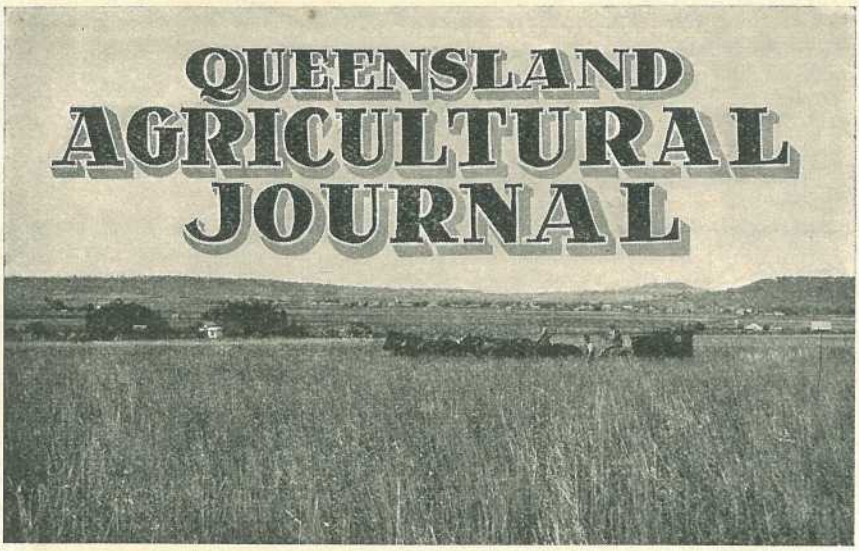
ANNUAL RATES OF SUBSCRIPTION.

Farmers, Graziers, Horticulturists, and Schools of Arts, **One Shilling.** Members of Agricultural Societies, **Five Shillings,** including postage. General Public, **Ten Shillings,** including postage.



VOL XLII. 1 OCTOBER, 1934. PART 4.

Event and Comment.

Fruit-Fly Control.

AS a consequence of resolutions passed by the mass meeting of fruit-growers at Stanthorpe on Wednesday, the 26th September, the Minister for Agriculture and Stock (Hon. Frank W. Bulcock), who attended the meeting, has announced that instructions have been issued to fruit inspectors in the Stanthorpe district to enforce rigidly the new regulations for the control of fruit fly during the coming season. The new measures will apply to the Stanthorpe, Warwick, and Killarney districts. Six additional inspectors will patrol these districts during the next five months, and action will be taken against those persons, including householders with fruit trees growing in their back yards, who neglect to carry out the requirements of the Department in respect of fruit fly control. For the information of householders, Mr. Bulcock added that the term "orchard" was defined by the Diseases in Plants Act as "any place where one or more fruit-producing plants are growing."

The new regulations provide—

(*a*) That fruit-fly traps charged with lure must be forthwith placed in every orchard in the districts concerned at the rate of one trap per acre, or part thereof.

(*b*) In the case of cherries and other early fruits, traps at the rate of ten per acre must be placed in the trees immediately.

(*c*) In the case of all fruits maturing before the 1st January, 1935, traps must be placed in position by the 15th November next at the rate of ten traps per acre.

(*d*) In the case of all fruits maturing before the 1st February, 1935, traps at the rate of ten per acre must be placed in position by the 15th December, 1934.

(*e*) In the case of fruits maturing after the 1st February, 1935, traps at the rate of ten per acre must be in position by the 1st January.

The traps must be cleaned out and charged with fresh lure twice per week.

It is to be hoped, added the Minister, that in this special effort to control fruit fly in our main deciduous fruit-growing areas, all persons who have fruit trees growing will co-operate with the Department in the carrying out, both in the spirit and letter, of these regulations.

A Story of Remarkable Development.

A STORY of remarkable development and prosperity in North Queensland was told by the Deputy Premier (Hon. P. Pease) on his return from a recent visit that took him as far as Cooktown. "From Mackay northwards there has been immense development in agriculture, and on all sides I saw unmistakable signs of progress and confidence," he said.

He had noticed that a transition period in the history of North Queensland was taking place. For many years the settlers north of Mackay had been loath to engage in anything but sugar farming. They naturally thought a cane crop that yielded from £40 to £50 an acre was more attractive than a yield of £10 an acre from a mixed farm. That reasoning had held good while the sugar industry was in its infancy, but the industry had now reached a stage when the growers produced more than Australia required, and they were obliged to sell the surplus overseas at a price much below the cost of production.

The North had been forced to turn to other avenues of agriculture in the enormous area that remained uncultivated, and this had led to quick development. From the Rise and Shine, O'Connell River, and Eungella lands, in the Mackay district, to the rich lands that lay in the hinterland of Cooktown, there were manifold signs of this more intensive cultivation. Not only was the land being tilled, but there was a ready home market for the produce that it yielded.

For instance, North Queensland for many years had been one of the most prolific fields for the vendors of powdered and condensed milk, which now had been almost wholly replaced by fresh milk from district dairies. Practically the whole of the milk consumed at Mount Isa now was sent under contract by an Ingham dairyman, who dispatched it in pasteurised form in bottles. The same dairyman had orders for three times as much milk as he could supply, and the demand came from places as far distant as New Guinea.

"What is doing more than anything else to settle North Queensland more closely is the provision of more main roads," said Mr. Pease. Despite the abnormally wet season in the North, a fine network of roads was being built to connect lands that were being thrown open to settlers, and when the planned roads were built Queensland would possess one of the longest and best road systems in the world. He could not help

noticing the effect of this improved means of communication in one particular instance—the growth of Mossman, where buildings were being erected, the population had increased, and people on the farm lands were finding an excellent market for their produce in Cairns.

The best proof of development in the North was that in every centre his party visited a deputation had asked for schools in areas where none existed previously. Places which a few years ago were covered by untrodden jungle were now neat, well-developed communities, and this was particularly true of the stretch of land from Townsville to Cooktown.

Although the tobacco industry was not in the most prosperous condition, it had great possibilities, and needed only reorganisation and some adequate form of protection. At the recent sales at Mareeba aromatic leaf brought upwards of 4s. per lb., indicating that a demand for it existed.

"The Government," added Mr. Pease, "was bent on making the most of Northern development. The greater part of the undeveloped Crown lands was situated in that quarter of the State, and offered wonderful scope for adding to Queensland's natural wealth."

Lure of the City.

COMMENTING on the lure of the city, the Public Service Commissioner, Mr. J. D. Story, I.S.O., said in the course of his annual report: "Clearly, it is not possible at present to absorb into vocations peculiar to the towns all those lads who desire employment in such vocations. The growth in the number of applicants who desire employment in clerical and allied positions, and particularly in the various State services, is disconcerting. One views with dread each year the results of the public examinations. Those examinations open the flood-gates and the applications pour in. Parliamentarians, as well as officials, are caught in the vortex. Ten State Service vacancies for male clerks were declared in connection with last Junior examination. There were 580 applicants, and 497 obtained 50 per cent. of marks or over. Ten vacancies were declared for clerk-typists; there were 222 entries, and 201 of the applicants obtained 50 per cent. of marks or over. Approximately 250 senior certificate holders are registered for employment, and there are, in all, not less than 2,000 applicants for employment in the section of the State Service under my jurisdiction. These facts demonstrate the great seriousness of the position.

"The concern is still further intensified by the disinclination of many boys to proceed to positions in the country and the reluctance of their parents to permit them to leave home. The allure of the city grows magically. Entertainers vie with entertainers in providing super attractions. The artificial pleasures of the town are not found in the country; and the routine life of the farm, with its round of chores and ups and downs, lacks the attraction of a great adventure. Cream is not associated with doubloons, nor milk with pieces of eight. Yet the merino fleece, if not the pig, helps to pay the Australian rent.

"The towns depend largely upon the country. If the country stagnates the stagnation will react upon the cities, and the cities will perforce be compelled in their own interests to find ways and means of balancing, in kind, conditions as between city and country. And, the city allure notwithstanding, there are many compensating advantages in the country."

Spraying Experiments for the Control of Fruit Fly in the Stanthorpe District.

By HUBERT JARVIS, Entomologist.

IT is generally recognised that repellents have not yet played an important part in the control of insect pests. This may in some measure be due to a very meagre knowledge of the senses of insects and to the assumption that an odour repellent to a human being would also be repellent to an insect, whereas the reverse might be the case. Furthermore, an odour hardly discernible to man might have considerable value as a repellent or an attractant to the insect community.

Recently serious study has been given by entomologists to this possible avenue of control, and some considerable measure of success has been achieved in South Africa by Dr. Ripley and Mr. Hepburn, who have tested some 350 compounds—essential oils and other substances—for attractant, obscurant, and repellent values in relation to the Natal fruit fly, *Ceratitis rosa* Ksh., which is a serious pest of citrus and other fruits in that country.

During the last few years some time has been devoted in the Stanthorpe district to the study of the possible value of various odours and sprays as a supplementary measure in controlling the Queensland fruit fly *Chætodacus tryoni* Frogg., and during the 1932-33 season it was noticed that the fruit on trees sprayed experimentally with a nicotine sulphate-white oil spray for the control of codling moth was free from fruit fly attack. This spray was accordingly tested as a possible fruit fly repellent during the season just concluded, and the information obtained in the course of the experiment is embodied in this report.

DETAILS OF THE EXPERIMENT.

The plot selected for the work was situated at Severnlea, and comprised two rows of Granny Smith apple trees, there being twenty-eight trees to the row, the sprayed trees being separated by an intermediate row in which the trees were mostly an earlier-maturing variety from which the fruit had already been harvested. The intermediate row was, therefore, not included in the experiment. Twelve trees were left untreated at one end of the plot and four at the other end, thus giving sixteen untreated trees, as controls, and forty sprayed trees. The majority of the trees were very vigorous and full of leafage, and carried a good crop of fruit.

The sprayed trees were given four treatments at approximately weekly intervals (Table I.) with the nicotine sulphate-white oil spray, which was used at a strength of half a pint of nicotine sulphate and half a gallon of white spraying oil to forty gallons of water.

TABLE I.

Time and Cost of Application of Sprays.

Date of Application.	Number of Trees Sprayed.	Materials Used and Strength.	Quantity Spray Fluid in Gallons.	Cost per Application.	Total Cost.	Cost per Tree.
				s. d.	£ s. d.	d.
7th February	40	Nicotine sulphate 1-640 with white oil 1-80	40	6 4½	1 5 6	7·65
12th ,,	40		40	6 4½		
19th ,,	40		40	6 4½		
28th ,,	40		40	6 4½		

The spray was applied with a power plant at a pressure of from 250 to 300 lb., each tree receiving about a gallon of spray fluid per application.

The weather throughout the experiment was favourable for fruit-fly activity, being warm and sultry. Although two of the sprays were applied during fairly hot weather conditions, no damage to the fruit or foliage was observed.

As the fly was active and had caused some loss to the Jonathan apple crop, it was decided to pick the main crop from the control trees, in order to avoid unnecessary loss, and at the time of the first application approximately six cases of fruit remained on the control trees.

Results Obtained.

A week after the first application a few fly-stung apples were found on the control trees, and by the second week over a hundred infested apples were counted. The sprayed trees were also frequently examined, but no fly-stung fruit was found on them until the time of picking the crop, when only thirty-seven fly-stung apples were found in 171 cases graded. The apples were stored in cases in the shed for three weeks, and a final count was made for fruit-fly infestation, the total number of fly-stung fruit from the sprayed trees being 154 apples (Table II.).

TABLE II.

Results of Fruit-Fly Spraying Experiment.

	Total Number of Apples.	Sound.	% Sound.	Unsound.	% Unsound.	Fruit fly-infested.
Treated Trees	17,100	16,946	99·1	154	0·9	154
Untreated Trees ..	607	146	24·1	461	75·9	461

Discussion of Results.

The results obtained indicate that nicotine sulphate and white oil was of definite value in this particular experiment in protecting the apples from fruit-fly attack, the fruit on the sprayed trees being practically 100 per cent. clean, whereas the fruit on the control trees was 75·9 per cent. fly-infested.

In the centre of the intermediate row separating the two experimental rows there were two trees—one Jonathan and one Granny Smith—which carried a considerable quantity of fruit during the course of the experiment, and which were, of course, unsprayed. The Jonathan tree, from which the main crop had been gathered, still carried eighty-one apples, of which number seventy-five were fly-stung—i.e., 92·6 per cent. The Granny Smith tree carried 126 apples, seventy of which were clean and fifty-six fly-stung—i.e., 44·4 per cent. were attacked.

It will thus be seen that the fly was active right in the middle of the plot, and it seems only reasonable to conclude that the spray used acted as a repellent to the fly, as the treated trees were loaded with fruit and only a few feet away from the untreated trees. This conclusion is, moreover, supported by minor experiments conducted with this spray in the Broadwater district.

It is necessary to remind readers that this is merely a preliminary experiment, and that it will obviously be desirable to carry out further trials next season—not only on apples, but also on other fruits—to test the efficiency of the spray and the degree of safety of application. Furthermore, it will be necessary to determine whether there are any cumulative ill-effects arising out of repeated applications of oil sprays on deciduous fruit trees.

ACKNOWLEDGMENTS.

Thanks are due to Mr. E. Cran, who made available the trees for the work, and whose co-operation throughout the experiment was of the greatest assistance. Thanks are also due to the Chief Entomologist, Mr. Robert Veitch, for making possible the work and for his valuable advice and assistance.

A FARMER'S APPRECIATION OF THE JOURNAL.

A Yarwun farmer writes (21st July, 1934):—"I wish to congratulate you most heartily on the excellence of your Journal, for I appreciate to the full the great value it is to the primary producer, almost every phase of farming, fruit culture, and stock-raising being dealt with in simple language, without a lot of unnecessary rigmarole scientific terms, which very often confuse the ordinary producer like myself. Your article in the current month's issue on bread-making in the farm kitchen was, in the wife's opinion, splendid, and despite her forty years' experience of bread-making she found out points that were to her previously unknown."

Parasites of the Horse.

By F. H. S. ROBERTS, M.Sc., Entomologist, Animal Health Station, Yeerongpilly.

EXTERNAL PARASITES.

THREE species of lice and three species of mites are known to infest the horse, the latter being concerned with mange conditions.

LICE.

Description and Life History.

