" is in a true line between circle on plough and point of hitch at the hame.

When ploughing deep or using tall horses, hitch higher at "A" than when ploughing shallow or using small horses.

When hitching horse strung out, hitch lower at "A" than when using four horses abreast.

Remember, if you hitch too high at "A," there is a down pull on the front end of the plough, and the rear end of plough will tend to come up.

If you hitch too low at "A," the draft will tend to lift the front end of the plough.

By changing the position of the clevis up or down, one or two holes at "A," a trial will generally show which hole places the clevis in a true line of draft.

Horizontal Hitch Adjustment.

Hitches are adjustable horizontally for the purpose of accommodating the position of the horses and the various sizes and types of eveners. Therefore, the cross-hitch is very long and has a large number of hitch positions.

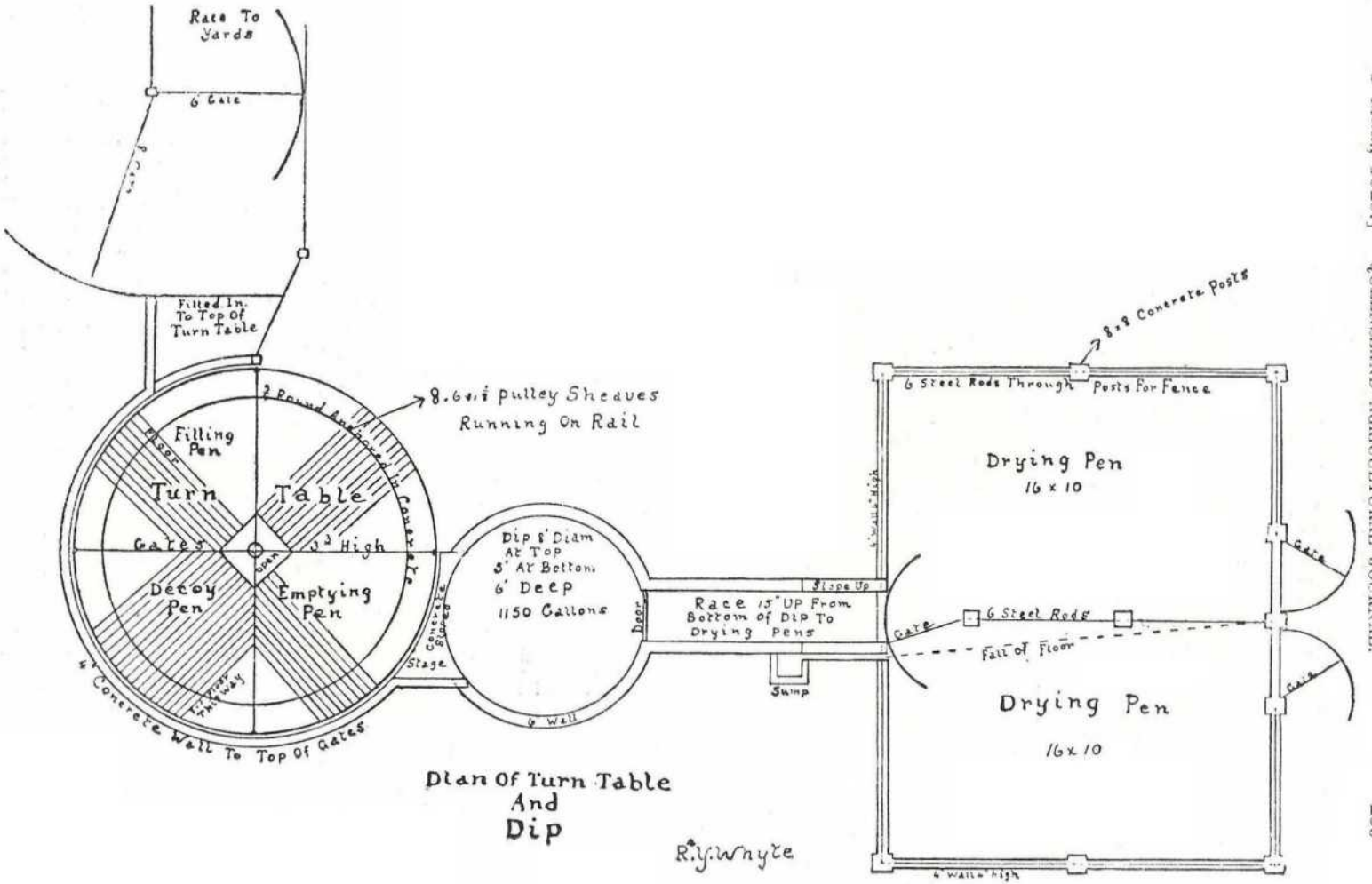
Move the clevis to right or left on the horizontal bar until furrow horse is accommodated. If hitched too far to left, plough will not take enough land; if too far to the right, plough will take too much land. Correct by changing hitch a little.

DIPPING MADE EASY.

Many and varied are the devices for dipping sheep in operation, but surely the most novel idea yet tried out is one recently constructed for Messrs. Henderson Bros., Otapiri, Southland, New Zealand. Henderson Bros., in engaging a contractor to put in an up-to-date dip, gave him an idea of what they wanted in the way of drying pens, dips, yards, &c., and also suggested placing a circular pen between the dip and the race. This circular pen was to have a centre post with swinging gates that could be pushed round behind a few sheep, thus forcing them to a handy position opposite the dip. The builder at once saw the possibilities of the turn-table idea, and on suggesting it to Messrs. Henderson Bros. had it accepted without delay. The work then went ahead on the new idea, and resulted in the erection of what must be the most efficient outfit of its kind in Southland to-day.

Some Details.

Of course, the chief novelty is the turntable, which, as will be seen from the accompanying sketch plan, is placed between the race and the dip. The turntable consists of a wooden platform set on a suitable number of pulley sheaves which runs on a rail anchored in a band of concrete 6 in. wide under the table. The top of the turntable is divided into four compartments by means of fixed gates or hurdles, which are filled with sheep in rotation. When the first compartment filled is in position opposite the dip No. 3 pen is at the filling point and No. 2, already filled, is between the two; this goes on continuously, there being a "decoy" pen always



Plan Of Turn Table And Dip

R. J. Whyte

between the filling and emptying points. A concrete wall as high as the gates partially surrounds the turntable and so completes the enclosure as each compartment swings round. Each compartment will take ten or twelve sheep at one time without difficulty.

The advantages claimed for the invention are:—

1. The turntable does away with the hard work of forcing the sheep into the dip.
2. The decoy pen acts as an inducement for incoming sheep, making the task of loading a comparatively easy one.
3. A saving in manual labour, reducing dipping to two or three men instead of four to six.
4. Of great assistance in dipping valuable stud sheep or old ewes.

Since its completion Messrs. Henderson Bros.' dip has been a great source of interest to farmers from far and near, and one and all have expressed their appreciation of the idea. With the exception of the turntable and gates, the entire outfit is erected in concrete and steel, and looks as though it would last for a hundred years.—"New Zealand Farmer and Stock and Station Journal."

RAINFALL IN THE AGRICULTURAL DISTRICTS.

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

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Jan.	No. of Years' Records.	Jan., 1929.	Jan., 1928.		Jan.	No. of Years' Records.	Jan., 1929.	Jan., 1928.
North Coast.					*South Coast*—continued:				
	In.		In.	In.		In.		In.	In.
Atherton	11·59	27	17·03	7 73	Nambour	9·98	32	9·46	8 21
Cairns	16·23	46	26·99	5·84	Nanango	4·66	46	9·51	4·33
Cardwell	16·45	56	28·01	5·18	Rockhampton ...	8·57	41	3·89	3·40
Cooktown	14·25	52	24·27	2·08	Woodford ...	7·89	41	13·22	5·19
Herberton	9·61	41	14·40	5·31					
Ingham	15·76	36	31·09	7·29	*Darling Downs.*				
Innisfail	19 81	47	35·58	14·80					
Mossman	14 08	15	36·38	8·81					
Townsville	11·27	57	15·96	7·93	Dalby	3·38	58	1·81	0·86
					Emu Vale ...	3·35	32	2·48	2·90
					Jimbour	3·75	40	1·53	1·49
Central Coast.					Miles	3·90	43	1·28	1·46
					Stanthorpe ...	3 64	55	1·73	3 95
Ayr	11·28	41	25·38	3·82	Toowoomba ...	5·05	56	5·00	4·15
Bowen	9·90	57	33·32	4·38	Warwick	3·61	63	2·43	2·96
Charters Towers ...	5·68	46	3·15	1 54					
Mackay	14·35	57	16 61	4·41					
Proserpine	15·55	25	39·62	7·31					
St. Lawrence ...	9·67	57	8·14	8·64	*Maranoa.*				
South Coast.					Roma	3·33	54	1·24	1·79
Biggenden	5·41	29	5·65	4·04					
Bundaberg	9·30	45	4·21	2·77	*State Farms, &c.*				
Brisbane	6·47	78	4·60	6·15					
Caboolture	7·84	41	6·62	6·33	Bungeworgorai ...	2·14	14	0·80	0·92
Childers	7·96	33	6·37	4·45	Gatton College ...	4·22	29	2·46	3 52
Crohamhurst ...	12·81	35	12·37	10·59	Gindie	3·80	29	1·30	4·34
Esk	5·76	41	10·74	4·53	Hermitage ...	3·32	22	3·23	3·18
Gayndah	4·64	57	10·53	3·25	Kairi	7 96	14	21·97	4·33
Gympie	6·76	58	9·34	3·50	Sugar Experiment Station, Mackay	14·63	31	16·33	3·48
Kilkivan	5·48	49	13·43	5·65					
Maryborough ...	7·62	56	4·18	6·41	Warren	5·56	14	0·44	2·74

GEORGE E. BOND,

20th February, 1929. Divisional Meteorologist.

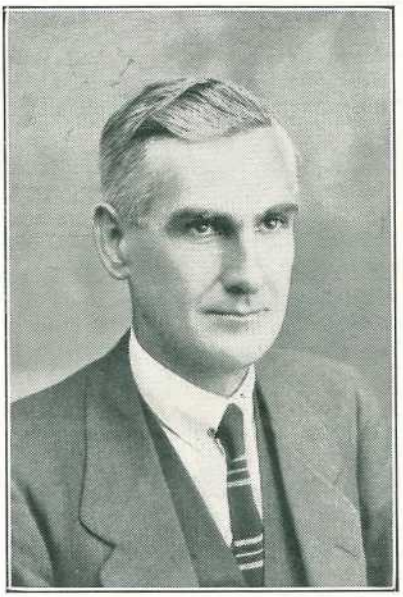


PLATE 80.—MR. WILFRED L. OSBORNE.
A well-known South Burnett farmer, who has been associated with every forward movement in that rich and progressive district.

In 1907, while still a lad in his teens, he took up land near Murgon, and has since then pioneered seven farms in virgin scrub country, developing each one from a wilderness up to the point of efficient, profitable, and continuous production. A rural economist, trained in the best and hardest of schools, and an earnest and tireless fighter for farmers' rights, Mr. Osborne has been at the front in every move for the betterment of the agricultural industry, and the farmers' organisations in the South Burnett have benefited greatly through his energetic and successful advocacy of their aims.

On the inauguration of the Queensland Producers' Association in 1923 he was elected to the first South Burnett District Council, and in two later elections under the ward system he was returned unopposed as representative of the Local Producers' Associations of the Murgon district, in co-operative matters one of the foremost districts in Queensland. Mr. Osborne has also served on the Murgon Shire Council, as District Secretary of South Burnett L.P.A.s, and as District Delegate to the State Conference of Primary Producers, and the Council of Agriculture.

As an advocate of the pooling system of maize marketing and complete rural organisation Mr. Osborne is regarded as one of the foremost of our farm leaders.