Of the three species of lice usually found on horses, one species, *Haematopinus asini*, is a sucking louse, the two other species, *Trichodectes pilosus* and *Trichodectes equi*, being biting lice.

The sucking louse (Plate 195, A and B) is yellowish in colour with a brownish thorax and measures about one-eighth of an inch in length. The head is long and narrow, terminating in a blunt point. The eggs laid by the female louse are attached to the hairs and hatch in twelve to fourteen days. The young louse becomes mature and may lay eggs when eleven to twelve days old.

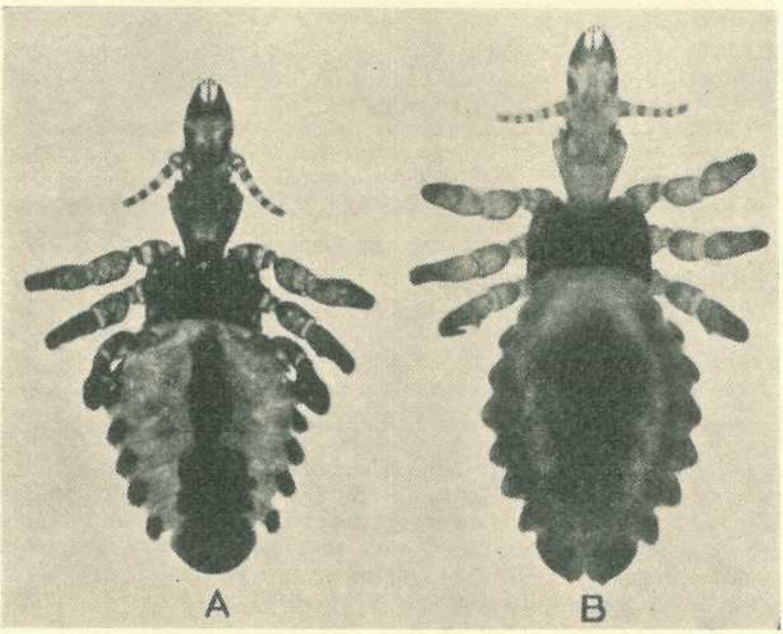


Plate 195.—Sucking Louse of the Horse (*Hæmatopinus asini*).
A—Male. B—Female.
(Magnified 25 times.)
(From Circular 148, United States Department of Agriculture.)

The two species of biting lice are very similar in appearance, the head being slightly longer than broad and semi-circular in front. *T. pilosus* (Plate 196, A and B) is larger than *T. equi*, with the antennæ placed well back from the anterior margin of the head, whereas in *T. equi* the antennæ are almost on a line with the anterior border.

The general colour of the abdomen in both species is yellow and that of the head, thorax, and legs brownish. The life histories are very similar, the eggs hatching in eight to ten days.

Horses infested with lice may manifest uneasiness and irritation and scratch, rub, and bite the affected portions of the body. Lice most usually occur on the back, flanks, jaws, and butt of the tail, but in heavy infestations the whole body may be involved.

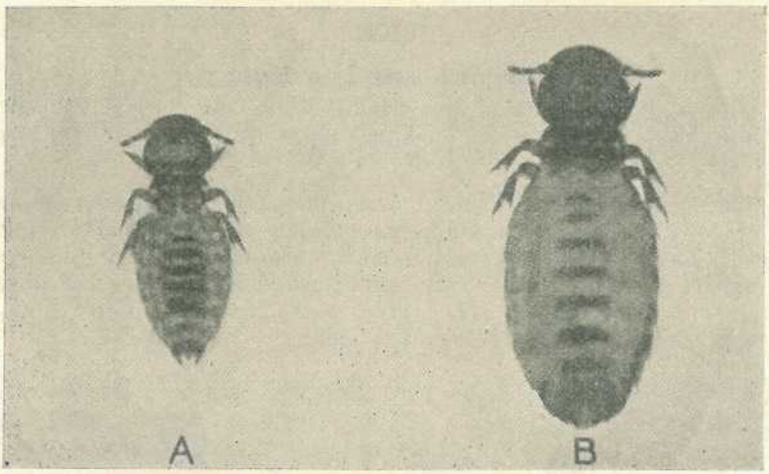


Plate 196.—Biting Louse of the Horse (*Trichodectes pilosus*).
A—Male. B—Female.
(Magnified 25 times.)
(From Circular 148, United States Department of Agriculture.)

Treatment and Control.

Good results follow dipping or spraying in an arsenic dip, two treatments with an interval of fourteen to sixteen days being required. If the infestation is of no great extent the dip solution may be applied as a wash.

Lice are spread mainly by contact. The sucking louse, however, may remain alive off the horse two to three days and the biting lice as long as ten days. Moreover, the eggs may retain their vitality for twenty days when removed from the horse and the young lice that hatch may live a further two to three days. Premises may, therefore, remain infected for twenty-five to thirty days after infested animals have been removed. The stables should, therefore, be thoroughly cleaned out and disinfected. Harness, blankets, curry combs, &c., used on infested horses should be similarly treated.

MANGE.

The three species of mange mites infesting the horse are each concerned with a mange condition which is designated from the generic name of the mite associated with it. Thus we have Sarcoptic, Psoroptic, and Chorioptic mange. Sarcoptic mange is unknown in Queensland and Psoroptic and Chorioptic mange are by no means common.

Sarcoptic Mange.

The mites which cause Sarcoptic mange are known as *Sarcoptes scabiei equi*. These parasites are very minute in size measuring no more

than one-fiftieth of an inch in length. They have a rounded body and four pairs of short thick legs and live in galleries under the skin.

Symptoms of Sarcoptic Mange.

The mites in burrowing under the skin cause great irritation and itching and the skin becomes inflamed and swollen. In time scales and crusts are formed over the affected area and the hair falls out. The animal's biting and scratching at the irritation causes the formation of large thick scabs with which is mingled blood and serum from the broken skin. Eventually the skin becomes thickened and thrown into conspicuous folds.

Usually the head, neck, and shoulders are first attacked, but occasionally the disease may commence on other parts of the body and if unchecked will ultimately affect the whole trunk.

Psoroptic Mange.

This condition is caused by a species of mite, *Psoroptes communis equi*. These mites live on the skin surface, puncturing it with their mouthparts to obtain blood and serum on which they live.

Symptoms of Psoroptic Mange.

Psoroptic mange usually appears first on the head under the forelock, round the roots of the mane and on the rump. The itching and irritation caused by the mites produces inflammation and the formation of papules. Serum exudes from the affected skin and large yellowish crusts are formed. As the disease advances the whole body may become affected and the skin is thickened, toughened and thrown into folds.

Chorioptic Mange.

This disease which is caused by the mite, *Chorioptes equi,* is usually confined to the foot and fetlock. The mite lives on the skin surface and produces a condition somewhat similar to that described for Psoroptic mange. The irritation resulting from infestation causes the horse to stamp and kick, and bite and rub the affected parts.

Treatment and Control of Mange.

For ordinary infestations successful treatments are available and of these dipping, spraying, or washing the affected areas with lime sulphur will be found satisfactory. For sarcoptic mange, treatment should be repeated every five to seven days until a cure is effected. For psoroptic and chorioptic mange the intervals between treatments should be increased to ten days.

To make an efficient lime sulphur solution take 1 lb. of slaked lime and 1½ lb. flowers of sulphur. Add sufficient water to the lime to make a thin paste, then sift in the sulphur stirring and, if necessary, adding water till a mixture of the consistency of mortar is secured. Pour into this mixture about 2 gallons of boiling water and boil until the sulphur disappears from the surface, keeping the mixture well stirred. When the mixture becomes a dark amber or chocolate in colour (about two to three hours) the boiling should be discontinued and the contents allowed to stand till clear. Pour off the clear liquid to which is added sufficient warm water to make 6 gallons. Before using, 7 parts of warm water should be added to every 3 of the prepared concentrate.

Hand applications of crude oil are also recommended as a treatment for mange. Horses so treated should be kept in the shade, as otherwise the oily dressing may blister the skin.

As mange is spread chiefly by contact all affected horses should be isolated till cured. There is also a risk that animals may pick up an infection from stables, &c., in which infested horses have been stalled. Such stables and any harness, curry combs, blankets, &c., should therefore be thoroughly cleansed and disinfected.

INTERNAL PARASITES.

Very few, if any, horses are entirely free from internal parasites, which, with the exception of the bots, are all helminths or worms.

Internal parasites are particularly damaging to young animals, attacking them at a period when they should be making their best growth and rendering them stunted and unthrifty. Among older animals parasite presence is shown by bigger feed bills and the inability of the infested animals to carry out their normal day's work. Stunted growth, emaciation, rough coat, anæmia, swollen abdomen, and sometimes colic and diarrhœa may be associated with an infestation and not infrequently death may follow.

The more important of these parasites are found in the alimentary canal and fortunately most of them are amenable to treatment. Their eggs are present in the manure so sanitation and proper disposal of this infected material is of the utmost importance for parasite control.

BOTFLIES AND BOTS.

There are three species of botflies known to attack the horse, the common botfly, *Gastrophilus intestinalis,* the throat botfly, *Gastrophilus nasalis,* and the nose botfly, *Gastrophilus haemorrhoidalis.*

A B C

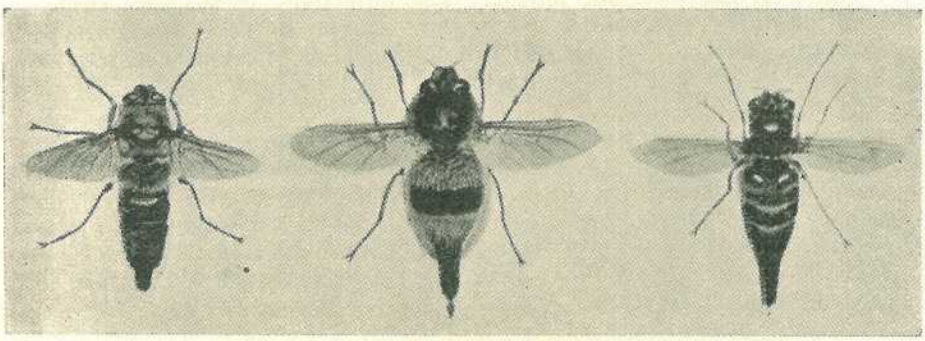


Plate 197.—Adult Botflies.

A—The Common Botfly. B—The Throat Botfly. C—The Nose Botfly.
(After Hadwen and Cameron.)

The adults are all two-winged insects, bee-like in appearance, each species differing somewhat in colour markings, size, and habits. The common botfly (Plate 197 (C)) is a brownish-grey species with mottled wings and a white face. The female deposits her eggs on the hairs of the mane, chest, shoulders, and legs, most usually on the long hairs of the forelegs, inside and below the knee. During egg-laying the female hovers around the animal, curving the abdomen beneath the

body in order to facilitate the deposition of the eggs, each of which is laid and fastened to the hair in about a second. The position of the abdomen at the time of egg-laying has given the impression that the fly stings the horse, but this is erroneous.

The throat botfly (Plate 197 (B)) is somewhat smaller than the common botfly and has a reddish thorax and a prominent black band across the abdomen. The wings are clear. The eggs are deposited by the female on the hairs under the jaws. The female fly is usually seen hovering near or between the forelegs of the horse and then quickly darting at the throat to lay her eggs. One to four eggs may be laid at the one time, each attached singly to the hairs. The presence of this fly causes the animal to nod its head violently and sometimes to strike with the forelegs.

The nose botfly (Plate 197 (A)) is the smallest of the species under discussion, and chooses the hairs of the lips for egg-laying, particularly those hairs on the edge of the lip which are moistened by the saliva. The flight of the fly is very rapid, the insect darting at the lips to deposit a single egg and then withdrawing for a few seconds to repeat the process.

Of these three species, the throat botfly is most frequently seen in Queensland. The common botfly is not uncommon but the nose botfly is regarded as being rare, if present at all.

As the mouth parts of the adult flies are rudimentary they cannot feed and are therefore comparatively short-lived. The common botfly has been known to live as long as twenty-one days, but the average life is not thought to extend much beyond a week. The two other species live only about three to twelve days, the throat botfly surviving the longer period.

LIFE HISTORY NOTES.

The Egg.

The eggs of these three botflies are glued to the hairs of the horse and differ considerably in shape, colour, and manner of attachment. The egg of the common botfly is yellowish in colour and is attached to the hair for about one-third of its length, the free portion of the egg forming an angle with the hair. Frequently more than one egg may be attached to a single hair, especially if the hair is long. The eggs do not hatch until they are rubbed or licked by the horse. The minute, spiny maggots are ready to hatch in about seven days, though they may remain unhatched and alive for months.

The eggs of the throat botfly are slightly different in shape to those of the common botfly and are fastened to the hair for about two-thirds of their length. These eggs do not require friction to cause hatching, which takes place normally.

The eggs of the nose botfly are black and stalked, the stalk being corkscrew-like and continued to the follicle from which the hair arises. Here, again, hatching does not require friction; the eggs nearest the moist edges of the lips hatch first, usually in five to six days, while those an inch away may take as long as eighteen days, and those some distance from the lips may not hatch at all.

The Larva or "Bot."

On hatching, the larvae of all species enter the mouth. In the case of the common botfly, of which the life history is best known, the larvae

then bore their way beneath the lining of the mouth and tongue, where they remain for some time. Eventually the larvæ of all three species make their way to the stomach.

Once in the stomach, the larvae attach themselves to the wall by means of a pair of strong mouth hooks (Plate 197). The common bots are reddish in colour and are found attached to the white covering of the left sac and along the ridge between the right and left sacs. The larvae of the throat botfly occur most usually near the pyloric or

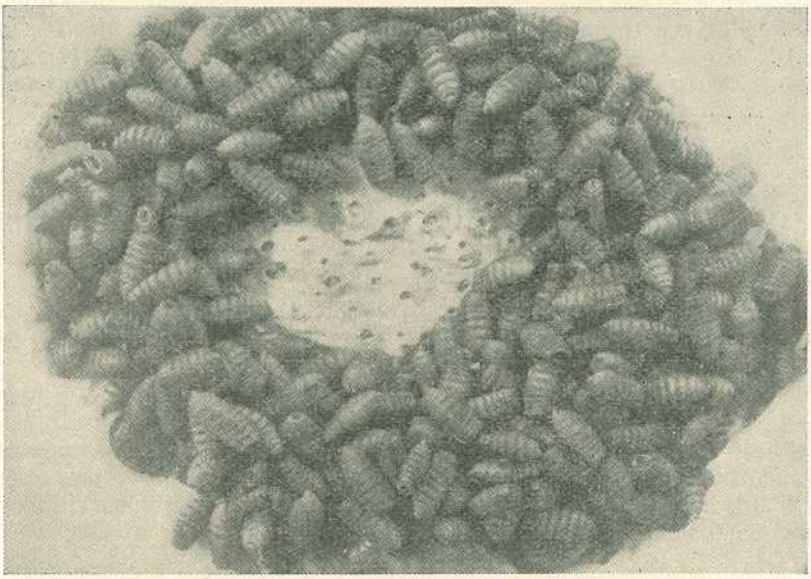


Plate 198.—"Bots" attached to the Stomach Wall, showing Lesions in the Centre.
(From Bulletin 957, United States Department of Agriculture.)

exit end of the stomach, and in that portion of the intestine leading out of it. Those of the nose botfly may occur attached to various parts of the stomach, but are more usually located near the pyloric end. The larvae or "bots" are all provided with rows of spines on the anterior border of the majority of the segments, the number and arrangement of the spines differing in each species. After living in the stomach for about eight to twelve months the larvae are fully grown and are passed out with the dung. Those of the common botfly and throat botfly pass out without any reattachment; but in the case of the nose botfly the larvæ fasten themselves to the rectum and again to the anus before they finally reach the ground.

The Pupa.

As soon as they reach the ground the larvæ at once commence to seek some protection. However, they do not crawl very far, and burrow into the soil only a short distance. In one to four days the outer skin hardens and forms a protective coat, known as the puparium, inside which the transformation from the larva or "bot" to the adult fly takes place. The puparium is brown to black in colour, but is otherwise similar to the bot. At the end of about three to ten weeks the transformation is complete, and the adult fly emerges.

Injuries Caused by Botflies.

Possibly the greatest damage among horses through botfly presence is self-inflicted. Extreme annoyance and worry is caused during egg-laying by the females, as the horse recognises its enemy and makes desperate efforts to protect itself. The common botfly appears the least irritating of the three species, probably because of the varied situations in which its eggs are deposited. Even so its presence keeps the animals in a continuous state of annoyance and prevents them from resting. The throat botfly causes the animal to throw its head about violently, and makes it difficult to manage in harness. The nose botfly appears to be the most annoying species, for the insect, in depositing its eggs on the hairs of the lips, causes a severely irritating tickling. The actions of horses while the insects are about are very characteristic. The throat botfly causes them to stand together with their heads over each other's back, and if the nose fly is about they protect their lips by placing them against each other's body. Should the insects be numerous, and the protections abovementioned be inadequate, the animals keep up a continuous movement, occasionally breaking into a gallop, in attempts to prevent the insects alighting and laying eggs.

It is commonly considered that the bots in the stomach are of little importance. It should be remembered, however, that the larvæ are developing for eight to twelve months in the horse's stomach, and during this period considerable harm may be done. The spiny armature and the large mouth hooks cause inflammation of those parts with which they may come into contact, which results in an interference with digestion. Very commonly many hundreds of bots may bring about obstructions and seriously interfere with the passage of food. The nature of the food taken in by bots is not known, but they certainly live at the expense of the horse, and the pinkish hue of some of the larvæ indicates that they may be blood suckers. It has also been shown that their body fluid is decidedly toxic, and if a small quantity of this fluid is injected beneath the skin alarming symptoms may result.

Protection and Treatment.

Various devices have been recommended for the protection of the horse against botfly attack. For the throat botfly a piece of ordinary

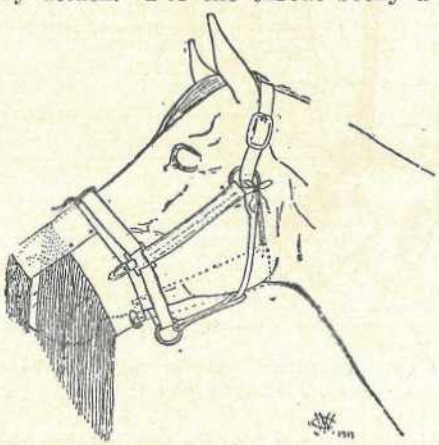


Plate 199.—Leather Nose-fringe as Protection against the Nose Botfly (after Hadwen and Cameron).

canvas attached to the nose band and tied to the headstall will completely cover the region between the jaws. As protection against the nose botfly the Canadian authorities recommend a leather band cut into thin strips and encircling the nose (Plate 199). In the United States excellent results have followed the use of a mouth guard constructed from ½-inch hardwood boards. For protection against the throat and nose flies it is recommended that the throat be covered by a piece of canvas which is attached in front to the wooden mouth protector (Plate 200). Furthermore, this combination device is said to prevent the animal from taking into the mouth the larvæ of the common botfly while attempting to bite or scratch itself. The hardwood guard completely protects the lips when the head is up, and the block beneath causes the guard to fall back when the head is lowered, and does not interfere in any way with the animal's grazing.

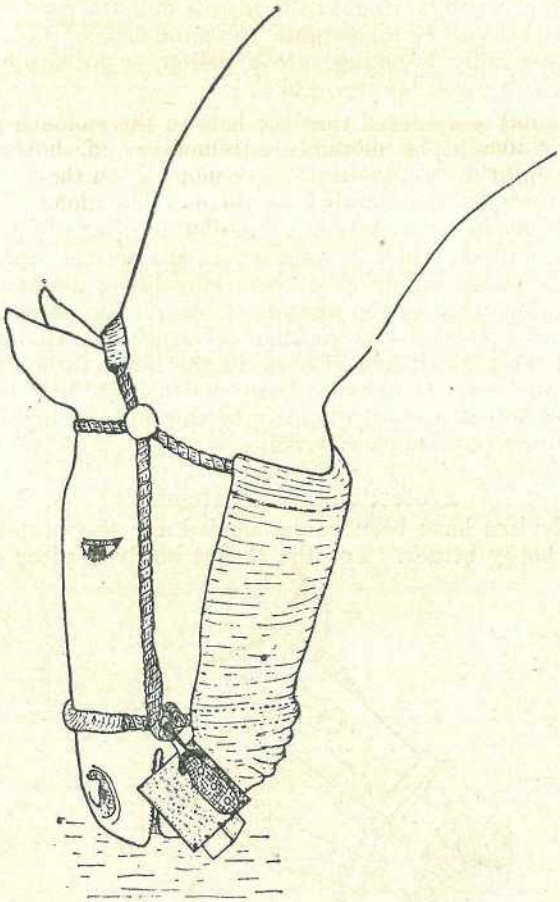


PLATE 200.—DEVICE FOR PROTECTION AGAINST THE THROAT AND NOSE BOTFLIES (after Bishopp and Dove).

Another effective protector for use against the nose botfly when the horse is in harness consists of a piece of leather 4 to 6 inches wide attached at each side to the bit ring so that the entire lips are covered.

As the eggs of the common bot are not confined to any particular region of the horse, it is difficult to recommend any good means of protection. The mouth guard mentioned (Plate 200) will be found beneficial. In other parts of the world the provision of deep sheds or brush shelters is said to give some protection, for when the flies are bad the animals may retire into the sheds, into the shady interior of which the flies will not venture.

Frequent grooming and clipping of the hairs of the areas on which eggs are laid will aid in control, and a 2 per cent. carbolic wash applied with a rag will kill the majority of the eggs.

For the removal of the bots carbon bisulphide will be found very efficient. The animal should be fasted for eighteen to twenty-four hours before treatment, and the drug is given in a capsule, the dose rate being 6 cubic centimetres for every 250 lb. weight, horses of 1,000 lb. weight or more therefore requiring a dose of 24 cubic centimetres. The capsule may be administered either by hand or with a balling gum. No food or water should be given for three hours after treatment. No purgative is required either with or following the drug. If there is any question as to the animal's ability to tolerate this dose, divided doses may be given and treatment suspended if ill-effect follows the administration of a partial treatment. Great care should be taken in the administration of the capsule, for if it should break and the drug enter the lungs fatal results may follow.

It is also advisable to wash the animal thoroughly with the 2 per cent. carbolic solution before treatment to destroy any eggs, otherwise the young bots hatching from the eggs will be taken in and reinfest the stomach.

TAPEWORMS (Anoplocephala spp.).

Three species of tapeworms are known to infest the horse, the largest and smallest of which, *Anoplocephala magna* (Plate 201) and *Anoplocephala mammillana* respectively, are found in the small intestine. The third species, *Anoplocephala perfoliata,* occurs in the large intestine, particularly in the blind gut or cæcum.

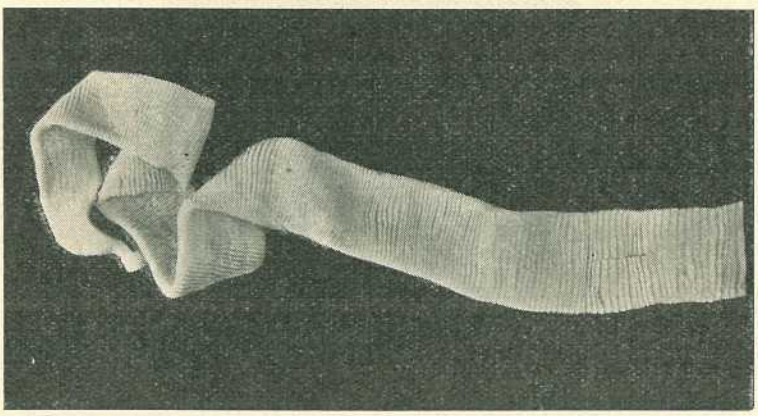


Plate 201.—The Large Tapeworm of the Horse (*Anoplocephala magna*). (Natural size.)

Unless present in large numbers tapeworms do not appear to cause any serious ill-effects, but a heavy infestation might cause emaciation

and anæmia. *A. perfoliata* is the most harmful species, and produces ulcer-like lesions on the intestine wall. Their life histories are unknown.

Tapeworm infestation may be readily diagnosed by examining the fæces in which segments of the worms may be found. Blood-stained fæces is often indicative of the presence of *A. perfoliata.*

Treatment and Control.

Turpentine is said to be satisfactory if given in a dose of 2 fluid ounces in capsules after thirty-six hours starvation, followed every second day by 1 ounce in capsule until five or six doses have been given. The last dose should be preceded or followed by 1½ pints of raw linseed oil. This treatment is for a 1,000-lb. horse, and the dosages should be reduced accordingly for lighter and younger animals.

Tartar emetic is also considered effective in two doses of 3 drachms each at an interval of twelve hours. The drug should be mixed with a gruel of linseed meal.

As the life histories of the horse tapeworms are unknown, general control measures only can be recommended, and of these sanitation is the most important.

THE LARGE STOMACH WORMS (Habronema spp.).

Three species of large stomach worms, *Habronema spp.*, occur in the stomach—namely, *H. megastoma, H. muscæ,* and *H. microstoma.* Both *H. muscæ* and *H. microstoma* may grow up to an inch in length, and occur free or attached to the stomach wall. *H. megastoma,* on the other hand, rarely exceeds half an inch in length, and is found in nodules of varying sizes in the stomach wall itself.

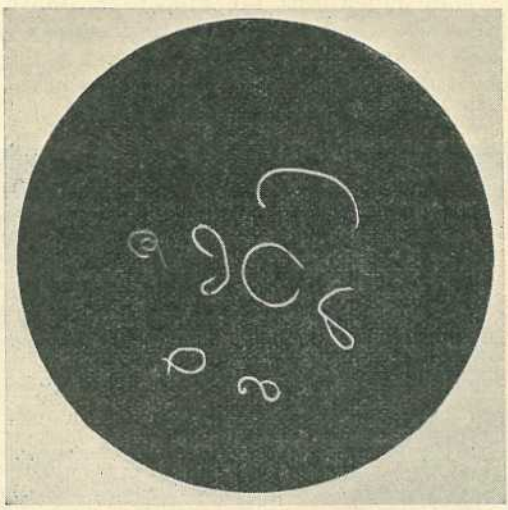


Plate 202.—Large Stomach Worm (*Habronema* spp.).
(Natural size.)

Life History.

The eggs laid by the female worms eventually reach the exterior in the dung. They must then be swallowed by the maggots of certain

species of flies which breed in horse dung. The larvæ which are developing in those maggots are still present in the adult flies when they emerge. In the adult fly they congregate in the region of the proboscis, and when the fly is attracted to the horse's mouth by the moisture there they break out of the proboscis and, reaching the mouth, are swallowed. They eventually reach the stomach, where they settle down and grow to the adult stage. Infection may also occur when live or dead flies are swallowed.

The house fly, *Musca domestica,* is of great importance around stables as the intermediate host of *H. muscæ* and *H. megastoma,* whilst in the bush its place is taken chiefly by the bush fly, *M. vetustissima,* which closely resembles the house fly in general appearance.

The stable fly, *Stomoxys calcitrans,* forms the intermediary of infection for *H. microstoma,* the larvæ in its proboscis, rather peculiarly, preventing the fly from using the proboscis as a piercing organ and compelling it to take its food by suction only. The insect is therefore no longer able to obtain blood, and to exist must attempt to live on the moisture round the horse's mouth and eyes, &c.

Effect on the Horse.

Habronemiasis, which is the name given to the disease condition caused by infestation with these three species of worms, is a very important disease in Australia, as it is considered that a large percentage of debility cases among horses is due to this cause.

Habronema muscæ and *Habronema microstoma* irritate the stomach lining, and may cause serious digestive disturbances. *H. megastoma* is the most harmful of the three species, for it burrows into the stomach wall, destroys the gastric glands, and causes the formation of fibrous nodules. Occasionally these nodules may be so numerous and so large as to interfere very seriously with the passage of food.

These roundworms may also be concerned with certain types of skin growths. These are caused by the larvæ breaking out from the proboscis of the fly when it is feeding on sores or moist places, such as the eye, and burrowing into the skin and tissues. In Australia growths in the eye and on the penis have been shown to be caused by these larvæ, and swamp cancer may also be an associated condition. In other countries "summer sores" are a direct result of larval infestation of the skin.

Treatment and Control.