NEW SERIES OF HORSE AND CATTLE BRANDS.

The Brands Branch of this Department advises that horse and cattle brands from a new series are now being issued. The brands are composed of two block-type letters similar to those issued in the first series and a design. The four designs included in the series are ⌐ ⌂ ∩ ▽ ; and for purposes of identification are referred to as the "Cranking handle," "Spur or rowlock," "Tent," and "Triangle."

The "G" series of brands, which has just been exhausted, contains similar shaped letters and numerals, but in that series the designs are "Diamond," "Heart," "Spade," and "Cross."

Both the "G" and "H" series (the new one) contain 12,096 brands, and up to the end of February, 1929, over 80,150 three-piece brands had been registered in Queensland since the first brand, CA1, was issued in the name of the Hon. Louis Hope, Kileoy, on the 1st May, 1872.

INTERSTATE BUTTER TRADE.

At a meeting of representatives of the Sydney butter distributing houses it was decided that all the members present would, for a period of three months, or until the plan for the control of interstate trade had been formulated, refrain from sending butter to Queensland from New South Wales.

The meeting was sponsored by the New South Wales Butter and Cheese Exporters' Association, and its president (Mr. A. C. McCartney) presided. The chairman said that the meeting had been called to confer with the chairman of the Queensland Butter Board (Mr. J. Purcell), who had already met the trade in Melbourne.

Mr. Purcell said that his board thought that if the interstate trade in butter could be controlled it would be in the interests of the whole industry. They had decided, therefore, as a board, to stop the flow of butter out of Queensland into other States until such times as a shortage occurred in the supply in a neighbouring State. Mr. Purcell referred to the present wasteful methods in Melbourne. He saw two vessels

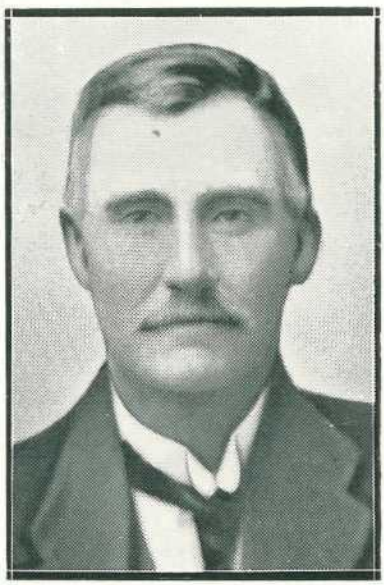


PLATE 81.—MR. JAMES PURCELL,
Chairman of the Queensland Butter Board.

lying almost side by side, one of which was discharging 2,000 boxes of Queensland butter for Victorian interests, while the other was loading Victorian butter, practically the same quantity, and this was being shipped to Brisbane. Such handling of a perishable article, he said simply meant that producers had to pay an unnecessary cost for the double transfer of the commodity.

Consideration was given by the meeting to the West Australian trade, which required about 3,000 boxes a week. It was stated that the question of a basic price had been arranged at the Melbourne meeting, and that it was understood that Western Australia would find that future shipments would arrive there at the same rate from the Eastern States.

In reply to a question whether it had been agreed that Victoria should not send butter into New South Wales, Mr. Purcell said that he took it that the agreement applied to Victoria, New South Wales, and Queensland.

FAT LAMBS.

THE TYPE OF EWE TO BREED FROM.

When considering the type of ewe from which to breed fat lambs, several aspects of the case must be considered, and perhaps the most important of these is availability. Because of the greater numbers bred (writes the Sheep and Wool Expert of the N.S.W. Department of Agriculture) it is always possible to buy Merino ewes, but the same cannot be said of comeback and crossbred ewes, good even lines of which are often very hard to obtain. This fact must be borne in mind when considering the purchase of ewes for lamb-raising, and it indicates that, whether suitable or not, in numerous cases the Merino ewe will be used because other types of ewe are not available. As a mother for the production of a first-class export lamb under average conditions, the pure Merino ewe cannot be regarded as entirely satisfactory. Merino ewes mature slowly, and, compared with the crossbred ewes, do not give high lambing percentages; they are not good mothers, have a smaller supply of milk, and when mated with British breed rams experience more difficulty in lambing—all of which are important points in the production of fat lambs. The ideal ewe is a big-framed, roomy, early maturing type with a good milk supply, giving a high percentage of lambs and looking after the lambs properly.

Experience has shown that the lamb from the Merino ewe by one or other of the longwool breeds does not altogether come up to the requirements of the export lamb trade at the weaning stage. The lambs dress on the light side (25 to 28 lb.) and are rather slab-sided and leggy, and generally are not as compact and symmetrical as is desired. When the Merino ewe is mated direct to a ram of one of the Down breeds the resulting lamb is still less satisfactory, there seeming to be such a great difference between the two breeds that they do not nick well, and the result is unevenness, both in the individual and in the group of lambs; besides this, the lambs are slow in maturing. The results with the Dorset Horn (especially in the hotter districts and where big-framed ewes are used) have been much better than those obtained with the black-faced breeds.

Despite the disabilities mentioned, the fact remains that often Merino ewes are the only ones obtainable, and in such a case big-framed, plain-bodied ewes should be selected, and the best results will usually be obtained by joining with them rams of one of the longwool breeds.

The breeding propensities of the ewe must also be considered. In the hotter districts an early mating is desirable so that the lambs can be sold before the grass seeds begin to be troublesome in the spring. It has been found that crossbred ewes will not mate readily in the early part of the summer or during the hotter months in those districts where an early mating is desired, and this is specially noticeable when the ewes have been procured from a cooler district. An endeavour should be made to secure ewes bred under similar conditions to those where they are to be run, but in certain districts the crossbred is unsuitable for the above reason. Comeback ewes will breed more readily than crossbreds, while the Merino will breed almost at any time; and, considering the fact that Merinos can always be procured, it can be assumed that Merino ewes will be used in greater numbers in the production of fat lambs, despite the disabilities under which they labour as compared with the crossbred ewe, and the farmer who has to use them will be able to set off against the greater value of the lamb from the crossbred ewe the advantage of this earlier mating—the early dropped lambs which are obtained with the Merino.

The added value of the fleece of the Merino ewe will also help to balance the scales, although it has to be remembered that when run continuously on cultivation ground, the wool of the Merino depreciates to a greater extent than the wool of crossbreds under like conditions.

Under average conditions it must be granted that the best fat lamb is produced by mating one of the Down breeds with a first cross longwool-Merino ewe, and to secure the early maturing lamb desired, the best combination of breeds has been found to be the Dorset Horn ram mated with the Border Leicester x Merino ewe. The Ryeland is also showing great promise when mated with a first cross longwool x Merino ewe, but is only recommended for use in the cooler districts, or where mating does not take place early in the summer.

As mentioned previously, it is not always possible to secure the exact type of ewe required, but an endeavour should be made to get an even flock. Comeback ewes will give a more valuable fleece than the crossbred, but being nearer to the Merino and smaller in frame will not give such an early maturing lamb. The lambing percentage from comeback ewes will not be so good as from crossbred ewes.

CO-OPERATION.

ROMANCE OF THE ROCHDALE MOVEMENT.

"Surrounding the performance of the many little services so necessary to fill the wants of even the smallest community is a tremendous waste in money and effort. In the larger towns this is particularly noticeable. The further outback one travels the less this interdependence applies, but there is a corresponding loss of leisure time, or restriction in these services. Again, two-thirds of the farmer's income is spent in providing himself with implements, plant, seed, and the little comforts of life. Of what use is it to double the price of butter if the money gained from this source is wholly lost or dissipated in buying the necessities of living?"

In an address of which the foregoing was substantially the text, Mr. R. J. Grierson, manager of the Co-operative Wholesale Society, Newcastle (N.S.W.), urged upon a recent gathering of North Coast farmers the formation of co-operative community centres, and incidentally gave an interesting account of the origin and growth of the Rochdale consumers' movement. The movement was born at Rochdale, Lancashire, in what had been called the "hungry forties," conceived of dire necessity, when most of the population were struggling under an insupportable load of poverty. It had since been adopted by almost every nation in the world without modification, and had proved worthy to be ranked as one of the great world-wide social movements.

A Romance of Commerce.

The history of the movement was one of the most fascinating stories in the world. In 1844 a little band of twenty-eight Rochdale weavers met together to discuss (in their words) a way out of their misery. Their idea was to formulate a plan for a better existence. It was easy to devise a plan, but how to put it into practical operation was quite a different story. Among the many suggestions offered only one seemed practicable. This was to open a store, the profits of such to be returned to the people, less an amount to be retained for education.

According to the original plan it was decided that operations be commenced with a grocery store, the capital to be subscribed in shares of £1 each; that interest paid on this capital should not exceed the legal rate; that the shares should always remain at par; that the control of the business should be democratic—that is, one man one vote, regardless of shareholdings, and the voting to be done in person, never by proxy; and, lastly, that the selling price of goods to members should be at current market rates, and all sales for cash, but—and herein lay the distinctive feature which marked the co-operative from the privately owned store—the margin between wholesale and retail prices, commonly called profits, was to be returned to the consumers in proportion to the purchases, and 2½ per cent. of these profits were to be devoted to education. It was on record that a journey of 20 miles was required to gather the initial contribution of 2d. per member, and this task was undertaken in turns by the original pioneers. Out of this small weekly sum of 4s. 8d. had grown the British Co-operative Bank with its present turnover of £520,000,000 per annum.

A Start in a Small Way.

The store was commenced in such a humble way that the original stock only covered four items—namely, flour, sugar, butter, and oatmeal—and so embarrassed with their small beginnings were these men that it took a lot of courage to take down the shutters and open the shop. The story ran that the shop was opened amid the jeers and catcalls of the population of Toad lane. Although it took a year to raise £28, the pioneers were not daunted, for their community store was to be only the initial step to bring about equity in industry, and to these enthusiasts the store was not an end, but merely the means towards securing the pecuniary benefit and improvement of the social and democratic conditions of its members. So enthusiastic did they become that further objects were included in the plan, as being preparatory steps to the final one, which was no less than this—that as soon as practicable the society should proceed to arrange the powers of production, distribution, and exchange, and that the opportunity be created to allow of unrestricted co-operation on the part of all the members for every purpose of social life.

An International Organisation.

Few people grasped the immensity of the vision displayed in formulating the above plan, observed the speaker, for out of that effort had grown in Great Britain an organisation with a membership exceeding five and a-quarter million householders, amounting to one-third of the population. In 1926 the capital invested was £100,000,000, the sales were £185,000,000, while 210,000 persons, earning £19,000,000, were employed. And it was notable that the idealism of the foundation members had not been lost, inasmuch that in the year referred to over £180,000 was spent in education.

The enormous growth of the movement was well illustrated by the magnitude of its present operations. The British National Wholesale owned the largest boot factory in the world, it operated the largest textile mills, and its eight great flour-mills were the largest takers of Canadian and Russian wheat, while last year it absorbed and financed the whole wheat pool of Western Australia. It owned 35,000 acres of tea plantations in Ceylon and 33,000 acres of farm lands in Canada; it owned collieries and steamships, and had vast tracts of palm nut groves in Sierra Leone for the production of oil nuts for soapmaking. Such had been the international development of the movement that no less than 50,000,000 householders in thirty-two countries had been registered as active adherents to the principle, and a recent development had been the formation of an International Wholesale, having for its object the transfer of co-operative production through co-operative channels from one country to another.

THE SIXTH TRACTOR SCHOOL AT GATTON COLLEGE.

The Queensland Agricultural High School and College, in conjunction with the Council of Agriculture, will hold the Sixth Queensland Tractor School from the 24th March to the 5th April, inclusive. The course will cover lectures, demonstrations, and practical work in the care, adjustment, repairs, and driving of many makes of tractors.