Owing to its location in nodules in the stomach there is no effective treatment known for *H. megastoma.* The removal of *H. muscæ* and *H. microstoma* may be effected if the horse is previously starved for eighteen to twenty-four hours, and the stomach washed out with 8 to 10 quarts of 2 per cent. sodium bicarbonate. This should then be siphoned off. When syphoning is not carried out fifteen to twenty minutes should be allowed to elapse. Carbon bisulphide is then given at the rate of 6 cubic centimetres for every 250 lb. weight with a maximum dose of 24 cubic centimetres. No food or water should be given for another four hours.

Control is only possible so long as the manure is regularly collected and so disposed that the intermediate fly hosts are unable to breed in it. Spraying and trapping flies among stabled horses is also desirable.

General measures for a high standard of sanitation must not be overlooked. Efficient methods of manure disposal will be discussed in detail later.

Where horses are running on large pastures it is difficult to suggest any control methods that are practicable, but for obviously affected animals periodical treatment is advised.

THE SMALL STOMACH WORM (Trichostrongylus axei).

This is a small slender species, no more than about one-fifth of an inch in length, which occurs in the lining of the stomach. It has only recently been recorded from the horse in Australia, and its importance in this country is unknown.

In other countries where this parasite is present it is said to injure the stomach wall, causing lesions somewhat like ringworm in appearance. The life history is not definitely known, but is direct—that is, no intermediate host is required.

The treatment recommended for the large stomach worms is also advised for this species.

THE LARGE ROUNDWORM (Ascaris equorum).

These are very conspicuous worms, yellowish white in colour, and attaining about 12 inches in length. At the anterior end is the head bearing three distinct lips and marked off from the rest of the body by a constriction. The large round worm occurs in the first portion of the small intestine, and frequently in very large numbers, especially in young horses.

Life History.

The eggs laid by the female worms reach the exterior in the dung. Under favourable conditions of temperature and moisture a tiny embyro appears inside the egg in about fourteen days, and in this stage the egg is ready to infect other horses. When swallowed by the horse the egg hatches in the intestine, and the tiny larva that is set free immediately bores into the intestine wall, reaches the blood vessels, and is carried to the liver. From the liver it is eventually taken to the lungs in the blood stream. After a certain period of development in the lungs the larva then migrates into the trachea or windpipe, crawls up into the mouth, is swallowed, and reaches the small intestine again, where it may settle down and grow to the adult stage.

Effect on the Horse.

The large roundworm is especially harmful to young horses, and heavy infestations result in an unthrifty and stunted condition. The migrating larvæ damage the liver and lung tissue, and may cause fever and lung disorders. The adult worms, when in numbers, produce serious digestive troubles, and sometimes the worms, in bunching together, hinder the free passage of food, and symptoms of colic may be evident. The toxins or poisonous substances produced by both larvæ and adults may also be a cause of illness. Frequently infestation may be diagnosed by watching the dung in which the very conspicuous adult worms may be passed.

Treatment and Control.

Carbon bisulphide as recommended for bots is also a highly efficient drug for the removal of the large roundworm.

Turpentine may also be used, but is not so effective. The animal to be treated is starved for eighteen to twenty-four hours. For an animal weighing 1,000 lb., 2 ounces of turpentine are administered, followed by an aloes ball or 1½ to 2 pints of raw linseed oil. Both the turpentine and linseed oil should be as pure as possible.

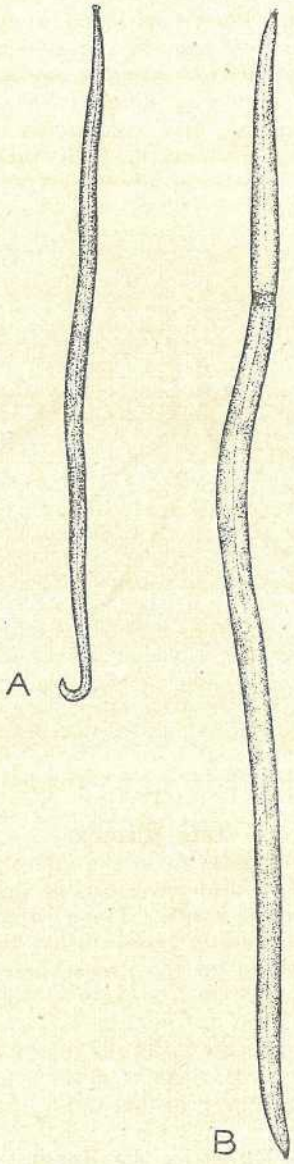


Plate 203.—The Large Roundworm (*Ascaris equorum*).
A—Male. B—Female.
(About half natural size.)

Control is possible only with strict sanitation. Treatment will remove the adults from the intestine, but has no effect upon the larvæ in the liver and lungs. The egg stage, moreover, is highly resistant to adverse conditions, and can exist for long periods in suitable places.

Removal of manure, drainage, &c., are necessary factors for the control of this parasite. Special paddocks should be reserved for the mother and foal, either new land or such as has not been used by horses for at least a year.

PALISADE WORMS (Strongylus spp.).

These worms are also known as blood worms or red worms, owing to their red colour, which is due to ingested blood. There are three species present in the horse—*Strongylus equinus*, which is the largest and may grow up to 2 inches in length; *Strongylus edentatus*, which attains a length of 1½ inches; and *Strongylus vulgaris*, which is rarely more than about 1 inch in length. All these species occur firmly attached to the walls of the large bowel and blind gut.

Plate 204.—Palisade Worms (*Strongylus* spp.). (Natural size.)

Life History.

The eggs reaching the exterior in the manure hatch in a day or two. The tiny larva that emerges undergoes certain development, and in about a week reaches the infective stage. These infective larvæ are enclosed in a sheath which assists them to resist unfavourable conditions for long periods. They then migrate up the grass blades and are swallowed by the horse when grazing. Their life cycle in the horse is not definitely known, but it is considered to involve a movement through various organs, the liver and lungs especially, as in the case of the larvæ of the large round worm. They eventually return to the large gut, attach themselves to its wall, and grow to maturity.

Effect on the Horse.

Palisade worms injure the gut wall and live on blood. During their life cycle in the horse extensive damage to the liver and other organs, into which the larvæ may wander, may occur. Heavy infestations cause anaemia, diarrhœa, weakness, and emaciation. They have a big effect on working horses, so lowering their vitality that the horses do less and less work as the disease occasioned by the infestation advances.

Strongylus vulgaris is especially dangerous, as its larvæ invade the walls of certain arteries, especially those supplying the large bowel with blood. As a result of this invasion the walls of the artery thicken, harden, and enlarge, to form a conspicuous dilation known as an aneurism. This interferes with the circulation of blood, and as a result the large intestine does not receive an adequate supply. Sometimes complete blockages occur in these arteries. Anæmia, emaciation, and colicy conditions may arise. Occasionally portions of the aneurism may be carried into blood vessels in other parts of the body. The vessel becomes blocked by this material, and sometimes serious and fatal hæmorrhages may occur. If any of the main vessels supplying the limbs become plugged lameness may result.

Treatment and Control.

Oil of chenopodium is considered to be a highly satisfactory drug for the removal of palisade worms. This drug is given after thirty-six hours' starvation, preceded or accompanied by raw linseed oil or an aloes ball. The dose for animals two years and older is 4 to 5 fluid drachms of chenopodium with 1½ to 2 pints of raw linseed oil. Young horses six months old and over should be given 1 drachm of the drug.

For pregnant mares carbontetrachloride in doses of 6 to 12 fluid drachms is advised.

Stable sanitation is necessary for the control of the palisade worms. Low-lying paddocks of a marshy nature should be avoided as horse pastures.

SMALL STRONGYLES.

The large bowel and blind gut are also infested by small whitish and reddish worms measuring usually about ½ inch to 1 inch in length, and sometimes occurring in enormous numbers. Some of these produce

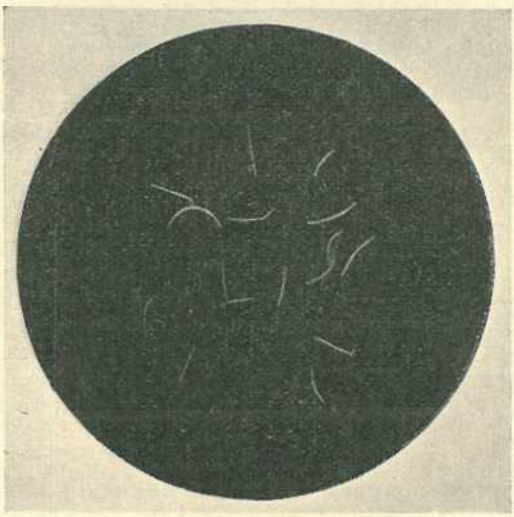


Plate 205.—Small Strongyles. (Natural size.)

nodules in the gut wall, in which they spend the early portion of their parasitic life. The horse becomes infested when it swallows infective larvæ which are present in the soil and on the grass.

The small Strongyles contribute to the effects of gross parasitism, and assist in causing diarrhœa, weakness, anæmia, and emaciation.

Treatment and control is on the same general lines as that advised for palisade worms.

PIN WORMS (Oxyuris equi).

The female pin worm is whitish with a long pointed tail, measuring from 2 to about 6 inches in length. The male is smaller, and is seldom seen. This species infests the large bowel.

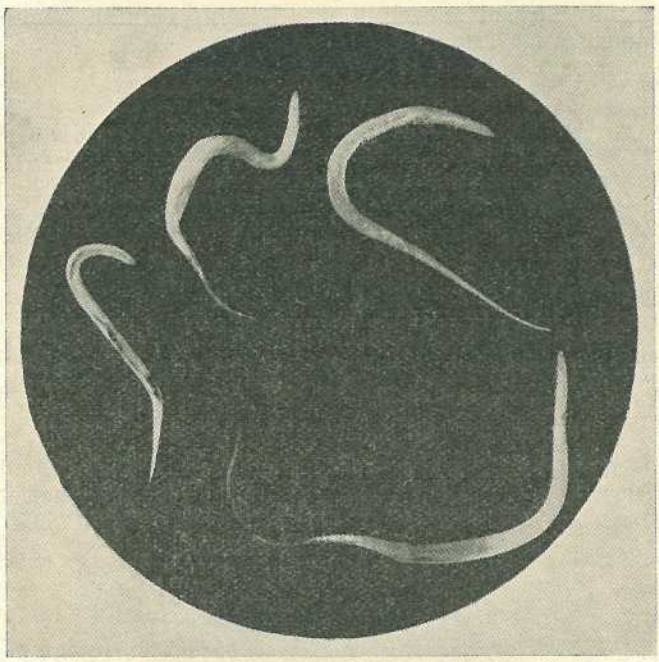


Plate 206.—The Pin Worm of the Horse (*Oxyuris equi*). (Natural size.)
(From Circular 401, University of Illinois.)

Life History.

Instead of laying eggs which may reach the exterior in the manure, the gravid female worm itself passes out in the manure, and then deposits eggs. Sometimes these females adhere around the anus, depositing their eggs in this situation, the masses of eggs having the appearance of yellow crusts. The eggs eventually become infective, and when swallowed by the horse hatch to give rise to tiny larvæ. These larvæ make their way to the large bowel, where they grow to maturity.

Effect on the Horse.

Pin worm infestation may be responsible for digestive disturbances. The clustering of the female worms around the anus causes severe irritation, which the horse attempts to relieve by rubbing or scratching.

Treatment and Control.

Turpentine or oil of chenopodium as advised for the large roundworm and palisade worms respectively is said to be satisfactory for the

removal of pin worms. A high standard of sanitation is necessary if infestations are to be controlled.

GENERAL CONTROL MEASURES.

Manure Disposal.

(*a*) The regular collection and proper disposal of all manure is an extremely important measure for the control of the worm parasites of horses.

All manure should be collected daily. It may be used for fertilizing purposes only on pastures to which horses are not admitted. In such cases it should be well scattered over the ground. This enables it to dry out quickly, and renders it unsuitable for breeding purposes by the house fly and other species.

Otherwise the manure should be stored in compact heaps, well beaten down on the top and on the sides with a shovel. The heat generated in such closely compact heaps kills any fly maggots and a big percentage of the worm eggs. To make the heap as safe as possible the outer few inches should be buried into the heap every week or so.

(*b*) The three species of stomach worms are all carried by flies which breed in manure. Fly traps should be provided in various parts of the premises. A good spray may be made by extracting ½ lb. of fresh pyrethrum in 1 gallon of kerosene for two hours.

(*c*) Good drainage and dry conditions are important both in the stables and in the pasture.

(*d*) Stable bedding should be changed frequently, and the stables should be kept as clean as possible.

(*e*) Do not allow the food to become contaminated with manure by throwing it on the ground. Place the food in well-constructed feed-boxes raised well above the ground surface. Good, clean water should be provided.

(*f*) Do not overstock on pastures, and if possible use the horse paddock for yearly periods for cattle or sheep.

(*g*) Young horses are most readily affected by parasites, and any control measures should be especially enforced where they are concerned.

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

PART III.

THE BERKSHIRE.

AS the most adaptable of several dual-purpose types, the Berkshire occupies a prominent place in the list of breeds approved for use in this country in the production of pork and bacon pigs for both the domestic and export markets.

Introduced away back in the very early days of Australian settlement, and maintained as a pure breed by careful breeding and regular importations of fresh and unrelated blood, the Berkshire is distributed throughout the Commonwealth and New Zealand.

The first imported boar listed in the herd books of the Australian Stud Pig Breeders' Society (formerly the Berkshire and Yorkshire Society of Australasia) is "Burton Harold" (imp.), who had as his sire, "Blenheim," BB5792 and dam, "Stumpy," MDXXVII., BB6841. This boar was the grand sire on the dam's side of "Dan No. 1," the first boar to be registered. "Burton Harold" (imp. was the sire of "Violet 2nd," owned by Mr. George Madden, a veteran enthusiast in the showrings of Victoria. "Dan No. 1," was owned by Mr. T. K. Adkins, so was "Silky No. 2," the first female Berkshire registered here. Of course, Berkshires were available in pure bred form for many years prior to the establishment of a Stud Society or a stud pig herd book.

It is recorded that the Berkshire was the pig that brought repute to British pigs abroad when distribution to other countries became possible. The breed has a long and distinguished history and has earned a high reputation among butchers and curers for its evenness of lean and fat, and absence of waste. They are quick growers on a minimum ration, and with careful handling and judicious feeding can be satisfactorily finished for market, either as light or medium weight porkers or for heavier weights in pork and bacon grades.