At the last school there were in use Fordson ('tween wheels plough), Fordson (with rotary cultivator), Fordson (crawler), Advance (crude oil), Hart Parr (two), Case, Massey-Wallis, McCormick-Deering, Cletrac, Caterpillar, Cletrac (College owned), British Wallis (College owned), Fordson (College owned). It is expected that other tractors also will be represented this year.

The cost to each farmer will be £3 9s. 6d., which will cover all instruction costs, board and residence, and recreation fee.

The Railway Department will grant attending farmers one-half excursion rates each way on presentation of a certificate from the College.

The College will provide power kerosene, the railage on tractors from and to Brisbane, and free board and residence for tractor mechanics.

Farmers should book to College station and ask the guard to stop, previously advising the College of the train by which they will travel.

Farmers will need to bring blankets, sheets, mosquito net, pillowslips, towels, soap, mirror, and other toilet requisites.

No farmer will be allowed to confine his attention to a particular tractor, but must work each in turn. Should he desire more work on a particular tractor, he will have to arrange it in his spare time.

Applications from farmers wishing to attend the school will be received from now onwards; early applications will be given preference. Any further particulars will be supplied on request.

A VALUABLE JOURNAL.

A Yamsion reader (enclosing a year's subscription to the Journal for a neighbour) writes (31st January, 1929):—"For myself, I can only say that it is a very valuable publication."

THE CULT OF THE COLT.*

By "U 9 L."

VI.

EDUCATION.

Some fault may be found that so far our colts have behaved themselves on conventional lines. They have, and the reason is that we deal with the majority first. We'll handle a snorter or two later, and now we will go on with the orthodox. We have gone through all the primary lessons of a colt's education, building a foundation for his knowledge, and, roughly, that is repeated over and over again. Specially does the tying up devolve into a lesson which is boring in its irksomeness. While we have any batch of youngsters in hand, as soon as they come to the yard in the morning, it is the same old routine with but little variation: catch him, rub him down, have a yarn with him, slip the halter on him and tie him to a stout post or tree. There that little fellow has got to stay, resting alternate legs and swishing the flies till there's no doubt he is heartily sick of the whole course. He may be tied for five hours just to prove to him in a momentary check that he has got to stay put when and where we leave him. That is the whole object of those hours of weary monotony. He cannot take any part of his education in tabloid form, and there are no short cuts to knowledge for him. He has to go through with it. But in gaps of time in between we teach other little lessons.

Leading—Building up the Colt's Confidence.

Of course, the colt has to learn to follow where we choose to lead. Honestly, there's nothing more gratifying than having a horse which goes without hesitation where you see fit to give it a lead. And if you want to add a few frills for your own pleasure, this is the period when we kill the time which drags. Let's teach a youngster or two to which we've taken a particular fancy to lead without reins. We have taught him to come to us when called, and on that same foundation we educate him to follow where we go. It's easy. I have always found a snap of the fingers impresses the colt in a more imperative manner than a click of the tongue, and if you build up gradually, always retaining your mastery of the situation, and the colt's confidence, you may go far. I mean by the former that you must never place yourself in a position to suffer a fall of prestige. For instance, if you get the youngster to follow you outside before you have him under command, then the chances are, as soon as you go through the gate, the colt will lift his tail above his back and leave you. That smashes all the good your teachings have produced. See to it, when he does think he can escape, that it is only a partial escape which is his—in the big yard or a small paddock, for instance. Then when you have got him again without trouble, and when you bring him to you with a run, that horse begins to think there is something wonderful about you which is worth attention. In this, and to let you know what can be done, let me relate a little story, without indulging in any of the "when I was younger." I had a little grey mare which I'd ridden for five or six years, and there was almost a perfect understanding between us. She'd follow anything I rode, running behind like a dog, and one day I was at the stock camp for dinner with my saddle horse tied to a tree and the little mare poking about. While we were having dinner a motor truck pulled in to the camp—one of those one-ton puffing abominations which paved the way for better machinery to follow. It stopped near where my horse was tied, and before it reached there I was standing beside my horse. The little mare, her ears pricked and her eyes shining with excitement and curiosity, was rubbing against me. In a spirit of flashness, bravado—call it what you will—when that truck started again I called to the mare, ran and jumped on the platform behind. The little thing never hesitated, and almost as I reached the platform of the truck she was beside me, snorting with pretended fear, her four legs braced wide, and with startled eyes peering over the edge of the truck at the ground slipping by beneath her. Now, I look on that sort of thing as being in the highest class of its own type of work—if you'll pardon me so praising my own teachings—and when a thing like that is done, then does a man feel that he has done something and that life is worth the living. Of course, you can't do it on any sort of animal at all. You've got to have the quality in the horse before results like that are achieved.

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* From the "Pastoral Review" for October, 1928. Previous notes on this subject by the same interesting and well-informed writer were reprinted in the March, August, October (1928), January and February (1929), Journals from the February, April, May, July, and September (1928), numbers of the "Pastoral Review."

Breaking.

Now let us get on with the breaking. That "breaking" is a hateful word, but it's a trade term, so I suppose we have got to use it. Among other places to which you've led your youngster is the stable. You have put him in a stall and left him there for a few hours for the good of his soul. That is all quite fit and proper. But when that little horse is in there, nervous and wondering what the dickens has happened to him, for the love of goodness don't let anyone stand and stare at him. That makes a horse self-conscious to the same extent that you would feel it, and he is no more comfortable under the process than you would be. Move about him if you wish, talk to him and try and make him feel at home, but don't treat him as an exhibit in a cage. The youngster does not like it. And above everything else don't stand still, look him fairly in the eyes and poke your finger at him. That may sound silly. You can take my tip, though, it isn't. If you will prove my words, please do so on a colt of no account. Put him in the stall, get him nervous and uncomfortable by gazing at him, and then poke your finger at him as I've told you not to do. Watch that youngster's eyes redden, see him move uneasily from foot to foot, and then snap your hand away quick as the colt comes with a charging rush at that pointing finger. Instead of annoying the animal, try and amuse it. Make it feel at home if you can, and bear in mind that it is only a little girl or boy horse you are trying to entertain. One game they seem to like above all others, and of which they never seem to tire, is for the man to place the flat palm of his hand over the lips of their mouth. Without exception they will immediately reach and try and take that hand in their open mouth. They can't. As they reach forward they push the hand further away, and they seem content to play that game indefinitely. And it is not wasted time! Anything which makes a bond of understanding between the breaker and his charges isn't lost effort.

The Early Morning Ride.

Now that the breaker has two, or three, or more youngsters in hand which have been ridden, and which are merely adding to their knowledge of man and his ways before faring out into the world, if that breaker's got the stuff in him, it is up to him to show his mettle. Every night let him keep one of his youngsters in and let him ride that colt after the horses in the morning. It takes doing, let me tell you, but is worth the trouble. It isn't any fool's job to turn out of a warm bed on a winter's morning, to go to the stall where that half-broken colt is shivering, to catch and saddle him and ride him round the paddocks to yard the horses. If there is a bit of a buck in that colt's repertoire then is the time he is going to show it, and there's going to be many a manifestation of temper when the rider wants the youngster to leave one mob of horses and go and gather another. I always think that early morning ride, uncomfortable though it is, is worth many times a lesson at any other part of the day. It has its little compensations, though. When a man's running horses he gets to understand the horse under him to a greater extent than any other opportunity gives, and in running his other breakers to the yard he gets a glint of their little peculiarities which later he may turn to his own profit. Anyway, for good work, it has to be done—that's the end of it!

Keep Your Hands Down.

Poets are born, not made, somebody is reported to have said. To a certain extent those more gifted with good hands receive direct from the gods their benefaction. Sympathy, understanding, and hands, and the greatest of these is ——. I'll leave it to your individual selves, but I am strong on hands. What is the use of anything and everything in a horse unless he is responsive? Hands bring that, and hands almost alone are responsible for that perfection. The first thing, and as I have stressed previously, is lightness. Never for one fraction of a second put one portion of an ounce more weight on the horse's mouth than that necessary to achieve its purpose. An advice which has come down the ages is to keep your hands down. It's easy, easy and natural, once you have acquired the habit, and if any difficulty is experienced there is a simple way to accomplish it. If you keep your elbows in you must keep your hands down. Try it and see. There is no need to press with your elbows against your ribs, and there is no necessity to sit stiff and grim like a graven statue and to move in the jerky motions of a mechanical toy. If you let your elbows swing naturally and easily at your sides, not flapping them like a bird about to take flight, you will find, within reason, that your hands are forced into the proper position when you play on the reins.

Reins not Tiller Ropes.

Gauge the weights accurately and neatly, and don't use the reins as tiller ropes. They are not there for that purpose at all. The reins, really, are more in the nature of an emergency brake. More than half your steering, your desires and wishes are conveyed to your mount through your legs and your grip of the saddle with your thighs. How much does a skilled bicycle rider use his bars for steering purposes? You will find, should you care to note, that the bars aren't used for steering to any appreciable extent. The rider governs his direction by the swaying of his body. You will admit that, I think. Then, having admitted it, take counsel with yourself and think if a living piece of exquisite life isn't worthy of the same consideration as that shown a contraption of wires and hollow pipes. Picture to yourself, if you can, anything more deserving of the severest censure than that of a rider turning his horse by pulling on one rein alone, sitting bolt upright in the saddle, and with the hand holding that rein held out at right angles to his body. You have seen it, and so have I, and in your anger you have, like myself, called down the curses of both the regions beyond on the man who has attempted to exalt his paltry being by posing as the master of a horse. The proper place, and the only place, within reason, for all rein work is just a shade above the pommel of the saddle, and not more than an inch or two on either side of it.

When the Job is Finished.

Now, before leaving this horse which we have broken, let us deal with a few odds and ends. As I have said before, the time to impose on a colt all the new sensations of his life is the time when he is in the breaker's hands. Though he may never wear shoes, that's the time to lift up all his feet and go through the mock pretence of shoeing him, the time to flap all sorts of unnecessary gear over him, to drive him in a pair of winkers and let him drag something round the yard. All those things the colt has to meet and accustom himself to them by familiarity. And cruellest thing of all, and though your heart bleeds for the baby horse which you've taken under your wing, he has got to have the hobbles on him. This is awful, and almost you writhe in agony in sympathy with your colt's bounds. But it's got to be done, and it is all educational.

And then when you pass your little fellow into alien hands, your work completed, with a great feeling of sadness you watch the little chap leave your loving care and break for ever the bonds of sympathy and affection which you have built up. He goes gaily, not knowing what is ahead of him, and you spit on your hands and go to another fellow waiting you in the round yard.

Photo.: Jean Easton.]

PLATE 82.

"Along the Track that Leads to Home."—An Apple-tree Avenue on Coochin Coochin.

AGRICULTURE IN THE NORTH.

The Acting Secretary for Agriculture and Stock, Mr. T. Dunstan, has received the quarterly report from Mr. N. A. R. Pollock, Northern Instructor in Agriculture, Townsville, on agricultural matters generally (apart from sugar-cane) in the Northern portion of the State, and of which the following is a summary:—

AS a result of the recent favourable rains prospects generally in the Northern areas are good. Particular mention is made of the Muttaburra, Winton, Mackinlay, Julia Creek, Richmond, and Hughenden districts, and to the fact that, owing to the improved condition of pastures, graziers are busy bringing back their sheep from agistment elsewhere, also that hand feeding has entirely ceased in those localities.

In the Northern Division the months of September, October, November, and portion of December usually experience insufficient rainfall to permit the growth of crops except under irrigation, and sowings are not generally made until the wet season begins.

Maize.