Their original home was in West Berkshire, England. Their colour was black with splashes of white over the body. Some early records refer to the colour as brownish red; in fact, even to the present day where breeding is neglected, there is a tendency to revert to this brownish

tinge in the hair. Trade was fairly brisk, and there are records of exports of Berkshires to the United States and Canada in the year 1864. In July, 1883, R. Swanwick, A. Stewart, and H. Humphrey convened the first meeting of interested breeders at Berkeley, which led to the formation of the British Berkhire Society in 1883. R. Swanwick was the first president and H. Humphrey the first secretary. This Society prospered, and regularly issued herd books, and continued on until 1927, when it amalgamated with the National Pig Breeders' Association of England. Mr. Arthur Beale was the secretary of the Berkshire and Yorkshire Society in Australia when registration was first introduced here.

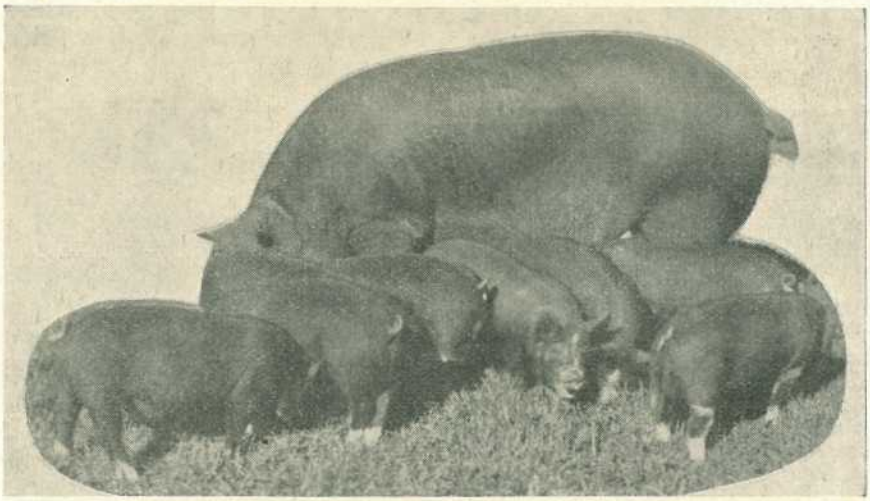


Plate 207.

Champion Berkshire Sow, with first prize litter at foot, Brisbane Exhibition 1934, "Linton Patience," imported by Mr. Frank Bach, of Oakey; a sow of excellent type and conformation.

Australian experience with the Berkshire breed confirms its overseas reputation, where the breed's claim as a producer of highest quality of pork and bacon has been proved by its repeated successes for over thirty years in show competitions of live and dressed meat, and especially as light-weight porkers. Its usefulness for crossing with larger and slower maturing breeds proved there has been borne out here, the Tamworth-Berkshire cross being a typical instance. This particular cross has for many years been the most popular of all bacon pig crosses in Australia, and even in face of competition of the Large White and its crosses, the Tamworth-Berkshire cross holds its own, although white skinned pigs are preferred for export requirements. That Berkshires are capable of producing heavy weight carcasses, if desirable, was shown in 1929, when a pair of Berkshire crossbreds scaled 6 cwt. 3 qr. 23 lb. when seven months old, an average daily gain of 1·77 lb. The supreme championship carcass at the same British livestock show was a purebred Berkshire scaling 140 lb. live weight at five and three-quarter months. There is abundant evidence in results of Smithfield carcass contests and numerous other shows in England and elsewhere where carcass contests are staged, to prove that the Berkshire can always hold its own in the keenest of competition. The same holds good in Australia.

Record Sale Prices.

Some remarkable sales were recorded from 1919 to 1923, a period of world wide high prices for stud stock. The Duke of Westminster auctioned sixty-two head of pure bred Berkshires averaging £115, the top price being 610 guineas, also 500 guineas for another at the same sale. Other high prices realised were 400, 370, 360, 310, 210 guineas, with others at prices from 200 guineas downwards. Such prices of course have never been realised in Australia, although, in comparison, Berkshires have always fared well at show sales if the quality and type is there to pay good dividends. Perhaps the record price for a Berkshire boar was that obtained for "Pamber Ugly Duckling," farrowed in 1920, and a Royal championship winner. He was noted as the record priced boar of any breed, and sold for 700 guineas for export. "Highfields Royal Pygmalion," farrowed in 1921, bred by F. Townend, a supreme

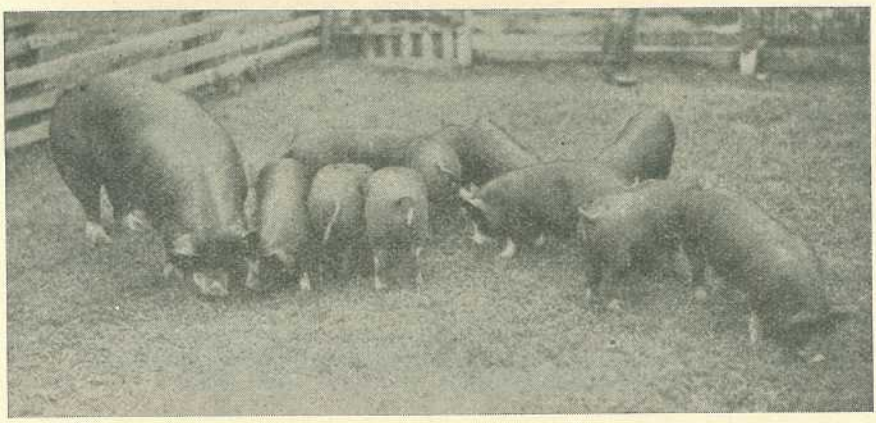


Plate 208.

"Gatton Dell" and litter; an excellent group, representative of the very best there is in Berkshires in this country. Note evenness of conformation, well developed hindquarters and typical breed markings.

Royal champion in 1922, and sold for £500 to the Eaton stud. It would be interesting to have records of high-priced Berkshires in Australia. Mr. Edgar Humphrey, from whose article in the Jubilee issue of the Pig Breeders' Annual much of this information has been extracted, is of opinion, after a life time's experience with this breed, that it can be said with confidence that the Berkshire is as good to-day as ever it was, and can be regarded as an ideal breed for the production of light weight porkers so popular in the Old Country. The cross with the Middle White is even a better pig for this purpose, to my way of thinking, for the white-skinned progeny of this cross certainly do appeal and are most attractive, although care must be taken to avoid over-fattening.

Points of the Berkshire.

In colour, the Berkshire is black with white points, a white star or splash on the face, four white feet, and a white flag or brush on the tail, all desirable markings referred to by Mr. Humphrey as the hallmark of purity, a proof of over sixty years' pedigree breeding for improvement in quality of meat production. It has been a moot point for some years in Australia as to whether there is any difference between the

Berkshire and the Improved Berkshire, so called a few years ago when a better, more attractive, and more dished-face type of Berkshire was imported. In my opinion, there is no difference in Berkshires in these days, that is, pure bred Berkshires are all of an improved type. It is well to remember, however, that in Australia we have a type once called Improved Berkshire which differs in type and general conformation to that we now refer to as the English type; the latter being the latest production in the breed and the most popular abroad. Our illustrations show some variation, especially in formation of hind quarters and face. Objectionable features in Berkshires are few, but important.

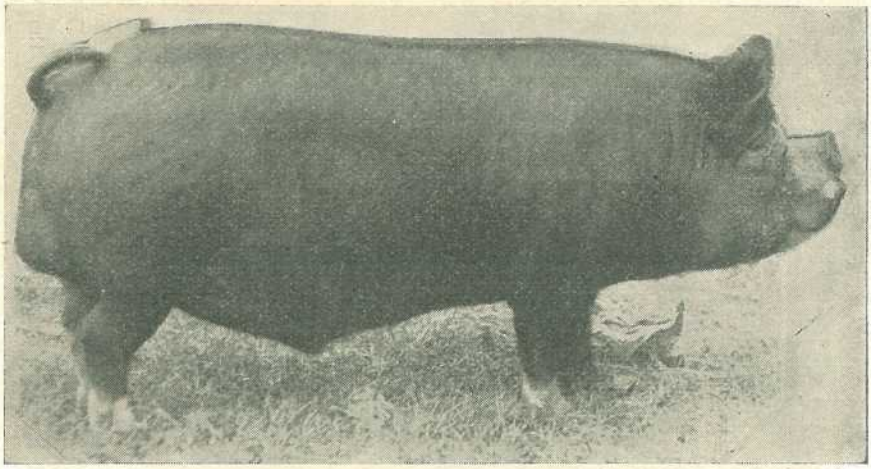


Plate 209.

"Goodna Model," stud sire at the Farm Home for Boys, Westbrook, and sire of first prize litter, shown with Champion sow "Linton Patience" (imp.).

There is a tendency to mismarking in many of the pigs of to-day; this practically covers all strains within the breed, and it is fairly safe to say it is difficult indeed to obtain a family of Berkshires that will produce 100 per cent. of well-marked pigs. Possibly our herd book standards are too severe and, perhaps, we should admit that many of our best-bodied Berkshires are faulty in markings. However, there appears to be a general acceptance of the position, and the result is that practically all champions in these days conform to herd book colour standards.

The boars are active and reliable workers if kept in reasonable breeding condition. The sows are good milkers and good sucklers; over-fattening and a lethargic condition are distinctly detrimental to breeding qualities and should be guarded against. It is certain that this breed will rise or fall in importance in accordance with its ability to breed freely, regularly, and abundantly. Any animal not capable of reproducing its species in a profitable way should be rigorously culled, and replaced by a more profitable animal. Many animals are ruined by over-fattening for show purposes; they do not only suffer in so far as their breeding organs are concerned, but they become knock-kneed, cow-hocked, and go down in the pasterns. One occasionally sees Berkshire sows (in particular) with a protruding tongue, an overgrown organ which they cannot control because it is too long to comfortably fit in the mouth.

This is a very bad fault. One notices some Berkshire boars and sows with such heavy drooping eyelids that the animals are virtually blind; they certainly have no full use of their eyes when in this condition, although the sense of smell is extra keen, and the animal may go for many months before being noticed. There is a tendency where breeding is neglected for the colour to fade to a brownish tinge on very coarse hair; this also should be guarded against. Sows that are clumsy and unable to satisfactorily rear a litter with a minimum of eight should also be disposed of,

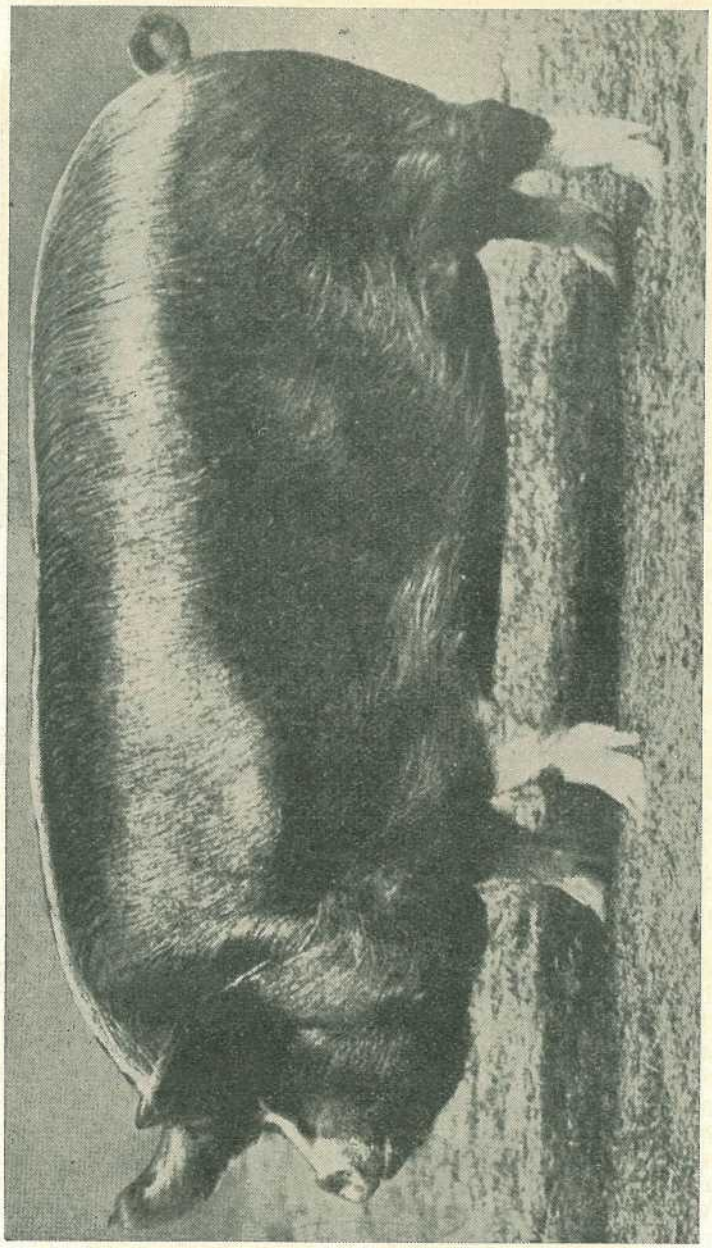


PLATE 210.

Berkshire sow of the most approved British type, "Basildon Princess Royal," supreme champion at the Royal Agricultural Society's Show, Harrowgate, England, a sow spoken of by overseas authorities as thoroughly typical of the best there is in Berkshires. Note her compact, yet roomy frame, her long deep body, and attractive appearance. The Berkshire is the most popular breed of pig in Australia, and has a wide distribution throughout the world, particularly in English-speaking countries.

for no breeding sow is profitable unless she rears eight or more well-developed pigs per litter; and there should be two litters per annum between the age of one and six years.

Prominent breeders of stud Berkshires in Queensland include the Government institutions at Gatton College, Goodna, and Willowburn Hospitals; Farm Home for Boys, Westbrook; H. Franke; M. Porter and Sons; F. Back; J. W. Handley; J. Barkle; O. L. Klein; Wide Bay Stud Piggery; Kairi State Farm and many others.

STANDARD OF EXCELLENCE FOR BERKSHIRES.