It is estimated that approximately the same area will be cropped on the Tableland as in the previous year. Indications point to the prospects of a heavy crop should the season continue propitious. Approximately 1,000 acres of forest country near Tolga have been reserved, and are sown with the new variety of maize (Durum) bred by the Department of Agriculture, and selected particularly for its suitability to the climatic conditions usually obtaining on the Atherton Tableland. On the coastal areas no increase in the area under maize is indicated.

Potatoes.

Crops on the Tableland will probably show a slight increase in area, and under the favourable conditions now being experienced should show better yields than those of the previous two years. The coastal crops which are usually planted in April cannot at present be forecasted.

Peanuts.

Seasonal conditions suggest a better average yield over the area planted, which is comparable with that of the previous season.

Truck Crops.

Indications point to the possibility of there being a slight increase in the area devoted to such crops as pumpkins, tomatoes, and cucumbers in the Lower Burdekin, compared with that of previous seasons, but, as sowings usually take place in February and March, at this early stage it is impossible to definitely forecast to what extent the area will be increased.

Green Fodder Crops.

Slight increases in the total areas on the Tableland and coast are expected in these for grazing-off purposes or for conservation as fodder in the form of ensilage. A certain proportion of the area will no doubt be utilised for green-manuring purposes.

Increased interest is being displayed in the matter of growing fodders in the Western country, and in the Stamford, Richmond, and Winton districts areas aggregating 150 acres have been sown with sorghums, cowpeas, and velvet beans in anticipation of being able to conserve those crops as ensilage should the present favourable weather conditions continue.

Tobacco.

Increased interest is being taken in this crop as the outcome of the encouraging results obtained from last year's trials of pipe and cigarette tobacco in the North, and commercial areas of 4 acres on Hervey's Range, 1 acre at Charters Towers, and ½ acre at Pentland are contemplated. Small experimental trials are being made by interested individuals in order to secure experience for growth on a larger scale should this be eventually recommended.

Regarded generally, present agricultural prospects in the Northern Division are excellent, and greater returns from present growing crops are anticipated than was recorded for last season's crop, at least for this particular season of the year.

Answers to Correspondents.

BOTANY.

From the outward mail of the Government Botanist, Mr. Cyril White, F.L.S.

Giant Couch.

W. McK. (Sexton, Kingaroy Line)—

Your specimen is *Panicum muticum*, or Para Grass, generally known in Queensland by its botanical name or as Giant Couch. It is a very valuable fodder, relished by all classes of stock. It does particularly well in districts with a high rainfall, such as the Atherton Tableland, where it is regarded as an important dairy grass. Generally it prefers rather moist country and is not particularly drought-resistant. It has considerable value as a soil binder along the banks of rivers.

Wild Mint—Chicory.

INQUIRER (Allora)—

(1) *Salvia lanceifolia*, the narrow-leaved Sage, more commonly known in Queensland as "Wild Mint." This plant is a native of the United States of America and Mexico and has been naturalised in Queensland for some years past, first making its appearance in the Pittsworth district. It has now spread to other parts of the Downs and threatens to become a bad weed. We do not know the exact methods of propagation of the plant and therefore cannot give you any very definite instructions as to eradication. With regard to its poisonous properties—this is a popular opinion in Queensland, but there is no record of the plant being poisonous in its native country and we have no definite information based upon feeding tests. Feeding tests would probably be the only means of finding out anything definite on this point.

(2) *Cichorium intybus*, "Chicory."—This is the wild form of the cultivated Chicory. The plant is very widely spread in the temperate parts of the world, and in Australia and the United States of America is regarded purely as a weed and a rather troublesome one at that. Under these circumstances its taproot becomes thin and worthless. In Europe the plant is cultivated to a considerable extent for commercial Chicory and the young leaves are bleached and used as a salad. Spraying is not particularly successful, and the only satisfactory means of control is deep cutting below the crown. Sometimes when the ground is sufficiently soft it may be hand pulled.

Western Plants Identified.

E.J.T. (Charleville)—Your specimens are—

1. An advanced specimen of *Trianthema decandra*, commonly known as Hogweed, very common in Queensland, and not known to be poisonous in any way.
2. A young growth of Hogweed (*Trianthema decandra*).
3. *Boerhaavia diffusa*, commonly known as Tar Vine, very abundant in Queensland and New South Wales. It has some reputation as a fodder.
4. The specimens in this package are only seedlings that have been eaten off and are rather difficult to determine. We should say, however, the package represents a mixture of seedlings of Saltbush (*Atriplex spp.*), Tar Vine, and perhaps Hogweed.
5. *Morgania glabra*, a small plant very common in Western Queensland and New South Wales, but for which I have not heard a common name. It is not known to be harmful or poisonous in any way.
6. *Ruellia australis*. The same remarks apply as to No. 1.
7. *Euphorbia Drummondii*, the Caustic Creeper. The general characteristic of poisoning by this plant is a marked swelling of the head and neck. It has, however, lately been shown to sometimes produce a prussic-acid yielding glucoside, and if eaten then in quantity by stock when hungry may cause death. Generally speaking, however, paddock stock are little affected by it.

Grasses Identified.

R.W.M. (Bundaberg).—Your specimens have been determined as follows:—

1. *Eleusine indica*, the Crowsfoot grass. This grass is very widely distributed over the warmer regions of the world. Like some of the Sorghums, it possesses a prussic-acid yielding glucoside. The glucoside is quite well developed in Queensland plants, but we have had no very definite cases of poisoning by it.
2. *Eragrostis diandra*, a species of Love grass.
3. *Panicum sanguinale*, Summer grass.
4. *Paspalum dilatatum*, common Paspalum.
5. *Eriochloa annulata*, sometimes called Early Spring grass, at other times Dairy grass. Neither name is particularly suitable.
6. *Eragrostis leptostachya*, a species of Love grass.
7. *Andropogon pertusus*, the bitter or pitted Blue glass, rather unpalatable to stock.
8. *Sorghum sp.*—I should say the wild or native form of *Sorghum halepense*. This Sorghum genus is rather difficult to determine specifically in the absence of root specimens, the heads of the native Sorghum, Johnson grass, and Sudan grass being all so similar. The native Sorghum is a perennial with a tufted root stock with young buds generally being sent out, or in winter time perhaps dormant. Johnson grass has long white underground stems which cause it to be such a pest in cultivation. Sudan grass is an annual.

Northern Plants Identified.

J.L. (Townsville)—Your specimens from Home Hill are.—

1. *Albizzia procera*, a tree very common in North Queensland and stretching through New Guinea and the Malay Archipelago to India and Ceylon. It is not known to possess any harmful property.
2. *Crotolaria laburnifolia*, a species of Rattle-pod. It has a somewhat similar distribution to the *Albizzia*. Nothing definite has been proved against it, but, as you know, suspicion always attaches to plants of the genus Crotalaria owing to the known very poisonous qualities of some of the members.

So far as we know, Whitewood (*Atalaya hemiglauca*) does not occur in the Home Hill area, but it is quite possible it may be found in some of the drier scrubs of the area, as it is a tree with a wide distribution in Queensland.

"Glycine Pea."

W.A.D. (Allora)—

Your specimen is *Glycine tabacina*, the Glycine Pea, a small legume common in the average mixed pasture in Southern Queensland. It is not known to be poisonous in any way, and is, in fact, looked upon as rather a useful fodder.

"Worm Seed."

K.W. (Taabinga Village, via Kingaroy)—

Your specimen is *Chenopodium ambrosioides*, a species of Worm Seed, also known as Mexican Tea and Jesuit Tea. It is a native of the warmer parts of America, but is now widely spread as a more or less common weed in various countries. The seeds of this and of a closely allied species are the source of oil of chenopodium largely used in the eradication of hookworm.

Bitter Bark.

E.T. (West End, Brisbane)—

Your specimen is Alstonia constricta, commonly known in Queensland and New South Wales as the Bitter Bark or Native Cinchona. The bark has some value as a tonic. We have also heard of it being used successfully in some places as a tick wash. The bark is official in the British Pharmacopeæ, but the demand is very limited. It does not belong to the true Cinchona but to the family Apocynaceæ.

PIG RAISING.

From the outgoing mail of the Instructor in Pig Raising, Mr. E. J. Shelton.

Paralysis of the Hindquarters.

C.D. (Haden)—

In making inquiries regarding sickness in animals it is advisable to furnish all details of feeding, housing, breeding, and other relevant information, so that a better idea of the conditions may be formed by the instructors, thus enabling them to diagnose the trouble more definitely.

Paralysis of the hindquarters may be caused by severe constipation, rheumatism, injury, and a few other items, but, from the particulars you give, the pig becoming suddenly paralysed, and appearing otherwise healthy and bright, may be injured by other pigs or larger animals, thus affecting the nerves of the hindquarters.

The best treatment you can give the pig is to put him in a dry, comfortable pen by himself, feed plenty of greenstuff, and if he becomes constipated give him a dose of castor oil in his feed. Then massaging the loins and rump with plenty of rubbing, and a mixture of turpentine and oil will help to stimulate the tissues.

The prevention of paralysis in pigs is summarised as follows:—Breed from sound constitutioned stock, feed a variety of wholesome foods, with abundance of greenstuff and water, run all pigs in grazing paddocks, and provide clean comfortable shelter. Rickets, a bone disease, which causes malformation of the bones, and in some cases loss of the use of legs, is sometimes mistaken for paralysis. To prevent rickets and keep your pigs healthy and making fast gains in growth, keep a mineral mixture always before them in a separate feed trough placed in a sheltered spot. A practical mineral mixture is as follows:—20 lb. hardwood ashes and charcoal, 15 lb. slaked lime or ground limestone, 40 lb. sterilised bonemeal, and 20 lb. coarse salt.

Planning a Piggery.

F.W. (Boonjie)—

The chief point in planning a piggery in Queensland is to provide plenty of paddock room, so as to have pigs of all ages on good grazing.

Under grazing conditions pigs not only develop better and are healthier and make cheaper gains in growth, but they can be topped off for market just as well on pasture, provided they are given sufficient concentrated feeds. Also, when topped off on pasture, there is little chance of the pigs being overfat, because of the exercise they get.

A useful type of piggery would be sufficient paddocks, say, ¼ to 1 acre in area, fenced with split palings and wire, or K wire; and in these paddocks have houses sufficiently large to protect the pigs in rough weather and give them shelter from rain, sun, and wind.

There is no need to go to any great expense over these sheds. A good type which is used on up-to-date pig farms is as follows:—6 feet high at front, 5 feet high at back, and 7 feet deep and any length, say, 9 feet long. Just the ordinary open-fronted shed with two ends and back boarded up with rough timber such as palings, an iron roof, and floor of 1-inch boards 1 foot off the ground to keep it dry. Round or sawn timber can be used for the walls, and any old iron for the roof. A shed of this size in each yard will accommodate pigs of any age, and if a sow and litter were to be locked up a few battens made into a hurdle across the front of the shed would do the job. The cost of the shed would be £2 to £5, depending on the class of material used, and it would be large enough for a sow and litter or for from fifteen to twenty young growing pigs. With paddocks and shelters like these either concrete or wooden troughs could be used and moved about occasionally to keep the ground from becoming too wet.

The open-fronted shed just described is durable, cheap, dry, and comfortable, and gets the full benefit of the morning sun right inside, and provides shade on one side all day.

Worms in Pigs.

A.L. (Frenchton)—

From your description—coughing, panting, and general debility in the pigs commencing when they are about three weeks old—they are apparently suffering from worms. The common round worm is present in most of our piggeries. The adult worm grows to about 10 inches long in the intestines of the pig, and lays thousands of minute eggs which pass through the pig and are deposited about the pens, yards, and troughs. These eggs are in time swallowed by the pigs when they eat out of dirty troughs or from muddy floors, or by suckers whose dam has been lying in the mud and whose udder is covered with filth. When they hatch the embryo worm enters the blood stream of the body, and in time passes through the lungs. While in the lungs these tiny worms, which cannot be seen by the naked eye, may set up coughing and panting and inflammation which may then lead to pneumonia. From the lungs they are coughed up and swallowed, when they pass into the intestines and increase in size and in turn lay eggs which pass out to infest more pigs. The effect of these worms is more severe on young pigs than on older ones. The first treatment for worms is to clean up the piggery thoroughly and remove litter regularly, keep troughs clean, use plenty of disinfectant, have the troughs so arranged that the pigs cannot lie or stand in them, and, above all, run the pigs in clean pasture paddocks instead of penning them in filthy yards or sheds.

Treatment.—Starve the pigs for twenty-four hours, then give them a small feed of skim milk containing turpentine and castor oil. For pigs weighing 100 lb. live weight, a sufficient dose would be one-third of a teaspoonful of turpentine and two tablespoonsful of castor oil. The size of dose must be regulated to suit the size and number of pigs to be treated. Mix the medicine thoroughly with the food, and see that each pig gets its share of the dose. This treatment must be repeated in exactly the same way two weeks later, for it must be remembered that the worms can only be killed by the medicine while in the stomach and intestines, and it takes about twelve days for the developing worms to pass through the lungs back into the stomach. Even when the young worms have passed into the stomach and intestines they are still often too small to be seen without a microscope. If this treatment is carried out to the letter, good results should follow.

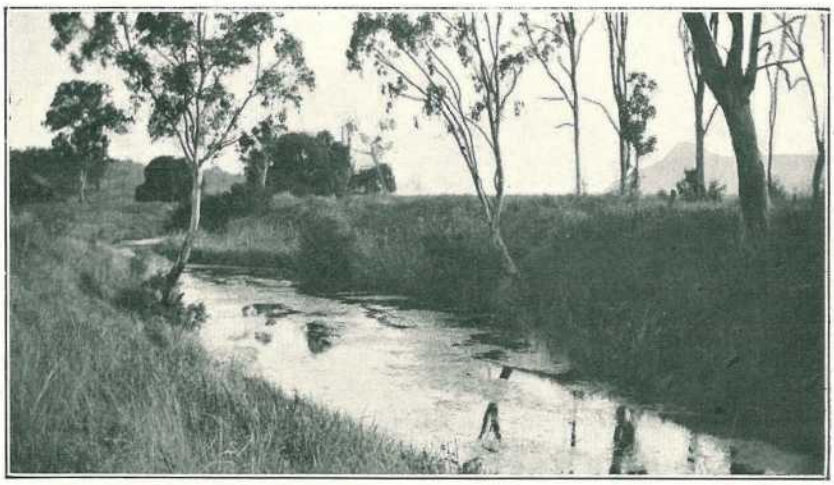

Photo.: Jean Easton.]

PLATE 83.—"WHERE THE PELICAN BUILDS HER NEST,"

One of the little brooks that meander through the fertile Coochin Country.

General Notes.

Staff Changes and Appointments.

Messrs. J H. Mitchell, P. Mitchell, and N. L. Miles have been appointed Temporary Inspectors under and for the purposes of the Diseases in Plants Acts, Mr. J. H. Mitchell until the 30th June, 1929, and Messrs. P. Mitchell and N. L. Miles for a period of three months. They will be stationed at Nambour, Currumbin, and Woombye respectively.

Mr. P. McCarthy, of Widgee, via Gympie, has been appointed an Honorary Inspector under the Diseases in Plants Acts.

Mr. G. P. Randles, of Kenmore, has been appointed Inspector of Slaughter-houses on probation.

Mr. F. A. Toop, of Holbrook, Nanango, has been appointed Officer under and for the purposes of the Animals and Birds Acts.

Mr. L. A. Burgess, Assistant to Analysts, Agricultural Chemical Laboratory, has been appointed Analyst, Agricultural Chemical Laboratory, Department of Agriculture and Stock, as from 12th February, 1929.

Mr. K. King has been appointed Inspector on probation under the Diseases in Plants Acts and will be stationed at Cooran.

Mr. C. D. Vere Hodge, of Cardwell, has been appointed Officer under and for the purposes of the Animals and Birds Acts.

Constable A. H. Holzberger, of Hebel, has been appointed Inspector of Slaughter-houses.

Mr. J. J. O'Brien, Glastonbury, via Gympie, has been appointed Honorary Inspector under the Diseases in Plants Acts.

Mr. F. J. Webber, of Burketown, has been appointed Government Representative on the Burke Dingo Board, and Messrs. F. Walden, A. J. Reid, J. Gaden, and E. G. Rotherey have been elected members of that Board.

The Officer in Charge of Police, Monto, has been appointed Acting Inspector of Stock as from 23rd February, 1929.

The Inspector of Stock, Miles, has been appointed Government Representative on the Condamine Dingo Board, vice Mr. W. M. Nash, resigned, and the Inspector of Stock, Charleville, has been appointed Government Representative on the Warrego Dingo Board, vice the Police Magistrate, Charleville, relieved of the position.

Mr. Jas Carew, Acting Senior Instructor in Sheep and Wool, has been appointed Senior Instructor in Sheep and Wool, Department of Agriculture and Stock, as from 1st January, 1929.

Cotton Board Election.

The Cotton Board election resulted as follows:—

District No. 1. (North of Bundaberg on the North Coast Line)—
John Beck, Stanwell—Returned unopposed.

District No. 2. (Wowan District)—
Harry Reeves Brake, Wowan .. .. 140 votes
Charles George Young, Wowan .. .. 117 votes

District No. 3. (Callide Valley District)—
George Herbert Bradley, Argoon, via Rannes .. .. 137 votes
Alfred Charington Webb, Thangool .. .. .. 132 votes

District No. 4. (Upper Burnett)—
James Bryant, Chowey .. .. 174 votes
Edward James Basson, Three Moon, Monto .. .. 121 votes

District No. 5. (South Burnett and Lines to Grandchester)—
David Charles Pryce, Toogoolawah .. .. .. 89 votes
Charles Litzow, Vernor .. .. 39 votes

District No. 6. (Lockyer and Darling Downs)—
Ferdinand August Kajewski, Ma Ma Creek—Returned unopposed.

The successful candidates at this election will hold office as from the 19th February, 1929, to the 31st December, 1931.

Egg Board.

By regulation under the Primary Producers' Organisation and Marketing Acts the period of time during which the Egg Board shall, out of the proceeds of the eggs disposed of by that Board, make payments to each grower on the basis of the net proceeds of the sale of the commodity of the same quality sold by the Board has been prescribed to be from the 1st January, 1926, to the 2nd March, 1929.

Equalisation System for Butter Board.

An Order in Council has been issued under the Primary Producers' Organisation and Marketing Acts amending the original constitution of the Queensland Butter Board in so far as the system of equalising returns to factories is concerned. Practically no alteration has been effected in the system which has now been in operation by the Butter Board for some time, but the amendment to the Board's constitution merely makes clearer the actual system in operation.

Stanthorpe Fruit and Vegetable Levy Regulations.

By regulation under the Fruit Marketing Organisation Acts the Stanthorpe Fruit and Vegetable Levy Regulations, which originally applied to growers of fruit and vegetables in that part of Queensland situated within a radius of 40 miles from Wallangarra and railed from any railway station within that district from the 27th February, 1928, to the 25th February, 1929, have been further extended to apply until the 25th February, 1930. The levy in question is payable on the basis of the quantity of fruit and vegetables grown in the district aforesaid, and is at the rate of 5d. per ton and a proportionate part of 5d. for each fraction of a ton of weight of such fruit and vegetables railed in any one consignment from any railway station in the area mentioned. A minimum amount of 1d. is prescribed in respect of any one consignment by every grower.

The proceeds of the levy shall be used, firstly, in payment of any cost attached to the collection or recovery of the amount of such levy; secondly, in making financial grants to the various local associations in the district as may seem appropriate by the Committee of Direction; and thirdly, the balance to be paid to the Deciduous Sectional Group Committee to be used by it at its discretion.

School of Instruction for Pig Farmers at Gatton College.

Attention is called to the Annual School of Instruction for Pig Farmers to be held at the Gatton College during the period 10th to 20th June, 1929.

These schools have been organised to provide the means whereby farmers and their sons desirous of improving their knowledge of the business of pig raising may come together at a convenient centre for the purpose of meeting one another, of attending practical demonstrations, lecturettes, and indoor studies covering several phases of the industry. The success of the first school held last year is sufficient guarantee that this year's school will be equally as popular, and as early application is necessary it would be well for those interested to get in touch with the Principal of the College so that arrangements may be completed in ample time before the opening date. Provision has been made for accommodation, meals, and other services and those attending may be assured that their personal comfort will be well studied. The social side of the life of these schools is a special feature, while each evening before the lecture session begins, opportunity is offered for a free and easy hour for questions and answers on any agricultural or related subject. At these sessions officers attend who are associated with other branches of college life, and question time is one of the most interesting periods of the day for those of the school members who are interested in orcharding, dairying, and other pursuits.

The evening cinematograph and lantern lectures are also of much interest and value. At these lectures other college students attend while, as opportunity offers, prominent authorities on agriculture give addresses on appropriate subjects.

An added attraction will be a visit of inspection to the Metropolitan Bacon Factories, for here the several operations associated with the manufacture of pork products may be seen in full swing. Apart from the educational advantages of such a visit, the day's outing is looked forward to with a great deal of interest by those fortunate enough to attend.

The school fees are exceptionally reasonable and concession fares on the railways are available to those attending. Further particulars may be obtained on writing to the Principal, Queensland Agricultural High School and College, T.P.O. South, or from the Department of Agriculture and Stock, Brisbane.

Control of Arrowroot Flour.

The referendum to decide whether or not arrowroot flour should be placed under the control of the Arrowroot Board was held on the 1st February, with the result that eighty-one voted for the placing and sixty-seven against. As there was not the necessary three-fifths majority, the proposal lapsed.

A Tribute to the Journal.

Thus "Merricus," of Dalby (using the wires in the boundary fence for a harp):—If the hens won't lay and the cock won't crow; if you don't know what's the seed to sow, just send a bob—a shiny "deener"—for a book for which no price is keener; and the very next month after this wise move you'll get all the knowledge you want, by Jove!

Broom Millet Board.

By Order in Council made under the Primary Producers' Organisation and Marketing Acts the operations of the Broom Millet Board have been extended from the 11th March, 1929, to the 31st October, 1931, and Messrs. H. Niemeyer (Hatton Vale, Laidley), E. M. Schneider (Binjour Plateau), and L. R. Macgregor (Director or Marketing) have been appointed members of the Board from 11th March, 1929, to 10th March, 1930.

Pineapple Levy Regulations Extended.

By additional regulation under the Fruit Marketing Organisation Acts, the Pineapple Levy Regulations have been extended for a further period from the 25th January, 1929, to the 24th January, 1930. The levy in question is at the rate of ½d. per case of pineapples and, in instances where they are sold loose, at the rate of ¼d. per forty-two rough-leaf or ½d. per twenty-four smooth-leaf pineapples. The levy is collected by means of stamps purchased from the office of the Committee of Direction and affixed to account sales.

Proposed Strawberry Board.

Notice has been given of the intention to create a Strawberry Board to deal with all strawberries produced in Queensland for sale for a period of one year, such Board to consist of three elected representatives of growers and the Director of Marketing. Nominations for growers' representatives will be received up to the 21st March, 1929, and each nomination must be signed by at least seven growers of strawberries. Persons deemed to be growers and eligible to vote are persons who, at any time during the period commencing on the 1st January, 1928, and ending on the day of the poll, have had growing for sale strawberries in any part of Queensland. On the constitution of the proposed Board, the whole of the strawberries shall forthwith be divested from the growers and become vested in and be the property of the Board.