	Points.
Head and Ears.—Moderately short; face dished; snout broad and wide between eyes; ears fairly large, carried erect or slightly inclined forward, and fringed with fine hair	15
Neck and Shoulders.—Medium length, evenly set on shoulders; jowl full, but not heavy; shoulders fine, sloping backward, and free from coarseness	10
Back and Sides.—Back long and straight; loin full; ribs well sprung; sides full and deep to flank; showing straight underline; and in sows, twelve good, evenly placed teats	20
Hams.—Wide and deep to hocks tail set high on back line, and fairly large ..	20
Legs and Feet.—Legs short, straight and strong; feet set wide in line with shoulders; hoofs nearly erect	15
Colour, Skin, and Hair.—Black, with white on face, feet, and tip of tail; skin fine and free from wrinkles; hair long, fine, and plentiful	10
Character.—A combination of all points showing distinctive breeding, type, and quality	10
	100

IMPORTANCE OF COOLING CREAM.

The first step towards controlling the action of bacteria in milk and cream is to prevent such organisms as have gained access to these products from multiplying to sufficient numbers to cause trouble. The only way to do this is to cool the milk or cream as much and as soon as possible. In the absence of water being laid on to the separating room, any of the small water-bag coolers, to cool the cream straight from the separator or the milk immediately it is drawn, are very efficacious, as every degree of temperature we bring the product below 80 degrees Fahr. will have a retarding effect on the bacterial development, and in many cases (in relation to weed taints, &c.) the aeration will improve the flavour.

If a cooler is not available a lot can be done by standing the milk or cream cans in cold water, or putting wet bags round them, but it must always be remembered that fresh water is advisable each day, and the bags should be changed each day and allowed to dry. In the case of cream it should be stirred with a tinned metal stirrer two or three times each day, and not be mixed until each lot of cream is cool. Finally, it should be delivered to the factory daily, if possible.

With reference to the delivery of cream, many producers, after taking as much care as possible on the farm, allow the product to become heated in transit to the factory, either by not having a well-shaded stand or, when they do the carting themselves, by not taking the trouble to keep the cans covered (by, say, clean wet bags). This neglect may very often be fatal to quality.

Marketing Table Poultry.

By P. RUMBALL, Poultry Expert.

IN the ordinary commercial sense, table poultry is not produced to any appreciable extent in Queensland. Although this branch of the poultry industry has not yet been developed in this State, there is no reason why it should not receive serious consideration by those who may be in position to enter into what is really a specialised business.

The basis of the poultry industry in Queensland is egg production, for which breeds such as Leghorns and Australorps are bred, the former predominating. Under these conditions the class of bird which forms the bulk of poultry sold for table purposes are young cockerels of both light and heavy breeds and hens culled on account of their age, or for other reasons which have rendered them unprofitable as egg producers.

In marketing there are two distinct conditions to be considered, namely:—(*a*) Conditions which are entirely in the hands of the individual producer; and (*b*) conditions under which the birds are sold. The latter conditions, by reason of the fact that they apply to all producers selling poultry, and the fact that they do not come under the immediate control of the individual producer, are possibly the more important and therefore can take precedence.

Present System of Sale.

Although large numbers of birds are sold privately, the greater number reach the consumer through the auction markets. A conservative estimate of the value of poultry sold daily in the metropolitan area would be in the vicinity of £250. This, to some, may appear rather a high estimate, but an inspection of the markets will convince the observant person that the estimate is, if anything, on the low side.

The birds are received by the selling agents by rail or direct from the producer in crates of all types, shapes, and sizes. They are then dumped on the saleroom floor, little effort being made by either the producer or agent in the direction of classification, and sold to the highest bidder.

Undoubtedly at times, even under these conditions, the birds tendered for sale realise payable prices, but, again, at other periods they are sold considerably under their value. The low values are, no doubt, influenced by the supply and demand, but at the same time, if the birds were classified, displayed to advantage, and put up for auction in numbers which would permit of the general householder bidding, values would be materially increased.

Transport of Poultry.

The conditions under which table poultry are sold undoubtedly leave room for improvement, both from a humane and a commercial point of view. From the humane point of view the crates used for forwarding birds to market should have sufficient head room and floor space for the number and variety consigned. They should be well ventilated and provided with water receptacles, the latter being firmly attached to each corner of the crate. The crates for fowls and ducks should be at least 18 inches high, and that for turkeys and geese

30 inches. This permits of the birds crated being able to stand erect without injury. The actual dimensions or area required for an individual bird naturally varies according to the numbers and variety to be marketed at one time. Crates 4 feet long by 2 feet 6 inches wide, with a partition in the middle, will comfortably hold sixteen to twenty birds, according to their size and to the prevailing climatic conditions. The object of the partition is to prevent crowding to one end and consequent losses in the event of the crate becoming tilted in transit. A little thought on the part of the producer for birds' comfort in transit would prevent overcrowding of crates. If the crates are well made they will last for some time, as well as ensure the comfort of the birds both in transit and while awaiting sale. Good crates are worth being returned from markets, which obviates the necessity of constantly constructing makeshift crates.

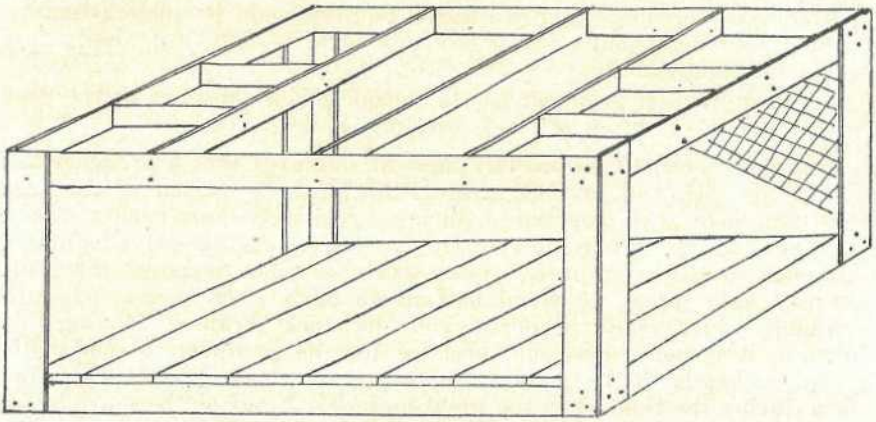


PLATE 211.—A CONSIGNMENT CRATE FOR POULTRY.

The sketch illustrates a crate of simple design, the measurements being 4 feet long, 2 feet 6 inches wide, and 18 inches high. It is made entirely of pine, the frame being 3 inches by ¾ inch, and the bottom 6 inches by ⅝ inch. Doors are provided in the top, and the whole structure covered with 1½-inch mesh netting. If larger netting is used, it is desirable to place a piece of timber around the frame at least 2 inches higher than the floor to prevent the birds' legs protruding and becoming injured.

There is a correct time for marketing stock, whether they are young or old. Every day they are kept on the farm after reaching sale condition they add to farm costs. If crates are not available at the time the birds are invariably retained, possibly a week or so longer. The crates can, with a little care, be so constructed as to permit of the birds being seen to advantage by the buyers. Under the present conditions of selling, it is a few minutes' work for the assistant to burst open a crate and pass a bird or two around for inspection. Doors placed on the top of the crate would facilitate this work, allowing buyers greater time for examination.

POINTS IN POULTRY MARKETING.

At present practically the only class of purchaser operating at poultry sales are poulterers and buyers for hotels and restaurants. Small buyers—that is, the household consumers—are unable to buy, for the sufficient reason that the birds are sold per crate at so much per pair. This may be necessary for the purpose of expediting sales, but it

undoubtedly restricts the consumption of poultry meat, and producers would find it to their advantage to market choice stock in small lots.

To what extent the trade of selling dressed poultry is carried on is hard to estimate. The price charged by most poulterers appears excessive, and frequently one notices very inferior stock exposed in windows for sale. There should be plenty of scope for the sale of dressed poultry at reasonable prices, providing it is as easily available to the consumer as butchers' meat and as reliable as regards quality.

Just how a dressed poultry trade is to be worked to the best advantage is difficult to say, but the first essential is a live organisation, with loyal supporters. With cold storage for holding reserves, regular supplies would always be available which would permit of contracts being made with clubs, leading hotels, and other large buyers; as well as supplying regularly, by delivery service, to private homes. Failing a delivery system, the selling of dressed poultry could be made a feature in many butchers' shops, but before this could be done organised effort would be essential.

The individual producer has to consider such questions as the time of marketing, condition of stock, grading, and crating.

Cockerels constitute possibly most of the birds that a producer has yearly for sale, and present greater difficulties by reason of the fact that they have to be disposed of during a relatively short period. They may be sold at various ages, each age having its special advantage. Although most buyers prefer young stock for table purposes, they will not pay high prices for small half-grown birds when larger hens are available, which would proportionately be much cheaper. Having this in view, it is not a desirable practice for the producer to send half-grown cockerels to the market and expect to receive good prices for them during the time when the great majority of our old hens are being disposed of on account of age. This period varies, but usually extends from some time in January until April. Young half-grown birds will find a ready sale from August until the Christmas season. After that period young stock should be well grown to command good prices, but not kept until they become staggy, which is indicated by spur growth.

It is necessary to give some attention to the general condition of the birds to be marketed. No good is done by sending stock low in condition to the selling floor. It is not suggested that any attempt be made to fatten this class of bird, as they generally are constitutionally unfit, and the producer's ends would be better served if they were destroyed, for it may happen that these particular birds will be the first to be examined by prospective buyers.

Cockerels, however, should receive some consideration and not treated, as they too frequently are, as an encumbrance and not worth feeding. If they are to be kept for any time at all they should be well treated and receive the same attention as the pullets; they have to be kept, and if they are to sell to advantage they must be well fed. Rubbish in the way of food is no good. They require, for economical growth, the same ration as the pullets. Keep them free from intestinal worms and dispose of them as early as possible.

Crating should receive the attention previously suggested, and a good layer of straw or grass placed on the floor to ensure the stock being in a clean condition on reaching the market. The birds crated together should be alike as possible as regards age, size, and condition, and of the one variety.

Seasonal Farm Crops.

By C. J. McKEON, Instructor in Agriculture.

POTATOES.

IN most potato-growing districts in Queensland growers are fortunate in being able to grow two crops a year, the first, which is usually sown in August, commonly known as the spring crop; and the second, planted in February, known as the autumn crop. Provided the soil and climate are suitable and good cultural methods are adopted, potato growing can be made a more payable proposition than most other crops; and those who persist with the crop, and are not discouraged by occasional reverses as a result of disease or low prices, find them one of the most profitable crops in the long run.

Potato Soils.

The ideal soil for potato growing is a friable, well-drained, alluvial loam, and one which is sufficiently rich in organic matter to absorb and retain moisture. As a general rule, good lucerne land is also good potato land, but this does not always apply, for lucerne can be grown successfully on the heavier classes of black soil which, unless under the best of conditions, are unsuitable for potatoes. Then again, potatoes can also be grown on some of the lighter sandy loams which could not be regarded as good lucerne land. Clayey soils and those which are badly drained and liable to become water-logged should be avoided, for not only are the chances of raising a crop small, but tubers of good quality cannot be produced on soils of this nature. Even on the best soils, high yields cannot be maintained where the land has been growing potatoes continuously for a number of years, unless care is taken to maintain the physical condition of the soil by keeping up the supply of humus. This can only be done by practising a rotation of crops or by ploughing in a green crop, preferably a legume, such as field peas for winter growth or cowpeas for summer growth. Farmyard manure, where available, is also excellent for this purpose, and also possesses considerable value from a fertilizing point of view.

An early and thorough preparation of the soil is essential to get best results from any crop, but to none does this apply more than to potatoes. Farmers who spend the extra time and labour required to put the land in first-class condition for potatoes will be more than repaid, especially if a dry spell is experienced during the growth of the crop. Under the most favourable conditions good crops may be produced on land that has received a hurried and rough preparation, but in any district the odds are greatly against these conditions occurring other than at rare intervals, and, consequently, the necessity for thorough preparation of the land cannot be stressed too strongly.

Plate 212.—A Wheatfield at Upper Freestone, near Warwick.

"Leave the bustle all behind you; come and let contentment find you
In a cosy little cabin lyin' snug among the wheat."

The first ploughing should be to a depth of at least 9 inches, which will ensure that the seed when planted will have 3 or 4 inches of worked soil beneath it. The land should be left to fallow for a couple of months at least before planting time, care being taken in the meantime to deal with any weed growth which may appear. The use of a spring tooth cultivator or other suitable instrument will not only deal with weed growth, but will maintain the surface soil in good condition. Land prepared in this way will almost invariably be in a sufficiently good condition at planting time to ensure a good germination.

Varieties.

The question as to the most suitable varieties to grow is one that the grower himself will have to determine, either as the result of his neighbours' experience or by conducting trials of his own. Of the white-skinned varieties, Carmens and Scottish Triumphs are by far the most widely grown. Both are good yielding varieties and always command a good price in the markets. Up to Dates also do well in some localities, and come next in order of popularity. Of the blue-skinned varieties, Manhattans are at present the most popular, and are also the most reliable variety. In certain localities Guyra Blues

also give good results, but they do not do well in all districts. Satisfactions and Rough Skinned Brownells are the most widely grown of the red-skinned varieties; neither, however, should be planted in any quantity without first giving them a trial, as they only do well in certain localities.

As growers are compelled, by reason of the fact that locally-grown seed is not available, to use seed which has been imported from the Southern States for the spring crop, every effort should be made to secure seed supplies from a reliable firm of merchants. It is far better to get seed which will prove true to name of the variety which is known to suit the locality, even though it may cost a little more, rather than obtain a cheaper line of seed which may turn out to be anything but the desired variety.

Providing the spring crop is planted early, seed from this can be used for planting the autumn crop planted in February.

All seed, especially that used for the spring crop, should be treated with formalin before planting, otherwise there is a serious risk of disease being introduced. Anyone who may be interested in this treatment can obtain full particulars by making application to the Department of Agriculture.

Any tubers which are not perfectly sound or which, on being cut, show a suspicious looking discolouration should be rejected.