Normal Temperature of Animals.

The temperature, as taken with a thermometer, is an index of the heat of the blood, and this, even in the healthy animal, varies within certain limits. The normal temperature is raised slightly after a meal, during rumination, lactation, and in pregnancy. Work also raises it, so that the normal temperature of the same animal may be slightly higher in the evening than in the morning. Young animals have a slightly higher normal temperature than old ones, and animals of ardent and sanguine temperament a higher one than sluggish and phlegmatic ones.

	Degrees Fahr.
Horse	99.5 to 101
Ox	100 to 102,5
Sheep	101 to 104
Goat	101 to 104
Pig (adult)	101 to 102
Pig (young)	102 to 104
Dog	100 to 102
Rabbit	100.85 to 102
Cat	100.4
Fowl (average)	107
Small bird	108.6

Lake Pleasant, a Sanctuary for Animals and Birds.

Lake Pleasant, via Goovigen, Dawson Valley line, and an area within ten chains of the borders of that lake, have been declared a sanctuary for animals and birds.

Sanctuary at North Pine.

The properties of Mr. A. J. Wyllie and the adjoining Reesrves (R. 125 and R. 120) at North Pine have been declared a sanctuary for animals and birds. In connection with this sanctuary, Messrs. A. J. Wyllie and T. P. Sweeney have been appointed Officers under and for the purposes of the Animals and Birds Acts.

Poison for the Destruction of Noxious Plants and Useless Timber.

The attention of landholders is directed to an advertisement of the Prickly-pear Land Commission appearing in this issue relative to the use of arsenic pentoxide for the destruction of noxious weeds and useless timber. This poison, as is well known, has been proved to be most effective in the destruction of prickly-pear, and the Government has now authorised the Commission to make it available for the destruction of other weeds on the same terms as for prickly-pear destruction. The prices charged are on a low scale, and, in addition, the Commission pays railage.

Orchard Cultivation—Economy of Zigzag Tillage.

Discussing in the current "Agricultural Gazette" (N.S.W.) the important subject of orchard cultivation, the Orchardist of Glen Innes Experiment Farm observes that the most efficient and economical method of cultivation adopted at the farm orchard has been what might be called the "zigzag diagonal" method.

By using such a method both ways and with careful driving, hoeing is practically eliminated. The zigzag cultivation may be carried out in the direction of the rows of trees and crosswise, but the angular turns are so sharp that they do not allow of freedom in driving. Trees planted 24 feet apart on the square give a distance of 34 feet on the diagonal, and if the cultivations are carried out in the direction of the diagonals, the greater distance between trees affords more freedom for driving the horses. By using the zigzag method—that is, by driving the horses from one side of the diagonal row to the opposite side immediately after they have passed the tree—the cultivator can be drawn as close to the tree as the driver desires and no ground need be left unstirred; indeed, care has to be taken not to allow the horses to cut in too quickly lest damage be done by the cultivator cutting the trees. When an extended springtooth cultivator is used there is little risk of damage if the necessary care be taken in driving.

On those sides of the trees on which the cultivator is travelling a small triangle of ground is not stirred, but if the succeeding cultivation is done diagonally crosswise to the preceding one every square inch of ground is cultivated.

Pigbreeding in Denmark.

One of the most practical and efficient systems of swine breeding in existence is the one in operation in Denmark for the last few decades. It was planned and organised by the late P. A. Morkeberg. All breeders co-operate under the leadership of the Department of Agriculture in maintaining certain high standards and in producing the finest type of market pig. The registered breeding stock of the country is maintained in State-supervised breeding centres. Any farmer who has shown his ability over a period of time to raise purebred pigs can, upon application, have his farm certified as a breeding centre. Every animal intended for breeding purposes in such a centre must be approved by a representative of the Department of Agriculture, and its progeny must be subjected to a production test in one of the three Government swine breeding experiment stations before such a breeding animal can be certified and registered.

Four pigs from each sow are sent to the breeding station, there constituting an experimental lot. The rapidity of growth and economy of gain is ascertained, and upon reaching a weight of 200 lb. the pigs are slaughtered and subjected to a detailed killing test. This standard of achievement is extremely practical, for it does not involve showyard winning or extreme production of any sort, but rather the ability to beget litters that will make a quality export bacon as cheaply as possible. If a sow fails to demonstrate sufficient fertility or produces pigs that do not measure up to the standard, she will not be admitted to the herd, and no offspring from her can be registered.

The Foundation of Farming—The Cow.

The cow really forms the foundation of the farming industry. Not only does she supply the world with all the milk products, such as butter, cheese, milk, and cream, but almost all her flesh can be eaten, and beef is the staple meat of most countries. Her hide is used for making leather, and her hair for mixing with plaster. Glue is made from her hoofs, and gelatine powder from her joints. When everything else is removed her bones are ground into fertiliser. No other animal serves mankind in so many ways.

Cause of Soft Pork.

The experimental farms have been hunting down the cause of soft pork, and come to these conclusions: Pigs fed a ration which is lacking in balance go to the shambles without the bloom which a well-conditioned young porker should show. These are the pigs which make up into soft pork. Certain feeds are more prone to cause this defect in meat than others, but it is believed that any feed given exclusively will bring about that lack of vigour and thrift which is invariably associated with soft pork. These same feeds properly compounded into a balanced ration will produce no bad effects on the finished product.

A Tank Stand.

A suitable stand for a tank can be made by filling a ring of corrugated iron with sand. The ring should, of course, be well riveted, and it is also advisable to further strengthen it by means of hoops of fencing wire twitched up hard against the iron.

The greatest pressure on the floor of the tank will be about its centre, and it is advisable, therefore, to give the sand filling a slight crown at the centre so that the tank, when full, will settle with a level floor. The life of the floor of the tanks, and also of the ring of galvanised iron will be greatly extended if the surfaces coming in contact with the sand are given a wash of cement.—N. L. Jones, in the "Journal of Agriculture," N.S.W.

A Good "Handler."

Why are there so many hard feeders and bad thrivers amongst our commercial stock? Simply because no regard is paid in the breeding of many of our "stores" to those points that are productive of quick growth, early maturity, and capacity to fatten. Many of the bulls in use in dairy herds handle more like shoe leather than a kid glove, and it is their stock that feeders and graziers have to waste time and money on in fattening for the butcher. Another important point in the handling of a beast is to see that it has width of loin. A celebrated judge of cattle years ago, who officiated at many of the leading shows all over the country, was blind, and depended entirely on his hands in forming his judgment. He usually felt the loin and the skin and hair, and if they satisfied him it was enough. It is said that he seldom, if ever, was wrong in his judgment. That says much for the importance of "good handling" and a strong wide loin. There certainly has been some improvement in the last decade in the loins. There are fewer "slack" loins than formerly, and we see fewer animals "dipping" in the loins when standing, which was a very common fault a few years ago, particularly in the short-legged, big-bodied type of beast. Any animal to win in a showyard to-day must carry its back well and maintain the straightness of the top line when standing still. Slack loins are difficult to breed out, and it should always be made a strong point in a breeding animal that the loin is wide and strong, and the hand should be put over it to feel that it is so.—"The Live Stock Journal" (England).

The Home and the Garden.

OUR BABIES.

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

COMMON ERRORS IN THE MANAGEMENT OF THE BABY.

A mistake very frequently made, and which may lead on to very serious results, is that of giving the newborn infant artificial food in its first two days of life, before the mother gets her milk supply. We know that the mother's milk does not come in until the end of the second day, or the beginning of the third day after baby is born. Many mothers at this time get distressed at the thought that they have no food for baby, and in their anxiety they give him a bottle with artificial food of some kind. A food that is commonly selected is condensed milk, and it is usually given with the idea that it is merely a temporary measure to last only for the day or so, until the milk comes in. Every baby likes sweet things, so he takes the bottle willingly, and, in the time during which it is given to him regularly, he becomes very fond of it. Usually it is given from a feeding bottle with a large-holed teat, from which he gets the food, almost without the trouble of sucking for it. A little later the mother has plenty of milk and the baby is expected to take it. But mother's milk is only faintly sweet and baby does not like it nearly as much as he likes the very sweet condensed milk. Also, to get his mother's milk he would now have to suck vigorously, which he could not be expected to do to obtain food which he does not like. Naturally, he refuses to take the breast, and cries lustily for what he wants. The mother is distressed, as she realises that baby is refusing his food when he must be hungry. She strives, for half an hour or more, to make him feed, and at the end of that time both mother and child are tired out. The baby is screaming with hunger and disappointment and rage; and by this time quite possibly the mother is crying too. Then, in her distress she gives him another bottle of condensed milk, and so it goes on. When the next feed is due baby again fights and screams, and refuses the breast, and once more the sweet condensed milk is given. Because the mother is worried and anxious, and also because her milk is not being used, it first decreases in quantity, and later dries up altogether, so that baby is soon fully weaned. He must then be brought up on a bottle, with all its risks and disadvantages. This happens because the mother does not know that the very small quantity of food which she has for her baby during the first two or three days of his life is amply sufficient for his needs at that time.

Result of the First Mistake.

Put him regularly to the breast during the day; give him drinks of cool boiled water between his feeds and he will require nothing more. So managed, when the mother's milk comes in, he will go willingly to the breast, and subsequent natural feeding is carried on without difficulty. It is not only condensed milk which can cause this trouble, though on account of sweetness it is probably the worst; other foods, e.g., dried milk or cows' milk sweetened with ordinary sugar, can have the same result. Whatever food is given to the baby and readily taken by him in his first days he becomes accustomed to, and demands in the only method at his command, i.e., by crying lustily. This crying is very disturbing to a mother, particularly one with her first child. It is her anxiety for his good which had led her to make this mistake, which can have such serious results. Later she says, "I had to wean baby; he would not take the breast," not realising that by her own actions she has been responsible for his weaning. So give baby, in his first two or three days of life, and for nine months after, what nature intended him to have—his mother's milk.

"Dummy" Condemned.

This is a most common practice. Many babies are given the dummy soon after birth; sometimes even during the first day. With regard to the dummy, I think the mothers cannot all plead ignorance. I think a great number of them know that baby should not have it, but I am sure that they do not realise fully the ill results that may follow its use. If they did, they would not give it to him. No mother who loves her baby wishes to do him harm, yet by giving him a dummy she is exposing him to serious risks.

Now, let us consider the baby who has a dummy given to him on his first day. It is put into his mouth, and because he is born with the sucking instinct strongly developed he enjoys sucking it. He is not very hungry during his first day or two, but in that time he gets used to the dummy teat, and the feel of it in his mouth. When it falls out of his mouth he misses it, and cries for it to be replaced. Then the mother's milk comes in; also, at this time, baby gets hungry. He is put to the breast, but, being accustomed to the shape and size of the dummy, he resents the change. So he screams, and refuses to suck, and the worried mother, after endeavouring in vain to make him feed, gives him a feeding bottle with artificial food. This, as before explained, is the first step towards the weaning of the child.

A Grave Risk of Infection.

But the use of the dummy is still continued. Sometimes the baby cries. He may be wet, or too hot, or otherwise uncomfortable, which causes him to cry in spite of the dummy being put in his mouth. Then, not infrequently, it is dipped in honey or condensed milk, or glycerine and borax, or malt extract, or some other sweet stuff before being replaced in his mouth. Of course baby likes the sweet stuff, and for the time being stops crying. But very quickly he learns that he can get the pleasant substance by crying for it, and this he does, more and more often. Such things, repeatedly given, can lead to severe digestive upset. Glycerine and borax frequently given in this way can act as a poison to the baby. At night the baby who is accustomed to a dummy goes to bed with it in his mouth. As he falls asleep his lips relax and the dummy falls out. Even when almost asleep he misses it, rouses, and cries until it is again put in his mouth. So it prevents his sleeping as well as he would do without it. The dummy is a grave risk of infection for the infant. If it is not pinned on his frock it frequently drops on the floor, where it picks up dirt, and then, after being casually wiped—sometimes on the mother's handkerchief—it is replaced in baby's mouth. Frequently it is pinned to baby's frock, where it is still very dangerous. Every summer we have an epidemic among babies, sometimes called gastro-enteritis, sometimes called summer diarrhœa. It is really dysentery, and is caused by disease germs, which are carried by flies. When the dummy falls out of baby's mouth and hangs pinned to his frock, flies are attracted by the warm moist surface. They alight on it and infect it, perhaps with the germs of dysentery. This infected dummy is put in baby's mouth and he may become very ill. Many babies die of summer diarrhœa every year. Breast-fed babies, unless they have dummies, seldom get the disease. Another reason why a dummy should not be used is because constant sucking of it is tiring to baby's jaws. Then, when he is put to the breast, and should suck strongly, he is too tired to do so, and as a consequence, he may not get the quantity of food he needs. In addition, there is the effect on the child's character. The baby who, throughout infancy, has been trained, whenever not sleeping or feeding, to demand a dummy to suck constantly will develop later into the spoilt child who demands his own way in other directions, and cries until he gets it. So giving baby a dummy is frequently one of the first steps in the spoiling of the child.

Evil Results Summarised.

It may make him refuse to take his mother's milk; this frequently leads to weaning, and all the risk, work, and expense attendant on the artificial feeding of an infant. It is well to remember here that the death rate among artificially-fed infants is much higher than among those who are breast-fed. Putting sweet things on the dummy may result in severe digestive upset. Because he wakes up when the dummy falls out of his mouth, it can cause broken nights for both mother and child.

It will certainly expose baby to grave risk of infection from flies. Dummy-sucking tires baby's jaws, and as a result he may not take all the food he requires for his growth and health. Indulging baby with a dummy means helping to spoil him. Mothers say that they give baby the dummy to keep him from crying. If baby cries unduly do not put a dummy in his mouth, look for the cause of the crying and try to remove it. A baby who has never had a dummy never cries for one. If baby cries for a dummy it means that he has been trained to expect it.

KITCHEN GARDEN.

Hoe continually among the crops to keep them clean, and have beds well dug and manured, as recommended last month, for transplanting the various vegetables now coming on. Thin out all crops which are overcrowded. Divide and plant out pot-herbs, giving a little water if required till established. Sow broad beans, peas, onions, radish, mustard and cress, and all vegetable seeds generally, except cucumbers, marrows, and pumpkins. In connection with these crops, growers are recommended to adopt some form of seed selection for the purpose of improving the quality of vegetables grown by them. Just at present, selections should be made from all members of the cucurbitaceæ (pumpkins, cucumbers, &c.). Tomatoes should also be selected for seed. Early celery should be earthed up in dry weather, taking care that no soil gets between the leaves. Transplant cauliflowers and cabbages, and keep on hand a supply of tobacco waste, preferably in the form of powder. A ring of this round the plants will effectually keep off slugs.

GROWING GOOD LETTUCE.

If you would have really good lettuce do not rely on one sowing only. It is better to sow a little seed every ten days or so than make one sowing only. Do not sow thickly. Try the plan of manuring a shallow trench, covering it with fine soil, and then dropping two or three seeds at given distances, say 4 inches apart. Little thinning will be required, and the plants will make uninterrupted growth. These will mature quicker once they get a start than transplanted plants.

RHEUMATISM.

What it Does.

Rheumatism in childhood causes heart disease in manhood.

Rheumatism in manhood causes—

Pains in the bones and aches in the joints;
Crippled limbs and shooting nerves;
Lumbago and sciatica.

Rheumatism is a strong man's burden. It is easy to find, but hard to lose.

Why it Comes.

Rheumatism rules where the body is unhealthy and is being poisoned.

The poison comes from germs living on—

Bad teeth;
Enlarged tonsils;
Unhealthy throats;
Discharging ears;
Festering sores.

From indigestion and constipation;
From cold, damp houses;
From damp, cold clothes;
From too heavy work and too little sleep;
From drinking too little water and too much alcohol.

What to Do to Avoid It.

Wear clothes, clean, dry, and airy.
Change clothes, wet with sweat, quickly after work.
Wear more clothes when facing cold air after being before hot furnaces.
Keep your feet dry.
Eat fresh food, well cooked.
Eat fresh fruit, vegetables, and eggs, and drink fresh milk.
Eat slowly and in comfort, not sitting on some cold stone.
Drink plenty of fluid; but avoid alcohol, or if taken, take at meals sparingly.
Take care of your teeth; toothache and rheumatism go together.
Look after your throats, especially the tonsils of children.
Have running ears properly treated.
A clear skin and a warm bath are great helps to a healthy body.
Avoid undue strain after forty years of age.
Take eight hours' rest every night.
Help your body to be healthy, and your body will help you to be happy.—
E. L. Collis, M.D., M.R.C.P.

THINNING GROWING CROPS.

The presence of superfluous plants in a row retards and weakens the growth of the entire row. Therefore, the advantages which follow early thinning should be sufficiently obvious to all. Crops such as beetroot, parsnip, and salsafy, the small roots have no culinary value, should have a first and final thinning as soon as the seedlings are through the soil, but when dealing with others, such as carrots, onions, turnips, &c., at all stages of their growth a different course should be followed. The first thinning of each of these should take place when the plants show the true leaf. At the same time give the rows a sprinkle of old soot or wood ashes to make the tops distasteful to birds. A fortnight later each alternative plant in the row may be drawn and, if during the interval, a few warm showers have fallen, many of the largest of the thinnings will have at least some value in the kitchen. Continue to draw away each alternative plant until those in the row in the long growing or intermediate section stand from 6 to 9 inches apart. Large turnips are rarely sought after by those who appreciate them during the summer: in fact anything above the size of an ordinary orange seldom finds favour. To secure these the first thinning out should take place soon after the seedlings appear. Allow 4 inches between the plants, which distance will provide space for all to develop into decent bulbs before they touch each other, when each alternative one may be pulled up. If not required at once these keep much better if again "laid in" where the soil is damp. The neglect of timely thinning out is more apparent with onions than with most vegetable crops. Instead of leaving the whole bed in an overcrowded state until the plants have reached a critical stage, why not thin all except the outside row when the plants are 3 to 4 inches high. After thinning the outside rows as suggested these onions may be drawn upon to continue the supply for salads when those in the beds have attained the size of walnuts. After thinning out either of the above-mentioned crops, it is very necessary that a little more than ordinary attention be paid to the beds, and should no rain promise, give the rows a watering through a fine-rosed can, which, in addition to settling the soil about the roots, keeps the plants in a fresh condition, and having received little or no check, they soon settle down to new growth. Twenty-four hours after watering give the soil between the rows a stir with the hoe, and just before the next storm use nitrate of soda, at the rate of one ounce to each square yard, keeping this from the foliage.

TO REPAIR A LARGE LEAKY GALVANISED IRON TANK.

Carefully clean out the inside of the tank by removing all grease, dirt, and corroded incrustations; but this must be done carefully or the holes will be enlarged.

Both inside and outside should be cemented, especially if the holes are numerous. It is not then necessary to stop the holes with any special stopping, as the cement compo when laid on will pass through the holes on to the outside and will form a much better key than if they had been stopped.

Commence with the inside, and after cleaning as above described, give the sheets a coating of cement-wash (pure cement and water), about the thickness of cream, starting at the top and working down about 3 feet at a time. Then, before this is quite dry, fill in all the corrugations with a compo consisting of one part cement to one-and-a-half parts of clean, sharp sand. Proceed in this way to the bottom, then, as soon as possible, begin again at the top and lay on a coat three-quarters of an inch thick of one cement and one and a-half sand, and finish off with a wood or steel float.

Cover the bottom of the tank with wire-netting about 1-inch mesh, and before finishing the sides turn up some strips of netting at intervals against the sides and cover them with cement. Then cover the whole of the bottom with three-quarters of an inch of compo as before, and work it well with a wood or steel float. Run a fillet about 1½ inch wide all round at the intersection of the side and bottom.

To make a thorough job of a tank of this size, the outside should then be treated in the same way. which will make the walls of the tank about 2¼ inches thick and very durable. Thirty-two bags of cement and about three yards of sand will be required to do both sides and bottom. Nineteen bags of cement and two yards of sand for inside and bottom only.

To line a 1,000-gallon tank as above, one side only, two casks or six bags will be required with half a load of sand.

Orchard Notes for April.

THE COASTAL DISTRICTS.

In the Orchard Notes for March the attention of citrus growers was called to the necessity of their taking the greatest possible care in the gathering, handling, sweating, grading, and packing of the coming crop of fruit, as the returns for the labour expended in the upkeep of their orchards will depend entirely on the condition in which the fruit reaches the market. Many growers fail to realise the very important fact that the success of fruitgrowing does not depend merely on the proper working and management of the orchard, so essential for the production of a good crop of high-class fruit, but that the manner in which the fruit is handled and placed on the market is of even greater importance. In no branch of fruit culture is this more evident than in the case of citrus fruits, as no fruit pays better for the extra care and attention necessary to enable it to be marketed in the best possible condition. Every season there is more or less loss in the consignments sent to the Southern markets, the percentage depending mainly on the weather conditions, the loss in a wet year being much heavier than that in a dry year.

A very large percentage of the loss is due to what is known in the trade as specking—viz., a rotting of the fruit caused by a mould fungus, and this loss can be prevented, provided necessary precautions are taken. Although this matter was dealt with last month, it is of such vital importance to our citrus growers that it is necessary to again refer to it.

In the first place, growers must clearly understand that specking cannot occur on perfect fruit, the skin of which is free from injury of any kind. The fungus causing specking can only obtain an entry into the fruit through an injury to the skin; it will thus be seen that the remedy for specking is to take every possible care not to injure the skin of the fruit in any way.

Few growers realise how easily the skin of citrus fruits is injured, especially that of fruit grown under moist and humid conditions, when the skin is full of moisture and so tender that the least sign of rough handling causes serious injury, as the cells of the skin are so brittle that they are easily broken, and when so broken a ready means of entry for the mould fungus is provided, and specking follows in due course.

The remedy for specking is in the hands of the grower, who must learn so to gather, handle, and transport the fruit from the orchard to the packing-shed that it does not receive the slightest injury, and further, that when it has reached the packing-shed it must be carefully placed in shallow bins or on trays and be exposed to the air for at least seven days, so that the surplus moisture in the skin may be removed, and the skin thus becomes toughened and less easily injured. This drying of the skin is known as "sweating," and during the time the fruit is being sweated it should be kept under observation, and all fruit showing signs of specking or injury from fruit flies, sucking or boring insects, mechanical injury or bruising, should be removed.

In order to prevent injuring the skin when gathering, all fruit must be cut and not pulled. Gloves should be used to handle the fruit, and when cut it should be placed in padded baskets or other suitable receptacles. Any fruit that falls or is injured in any way should be rejected, as it is not fit to send to a distant market. At the same time, if the injury is only slight, it can be sent to a local market for quick sale.

For Southern markets only perfect fruit should be selected, and further, it must be graded for size, colour, and quality, and properly packed, only one grade of fruit being packed in a case. The cost of cases, freight, and marketing is now so high that only the best fruit will pay to send to the Southern States, and even the best fruit must be properly graded and packed in order to produce the best returns.

All orchards, vineyards, and plantations not thoroughly clean should receive immediate attention, as from now till the next rainy season the ground must be kept in a thorough state of tilth and free from weeds in order, in the first place, to retain moisture in the soil, and, in the second, to enable birds, ants, and predaceous insects to get at and destroy the pupæ of fruit flies and other pests harbouring in the soil.