Seed for the spring crop may be cut, but this practice is not advisable in the case of the autumn crop, for hot, wet weather is frequently experienced during February, and, consequently, the cut seed is likely to rot in the ground. Where cut seed is used, the cutting should be done the day before to allow the cut surface to dry. Sprinkling with wood ashes is a practice which is frequently adopted, and is a good one.

Much will depend on the size of the potatoes as to the best way to cut them, but as a general rule the smaller tubers should be cut in half lengthwise, and in the case of the larger tubers the stem end should be cut off at about a third of the length of the tuber, the remaining portion being cut through the centre lengthwise, thus making three sets.

Planting.

Although there are machines for planting, the general practice is to plough the seed in, the seed being planted in every third or fourth furrow according to the width of the plough cut. This practice has much to recommend it, as the furrows are not allowed to remain uncovered for any length of time and the seed can be spaced at an even depth and distance apart. The usual distance between the sets is, approximately, 15 inches at a depth of about 4 inches. They should be planted on the side of the furrow to prevent the horses tramping on them, as would be the case where they were planted along the bottom of the furrow.

The quantity of seed required per acre will naturally depend on the size of the tubers and whether cut or whole seed is being used, but, as a general rule, about 7 cwt. per acre is sufficient.

Cultivation.

The first cultivation should be carried out as soon as the young plants appear above ground. A light tine harrow, preferably a lever

harrow with the tines set back, is the most suitable implement. This cultivation will not only break up the surface soil which may have become slightly caked as a result of rain following planting, but will also destroy any weed growth which has sprung up between the plants. This will be the last opportunity of doing this, for all future cultivations can only be carried out between the rows. The number of inter-row cultivations required will depend on seasonal circumstances, but should be sufficient to keep weed growth in check and, at the same time, keep the surface soil in a friable condition.

When the plants reach the flowering stage they should be hilled; an effective and popular way of doing this is by fitting hilling attachments to an ordinary scuffler. The main advantages to be derived from hilling are that the tubers are protected from the potato moth, and it also prevents tubers which might otherwise have been exposed from becoming discoloured.

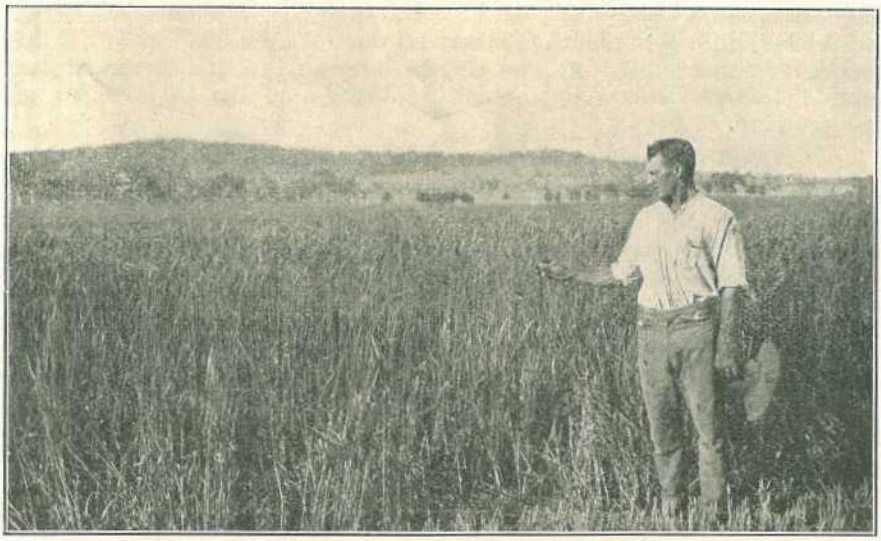


Plate 213.—A Fine Wheat Crop at Cambooya, Darling Downs.
". . . A pleasure in a measure for a man who likes the game."

During growth every precaution should be taken to protect the crop against an attack of Irish Blight, and where there is a likelihood of this occurring, regular sprayings with Bordeaux mixture should be carried out. Frequently, sprayings are not commenced until the disease appears, and it is usually then too late. Spraying with Bordeaux mixture is purely a preventive and not a cure for the disease as many people imagine, and to be successful should be carried out before the disease appears. Full particulars of the preparation and use of Bordeaux mixture appear in a publication on Potato diseases which may be obtained from the Department of Agriculture.

Harvesting.

Regarding harvesting, in the case of the spring crop this is usually carried out as soon as it can safely be done, one of the chief reasons being a desire to get the potatoes on the market as early as possible, as good prices are usually obtainable at the commencement of the season.

The hot weather, and the risk of damage by potato moth, also make it necessary to harvest the crop as soon as possible. In their anxiety to get the potatoes on the market as early as possible growers frequently make the mistake of digging them before the skins are firm enough, with the result that they arrive on the market in a badly rubbed condition and consequently bring a reduced price.

Harvesting is still very largely carried out with a digging fork. A plough is also used at times to turn the tubers out, but although this is a quicker method than hand digging the crop cannot be harvested as thoroughly.

The tubers after being dug should not be left exposed for any length of time to the hot sun, and should be bagged and removed from the field as quickly as possible. When the potato moth is prevalent, on no account should the bagged tubers be covered with the tops or haulms while standing in the field, for this is one of the surest ways of introducing the moth to the bagged tubers.

When preparing them for market they should be carefully graded, for a nice, even-sized line of potatoes will almost invariably command a better price than an uneven sample. Care sould also be taken to reject any tubers which are damaged or showing signs of moth infestation.

SORGHUMS.

Judging by the number of letters that are received from time to time by the Department of Agriculture for information regarding sorghums, it would appear that a considerable amount of confusion exists regarding the different groups. Those of importance as far as this State is concerned may be classified into the following groups:—Saccharine sorghums, Grain sorghums, and Grass sorghums. Broom millet, which is used for the manufacture of brooms, is also a member of the sorghum family. The saccharine or sweet sorghums are one of the most valuable and widely grown fodders throughout the dairying districts of the State, and when cut at the right stage provide not only a nutritious fodder but also a great bulk of fodder. The sweet juices contained in the mature stalks make them highly palatable to dairy and other stock. Although not quite so nutritious as maize, good crops of sorghum can be produced under conditions that would be fatal to maize. Sorghums also possess the advantage of remaining in a succulent stage for a considerable period after reaching maturity, whereas maize rapidly dries off on reaching maturity.

Although the heaviest crops are naturally produced on the more fertile soils, sorghums can be grown successfully on a very wide range of soils; in fact, it can be claimed for them that they will grow on a greater variety of soils and over a wider area of the State than any other cultivated summer crop. Owing to their hardiness and ability to withstand prolonged dry spells better than most other crops, they are of great value to stock owners during dry periods when there is a scarcity of grass or other succulent fodder.

Land Preparation.

To get the best results, it is just as necessary that the land should be thoroughly prepared prior to planting as would be done for any other crop. Owing to their hardiness and their ability to thrive under adverse conditions, less attention is frequently paid to the preparation of the

land for sorghums than crops such as maize, and whilst reasonably good crops are produced under these conditions, much heavier and more even crops will be obtained on well-prepared land.

Planting can be carried out at any time after all dangers of frosts is over and as soon as weather conditions are suitable.

Plate 214.—A Good Stand of Wheat on a Freestone Farm.

"For growin' things . . . it makes life sort o' sweet,
An' your conscience never swats you if your game is growin' wheat."

Sowing.

The seed is frequently sown broadcast, but under average conditions this method is not nearly as satisfactory as sowing in drills. This applies particularly to districts where weed growth is prevalent, as it is not possible to keep weed growth in check while the young plants are becoming established. A broadcast crop is also much more difficult to harvest than one sown in drills, and the crop is also much more likely to lodge during wind storms, and where this occurs, particularly in a tall crop, it will remain down and in a tangled position and the harvesting costs are greatly increased. The only advantage to be gained by broadcasting is that a finer stalk is produced. When sown in rows the usual spacing between the rows is about 3 feet, an ordinary maize planter fitted with a suitable seed plate being very satisfactory for the purpose. Where no planter is available, furrows should be opened out with a single furrow mould-board plough to a depth of 4 to 5 inches and the seed dropped thinly by hand in the furrows. A light harrow should be then run along the drills to cover the seed.

Approximately 5 lb. of seed will be sufficient to sow an acre when sown in this manner.

Cultivation.

Sufficient cultivation should be carried out between the rows during the early stages of growth to keep the soil in good tilth, and at the same time to keep down weed growth.

The crop is at its most nutritious stage when the grain is well formed, but still in the thick milk stage, and if the crop is to be used

for converting into silage it should be cut at this stage. Where it is required for feeding in a green state, much of it will be naturally advanced much beyond this stage before it has all been cut, but it will still be of considerable food value even for some time after the leaves have been more or less killed by frost.

It is an excellent crop for silage, and when being harvested for this purpose the quickest and cheapest method of doing so is with a maize binder which cuts one row at a time and ties the stalks in bundles. Very few of these machines are in existence in this State, however, and the crop is usually cut by hand with a cane knife.

Varieties.

Numerous varieties of saccharine sorghums have been grown in this State at different times, but only a small number of the best of these have become popular.

Of the quick maturing varieties, Early Amber Cane is the most popular, but it is a light yielding variety when compared with some of the others, and for that reason is not grown extensively.

Saccaline is the most popular variety at the present time and has quite deserved its popularity. It is a tall growing, leafly variety which grows to 11 and 12 feet in height and takes approximately four to four and a-half months to mature. It also has the reputation of retaining its succulence for a longer period after being frosted than most other varieties. Unfortunately much of the seed now available shows signs of inoculation with other varieties, and growers who have pure seed should retain their supplies for future requirements from their own crops. Pure saccaline seed should be a brick red colour.

Planters' Friend or Imphee.

This is a very old and popular variety, and although not so popular generally as Saccaline, still retains its popularity in some districts. It is a very heavy yielding variety and grows under good conditions to much the same height as Saccaline.

White African.

This is another tall growing, heavy yielding variety, but so far has not been grown to any extent in this State. In some of the coastal districts it has given excellent results during the past two or three years and is increasing in popularity.

The varieties already mentioned are those that have so far given the most satisfactory results in Southern Queensland at least.

Honey Sorgho.

In the northern portion of the State a variety called Honey Sorgho has given very good results during recent years and is now very popular. This variety, however, has never become very popular in Southern Queensland.

Grain Sorghums.

The grain sorghums are grown almost entirely for their grain and are not of anything like the same value for fodder purposes as the saccharine sorghums. The stalks do not contain sweet juices like the saccharine varieties, being of a more pithy nature. The yield of forage is also much lower. They are, however, capable of yielding large

quantities of grain which in food value is almost equal to maize. They also have the advantage of being capable of producing a crop of grain on soils which are quite unsuitable for maize, and they are also capable of producing a crop under climatic conditions which would be fatal to maize.

The grain is of considerable value for poultry and stock feeding purposes. The same cultural methods should be adopted as for the saccharine varieties.

Harvesting.

Harvesting has so far been largely carried out by hand, or where a suitable machine is available, the stalks may be cut and stooked in bundles until the grain is thoroughly dry. The heads are then cut off and threshed by a hackler or other suitable machine. Care should always be taken to see that the grain is sufficiently dry before being threshed and bagged; otherwise heating is likely to occur. The fact that so much hand labour is required for harvesting the crop has probably been the reason that grain sorghums are not grown more extensively in Queensland. The Department of Agriculture is at present conducting trials with a large number of varieties from overseas, and amongst these are some highly promising dwarf varieties which, when mature, are only about 3 feet 6 inches high. Should these varieties prove to be good yielders of the right class of grain, the cost of production will be considerably lessened, as harvesting of these can be carried out with a wheat harvester as is being done in U.S.A. at the present time.

Of the large number of varieties which have been grown in the past Feterita, Standard Milo, and Cream Milo have proved the best yielding and most suitable varieties. Red Kaffir has also been grown fairly extensively. Any of the varieties mentioned are capable of giving a yield of sixty bushels of grain per acre under average conditions.

Regarding the grass sorghums, Sudan grass is the only one that is cultivated extensively, although in the past Johnson grass was also cultivated to some extent, but those who were unfortunate enough to introduce it to their cultivation paddocks have never ceased to regret having done so. Whilst it is an extremely hardy crop and also a very useful fodder at the right stage, it is extremely difficult to eradicate and becomes a serious pest. Sudan grass is a very valuable fodder crop and may be used for grazing off, converting into hay, or for silage purposes. It is particularly suitable for the more inland and drier districts, where it is now grown in preference to any other summer fodder crop.

Under reasonably good conditions at least three cuttings may be expected during the season. It is usually sown broadcast or with a seed drill. It is also sown in some districts in drills spaced wide enough to permit of inter-row cultivation being carried out. The quantity of seed required to plant an acre will vary from 5 to 15 lb. according to the method of sowing. Sowing should be carried out as soon as possible after the danger of frost is over, to permit of as many grazings or cuttings being made as is possible.

Grazing Risks.

Although Sudan grass is grown in very large areas each season and is frequently grazed in all stages of growth right throuhout the growing period, there is always a risk in allowing stock on a crop before the flowering stage is reached. It will readily be admitted that thousands

of dairy stock are grazed on the crop each season, particularly in the Darling Downs and Maranoa districts, and suffer no ill effects. Cases of poisoning, however, do occur and serious losses result, as instances have come under the notice of the Department of Agriculture where a large proportion of the herd was wiped out. For a very long time the general opinion was that pure Sudan grass was not poisonous at any stage of growth, and that poisoning only resulted on crops which had been inoculated with other varieties of sorghum. This, however, does not appear to be the case, as in several cases that have been investigated, there was no evidence that the crop was not pure. Past experience would appear to definitely indicate that the risk attached to grazing or an immature crop is very slight if the crop has been well grown. Where a crop has received a severe check from dry, hot weather and the growth is stunted, and this applies particularly to a ratoon growth, there certainly is a very serious risk attached to grazing the crop off before it flowers.

PLATE 215.—ANOTHER GOOD WHEAT CROP AT CAMBOOYA.

"I am the song that the need of man has sung
From the soil at his feet."

The saccharine and grain sorghums are very definitely dangerous before reaching the flowering stage, and whilst it is claimed that certain varieties are less poisonous than others, this has not yet been definitely proved, and consequently it is not advisable to take the risk with any of them.

SUMMER GRAZING CROPS.

Cowpeas.