Banana and pineapple plantations must be put into good order, and kept free from weed growth.

Land to be planted with trees should be got ready, as, if possible, it is always advisable to allow newly cleared land time to sweeten before planting.

Strawberries can still be planted, and the earlier plantings must be kept well worked and free from all weeds in order to get a good crop of early fruit.

Scrub land intended for bananas can be felled now, as there will be little more growth, and it will have ample time to dry off properly in time for an early spring burn. Do not rush scrub falling, as it is work that pays for extra care. Lopping will improve prospects of a successful fire.

Keep a keen lookout for fruit flies, and on no account allow any fallen fruit of any kind to lie about on the ground unless you are looking for trouble with the ripening citrus fruit. Keep the fly in check, and there will not be any very serious losses; neglect it, and there will not be much fruit to market.

The advice given with respect to the handling and marketing of citrus fruit applies equally to custard apples, pineapples, bananas, and other fruits. In the case of bananas handled by the Committee of Direction of Fruit Marketing, grading is now compulsory, and it will undoubtedly tend to stabilise the market for this fruit.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Practically the whole of the fruit crop will have been gathered by the end of March, but several of the later-ripening varieties of apples grown in the Granite Belt may be kept for a considerable time, provided they are free from fly or other pests and are stored under proper conditions. Varieties such as Jonathan can be kept for some months at a temperature of 31 to 32 degrees, and later varieties, such as Granny Smith and Sturmer, can be kept till apples come again if stored at the same temperature. At the same time, although storing the fruit at this temperature under artificial conditions enables them to be kept for many months, the fruit can be kept for a considerable period, and marketed from time to time as desired, by storing it in a specially constructed apple-house in or adjacent to the orchard where grown.

Such a store can be cheaply constructed in the side of a hill out of the soil of the district and slabs of timber. The soil will make excellent pisé for walls, and the roof may be constructed of slabs covered with soil. Such a store can be kept at a very even temperature, and if the air is changed during cool nights—not frosty nights—the temperature can be reduced to a low point—low enough to keep the fruit in good condition for many weeks.

All orchards and vineyards not already cleaned up must be put in order, and all weeds destroyed. Keep the surface of the soil stirred so as to give birds and insects a chance to get at any fruit fly pupæ, as it is necessary to destroy this pest whenever there is a chance of doing so.

Land intended for planting during the coming season should be got ready in order to expose the soil to the cold of winter, thus rendering it sweeter and more friable.

If there is any slack time in the course of the month, go over all surface and cut-off drains and put them in good order. Also, if during periods of heavy rain, soft or boggy spots have made their appearance in the orchard, do what draining is necessary, as badly drained land is not profitable orchard land, and the sooner it is drained the better for the trees growing upon it. Soft or boggy spots are frequently caused by seepage of water from a higher level. In this case a cut-off drain will be all that is necessary, but where the bad drainage is due to hard pan or an impervious subsoil, then underground drains must be put in. After draining, the land should be limed. Liming can be done now and during the following three months, as autumn and winter are the best times to apply this material.

When the orchard soil is deficient in organic matter (humus) and nitrogen, try the effect of green-crop manuring, planting the grey or partridge pea and manuring the ground for this crop with a good dressing of finely ground island phosphate or basic phosphate.

Where citrus fruits are grown, they should now be ready for marketing. If the land needs it, it should be given an irrigation, but unless the trees are suffering from want of water it is better to stick to the use of the cultivator, as too much water injures the keeping and carrying qualities of the fruit.

The remarks on the handling and packing of citrus fruits in the coast districts apply to the inland districts also, but these districts have an advantage over the coast in that, owing to the drier atmosphere, the skin of the fruit is tougher and thinner, and in consequence the fruit carries better.

Farm Notes for April.

FIELD.—Those areas already lying in fallow for subsequent sowing with wheat should be kept in good tilth, using field implements that have a stirring effect in preference to those which tend to reverse the surface soil. The surface should never be allowed to cake; consequently all showers must be followed by cultivation, as soon as conditions will permit of teams and implements working freely.

Early fodder crops, such as barley (skinless or Cape) and certain varieties of wheat may be sown during April. Growers of winter fodders will be well advised to study the article dealing with dairy fodder plots which appeared in February, 1922, Journal.

Potatoes should now be showing good growth and must be kept free from all weed growths by means of the scuffler. If sufficiently advanced, and any doubt exists as to the prevalence of blight, advantage should be taken of fine weather to give a second spraying of "burgundy mixture," a calm and somewhat cloudy day being chosen if possible for the spraying.

Where land has been previously well prepared, lucerne sowing should be carried out this month, and intending growers of this fodder will be well advised to ascertain the germinating qualities of seed submitted to them for purchase. The difference between a good and bad "strike" is often traceable to the poor class of seed sown.

Maize and cotton crops should now be in the harvesting stage, and, once matured, are better in the barn than the open paddock, where weevils and other insects are usually prevalent at this season of the year.

Root crops sown last month should now be making fair growth, and during the early period of such should be kept free from weeds, and where necessary, thinned out. Sowings of mangels, swedes, field carrots, sugar-beet, and rape may still be made where conditions of moisture will permit.

As the sowing season is close at hand for certain varieties of wheat—i.e., those which require a fairly long period to develop in, every effort should be made to bring the seedbed into the best possible tilth and to free it from foreign growths of all kinds. The grading of all seed-wheat is strongly recommended, and growers who favour certain varieties should adopt a system of seed selection from prolific strains with a view to the raising of larger quantities of pure typical grain for ultimately sowing in their larger fields.

Pickling of wheat to prevent smut (bunt) is necessary. Germination tests should be carried out prior to commencing seeding operations.

Sorghums which have matured and are not immediately required as green fodder should, wherever possible, be conserved as ensilage to provide for a reserve, to tide over the period when grasses and herbage are dry. Succulent fodder of this description is the best possible form of insurance against drought, and for maintaining dairy and other stock in thrifty condition.

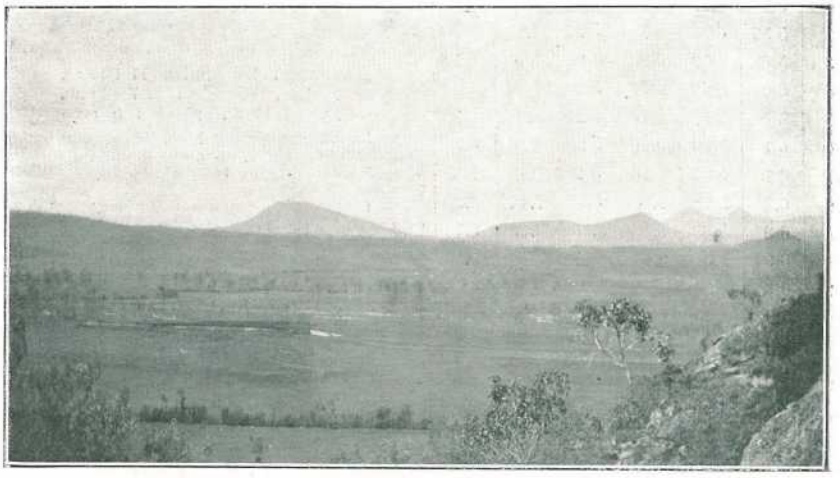

Photo.: Jean Easton.]

PLATE 84.

Looking down on the Coochin Country from Minto Crag.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	March, 1929.		April, 1929.		MOONRISE. Mar., 1929.	April, 1929.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					p.m.	p.m.
1	5.46	6.24	6.4	5.48	9.45	10.25
2	5.47	6.23	6.5	5.47	10.20	11.16
3	5.48	6.22	6.5	5.46	11.0	0.0 a.m.
4	5.48	6.21	6.6	5.45	11.46	12.11
5	5.49	6.20	6.7	5.43	0.0 a.m.	1.6
6	5.49	6.19	6.7	5.42	12.34	2.5
7	5.50	6.17	6.8	5.41	1.28	3.5
8	5.50	6.16	6.8	5.39	2.22	4.4
9	5.51	6.15	6.9	5.38	3.29	5.5
10	5.51	6.14	6.9	5.37	4.20	6.6
11	5.52	6.13	6.10	5.36	5.20	7.10
12	5.52	6.12	6.10	5.35	6.20	8.16
13	5.53	6.11	6.11	5.34	7.19	9.25
14	5.54	6.10	6.11	5.33	8.20	10.34
15	5.55	6.9	6.12	5.32	9.23	11.40 p.m.
16	5.55	6.7	6.12	5.30	10.29	12.40
17	5.56	6.6	6.13	5.29	11.38 p.m.	1.35
18	5.57	6.5	6.13	5.28	12.42	2.22
19	5.57	6.4	6.14	5.27	1.44	3.2
20	5.58	6.3	6.14	5.26	2.44	3.38
21	5.58	6.2	6.15	5.25	3.38	4.9
22	5.59	6.0	6.15	5.24	4.25	4.39
23	5.59	5.59	6.16	5.23	5.4	5.11
24	6.0	5.58	6.16	5.22	5.36	5.40
25	6.0	5.57	6.17	5.21	6.13	6.16
26	6.1	5.56	6.17	5.20	6.39	6.53
27	6.1	5.55	6.18	5.19	7.10	7.35
28	6.2	5.53	6.18	5.18	7.42	8.23
29	6.2	5.52	6.19	5.18	8.16	9.12
30	6 3	5.51	6.19	5.17	8.54	10.5
31	6.3	5.50			9.38	

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

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

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

Phases of the Moon, Occultations, &c.

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

3 Mar.	☽	Last Quarter	9 9 p.m.
11 ,,	●	New Moon	6 36 p.m.
18 ,,	☾	First Quarter	5 41 p.m.
25 ,,	○	Full Moon	5 46 p.m.

Apogee, 4th March, at 2·54 p.m.
Perigee, 18th March, at 12.24 a.m.

The planet Uranus will be passed about 9 p.m. on the 12th at a distance of about 5 diameters of the Moon.

As soon as twilight fades on the 14th Venus and the crescent Moon (at a distance of 8 degrees to the left), will afford an interesting spectacle as they draw near to the western horizon.

The Moon will pass Jupiter on the 15th at 8 a.m. and it will be noticeable in the early evening before they set that the Moon will be above the planet to the eastward.

Mars will be passed on the 19th about 3 a.m. when below the horizon.

On the 21st the Sun will reach the celestial equator on its way northward and may be said to rise and set exactly due east and due west, affording an excellent opportunity to mark these points.

On the 23rd the Moon will be passing Neptune about 1 o'clock in the morning. Neptune is still apparently near Regulus, one degree eastward, but requires a telescope and is of little interest for general observation. The other planet of small general interest, on account of its distance, Uranus, will be so much in a line with the Sun as to be entirely unobservable, especially on the 28th.

Venus will apparently reach its most eastern position amongst the stars of Aries on the 29th, after which it will seem to move backwards into the constellation Pisces until the 14th of May.

The Southern Cross will be coming into view, about 30 degrees east of south, at an early hour in the evening during this month; its position being nearly horizontal.

2 Apr.	☽	Last Quarter	5 29 p.m.
10 ,,	●	New Moon	6 32 a.m.
17 ,,	☾	First Quarter	12 9 a.m.
24 ,,	○	Full Moon	7 37 a.m.

Apogee, 1st April, at 11 12 a.m.
Perigee, 13th April, at 7 30 a.m.
Apogee, 29th April, at 5 0 a.m.

Conjunctions with the Moon of Mercury on the 9th, Venus on the 10th, and Jupiter on the 11th, will be invisible on account of their apparent proximity to the Sun.

On the 12th Neptune will be only 9 minutes of arc to the north of Regulus, the brightest star in Leo and uppermost in the handle of the Sickle. It will, therefore, be an interesting object for owners of small telescopes all through this month.