As farmers are now busily engaged in preparing land for summer grazing crops, some of the most useful of these will be briefly discussed in these notes. One of the most valuable of these is cowpeas, and although they have been grown for a great number of years and have proved conclusively that they will thrive over a wide area of the State and on a wide range of soils, they are not grown as extensively as they

might be. Their value as a green manure crop is much more widely recognised than their value as a fodder crop. They make a highly nutritious hay, but they are not an easy crop to harvest and cure and consequently are not widely grown for hay purposes.

For dairymen no more valuable crop could be grown for grazing purposes. Some difficulty is usually experienced at first in getting dairy stock to take to them, but once they acquire a taste for them they eat them readily, and their value as a milk producer will then be quickly demonstrated.

One of the best ways of getting the stock accustomed to them is to make a light sowing of maize or other strong growing crop amongst the peas. The trailing or twining varieties will twine round the maize stalks and the stock cannot avoid eating them whilst eating the plants of the other crop, and in this way will acquire a taste for them.

They can be grown on most classes of soil, provided the drainage is reasonably good, and they do not require any more favourable weather conditions than the average crop.

They will not thrive under cold conditions and should not be sown until all danger from frost is over. They are frequently sown broadcast, but sowing in drills is to be preferred. The usual width between the rows is 2 feet 6 inches to 3 feet with 8 or 9 inches between the plants. For broadcast sowing from one half to one bushel of seed is required to sow an acre, according to the size of the seed. When sown in drills from 5 to 15 lb. will be necessary.

When used for grazing purposes they not only prove a valuable milk-producing crop but will greatly improve the soil after the residue has been ploughed under.

Where the crop is grown solely as a green manure crop, difficulty will be experienced in satisfactorily ploughing under a heavy crop if the work is not carried out in a proper manner.

To do this successfully, the crop sould be first of all flattened by rolling, and where a disc cultivator is available the process of ploughing the vines under will be more easily and effectively done if this machine is run over the rolled crop before commencing ploughing. The best stage at which to plough the crop in is when the pods have developed, but before they have started to ripen. A crop which has been allowed to mature too fully will become woody and consequently more difficult to plough under. As was previously mentioned, properly cured cowpea hay is very nutritious and it is also very palatable to stock. In curing, a certain amount of care is necessary to prevent loss of leaf. To avoid this the cut crop sould not be allowed to remain exposed to the hot sun for too long a period, and should be placed in loosely built cocks or heaps before the leaves become brittle. To effect an even cure the cocks should be turned occasionally.

The most popular varieties are Black and Poona. The Black is a very old and popular variety which has proved to be a heavy cropper.

The Poona variety has come more into prominence during recent years and is now very popular in some districts. It is also a heavy cropper and can quite easily hold its own with the Black variety in this respect.

Quite a number of different varieties are grown throughout the State, but the two varieties mentioned are the most widely grown.

Soy Beans.

Considerable interest has recently been shown regarding the growing of Soy beans. The Department of Agriculture has been conducting trials with these over a number of years, and whilst excellent results have at times been obtained the difficulty so far has been to secure varieties which will give consistently good results.

Other countries which are now growing them extensively experienced much the same difficulty at first, but once this problem has been overcome they have proved a valuable crop.

Although they are highly valued as a human food in countries such as Japan, their chief value in this State, for some time at least, would be for fodder and soil improvement purposes.

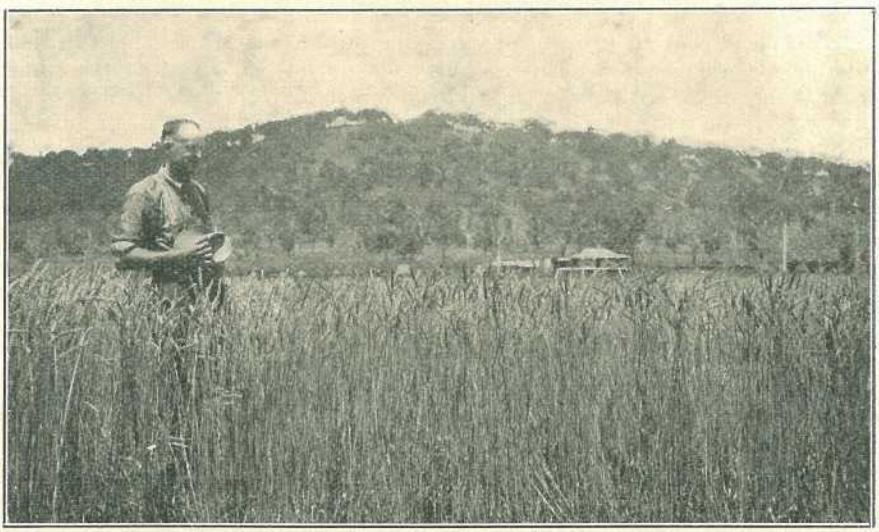


Plate 216.—A Paddock of "Pusa" at Pilton.

" Wheat, wheat, wheat! Oh, the sound of it is sweet!
I've been praisin' it and raisin' it in rain an' wind an' heat
Since the time I learned to toddle till it's beaten in my noddle
Is the song I'm singin' you of wheat, wheat, wheat."

The seed is valuable for oil extraction purposes and also for the manufacture of Soy bean flour, but it is doubtful if the seed could be produced here for the price at which it can usually be imported from countries where labour is cheap.

The plants contain a very high percentage of protein, and as they are palatable to stock either as a green fodder or in the form of hay, they would be of value for this purpose alone.

They also have a beneficial effect on the soil, and in countries where they do well are greatly valued for this purpose.

The results of the trials so far conducted would indicate that this crop will grow on most reasonably good soils provided the drainage is good. The young plants are fairly tender, and for that reason the surface soil should be well worked and should not be allowed to become caked prior to germination. Once the plants are established they are

fairly hardy and will stand a dry spell as well as most other crops. They are susceptible to frost, and sowing should therefore be delayed until all danger of frost is over.

The seed should be sown in rows spaced at least 2 feet 6 inches apart with about 6 inches between the plants. They should not be sown deeply, a depth of 3 inches in a well-worked soil being sufficient. The seed of the different varieties varies greatly in size and consequently the quantity of seed required to sow an acre varies. Approximately 5 lb. of seed is sufficient for the small seeded varieties and about 10 lb. per acre for the large seeded varieties.

If the crop is being grown for hay purposes it should be cut when the seeds are about half formed.

To prevent loss of leaf the same care would be necessary in curing the crop as would be the case with cowpeas.

A crop that is grown for seed should be cut when about three-quarters of the pods are ripe. The pods do not all ripen at the same time, and if the cutting were delayed until all the pods had ripened many of those which ripened first would have shed their seed. The seed should be allowed to dry out thoroughly before being threshed and bagged, as it heats very readily where this is not done.

Regarding varieties, a large number have been tried so far, and those which have shown the most promise are Otootan, Biloxi, and Laredo, particularly the two former. Otootan is the most leafy and lightest stalked of these varieties, and shows distinct promise as a fodder variety. The other two varieties are also tall-growing, leafy varieties, but are not as fine-stalked as Otootan.

From a grain point of view, Biloxi would probably prove the most suitable variety. These are fairly late maturing varieties and should be sown not later than November in the coastal districts and earlier than that in districts where early frosts may be experienced.

Of the quick maturing varieties, none has shown more promise than one known as A.K. 2. This variety was introduced last season by the Ford Motor Company and the seed was kindly forwarded to the Department of Agriculture for trial purposes.

To save any disappointment to those who may wish to secure seed of Soy beans it is as well to point out that until something more definite is known regarding the suitability of the different varieties only sufficient seed is being retained for experimental purposes. No variety has yet given consistently good results to recommend their growth in preference to cowpeas.

Millets.

For a quick growing summer grazing or hay crop, particularly for the coastal districts, the millets, or what are commonly known as panicums, have proved the most suitable. They can be grown on almost any soil that could be classed as worthy of cultivation.

They are usually sown broadcast at the rate of 12 to 15 lb. of seed per acre. They can be sown as soon as frosts are over and, given favourable weather conditions, will provide good grazing within five or six weeks from the time of sowing. They should not, however, be grazed too early but should be allowed to reach a height of 8 or 9 inches when they will have usually a sufficiently strong root growth to stand grazing.

If the crop is not allowed to become too mature before being grazed, a good second growth will appear, which can either be used for grazing purposes or for converting into hay.

When being used for hay the crop should not be allowed to mature the seed, but should be cut when the grain is forming.

Apart from the loss of food value in an over-matured crop, most varieties shed their seed freely, and this will germinate freely the following season. This would be of little consequence where the same land was again required for this crop, but where a crop such as maize or potatoes was to be grown, extra work would be entailed in cultivation to deal with the volunteer growth.

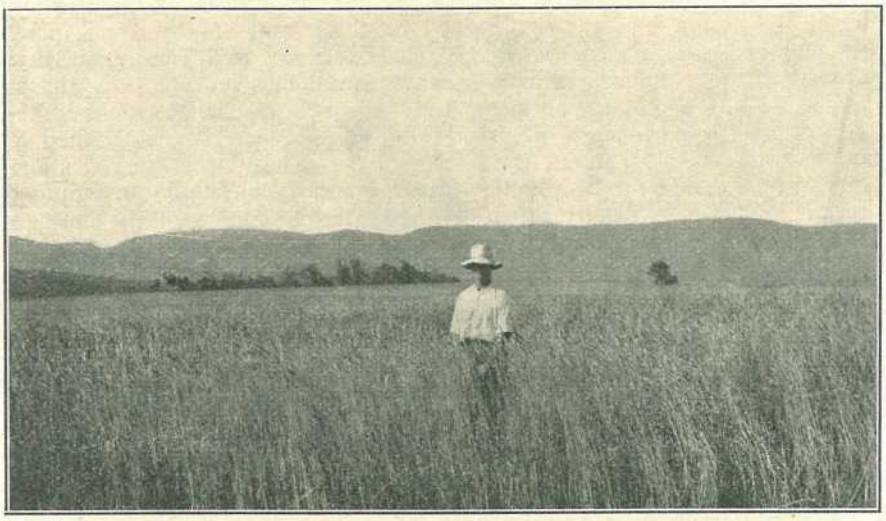


Plate 217.—Wheat Lands at Upper Freestone, Darling Downs.

"Wheat, wheat, wheat! Oh, the people have to eat!
An' you're servin' and deservin' of a velvet-cushion seat
In the cocky farmers' heaven when you come to throw a seven;
An' your password at the portal will be wheat, wheat, wheat."

It will be found that most varieties dry out more slowly than most other hay crops, but when properly cured make a very nutritious hay.

They are also of value for silage purposes either for mixing with a heavier stalked crop such as maize or sorghum or for using alone.

When used for this purpose the crop is much more easily handled both in the field and while being ensiled if cut with a reaper and binder.

Of all the varieties grown, White Panicum and Japanese Millet have given the best all-round results. They not only have proved to be heavier yielders, but are better stoolers and provide better grazing.

The best of the other varieties are Hungarian and Manchurian Millet and what is commonly called Giant Panicum or Liberty Millet.

Grasshopper Control.

By ROBERT VEITCH, B.Sc. Agr., B.Sc. For., F.R.E.S., Chief Entomologist.

GRASSHOPPERS have been hatching out in abnormally large numbers in Southern and South-Western Queensland during the past two weeks, and agriculturists and pastoralists in the infested areas are faced with the prospect of very serious losses of crops and pasturage if adequate and immediate steps are not taken to deal with the generation of hoppers that is now emerging.

The Present Outbreak.

Eggs were laid by winged grasshoppers in May of this year, and these eggs overwintered in the soil until the middle of September, when the young hoppers commenced hatching out. Many are still on the egg-bed sites or comparatively close thereto, and relatively little damage has as yet been inflicted. The ground in some places is almost black with the young hoppers, but in spite of their numbers the situation is not yet out of hand and control can be established if immediate action is taken. Once they have reached the winged stage, however, the control of plague grasshoppers is virtually an impossibility, and it is generally considered essential to deal with the hoppers not later than three or four weeks after their emergence from the egg-beds and while they are still wingless.

Control Measures.

Many measures have been recommended for dealing with grasshoppers, but the use of poisoned bran bait has practically displaced all other methods of fighting these pests except in very cheap labour countries.

Arsenic in various forms is employed as the poison in the bait, the arsenical generally used being sodium arsenite.

The following is the formula of a bait that has proved very effective:—

Arsenite of soda	½ lb.
Molasses	4 lb.
Bran	24 lb.
Water	3 gallons.

The arsenite of soda, or sodium arsenite, which is best obtained in a powdered form so that it is readily soluble, should be dissolved in hot water, the solution being then allowed to cool. The molasses is subsequently added and the mixture stirred until the molasses is thoroughly dissolved. This mixture is then added to the bran, which is worked up until a good crumbly mash is obtained. The mash should trickle through the fingers and should not be made mushy by the addition of too much water. As far as practicable it is desirable to avoid mixing the bait by hand especially if cuts are present, and it is, of course, essential to wash the hands thoroughly after the preparation and application of the bait.

The bait as prepared is broadcasted in a very finely divided state over the ground infested by the young hoppers, and experience indicates that the quantity prepared according to the formula just given is sufficient to treat two-thirds of an acre. In cases where the

grasshoppers are advancing in swarms the bait may be scattered over a 30 to 50 feet wide strip in front of the advancing hoppers. The bait is generally best applied in the forenoon, but local observations may indicate that application is desirable at some other time of the day. The important point to note is that hoppers habitually feed during the day, and the bait should be scattered when they are both active and hungry. Those using the bait should accordingly make sure that it is being eaten readily by the hoppers and, if necessary, should alter the time of application to ensure early and active feeding on the newly applied bait.

The young hoppers do not commence dying until about twenty-four hours after feeding on the bait, but when forty-eight hours have elapsed the mortality is high. In the late afternoon the hoppers congregate on small shrubs and tufts of grass, and on dying they fall to the ground. Hence if one looks under such a shrub or tuft of grass on a baited area one can find literally thousands of dead hoppers although numbers of dead are also scattered about in the open. Queensland experiments have demonstrated that poisoned bran bait gives an excellent kill of the hoppers, and as an efficient and inexpensive control measure is available, primary producers are strongly advised to use the weapon that is placed in their hands.

The degree of safety associated with the application of this bait is a matter of considerable importance, and with respect thereto the position is that it contains an arsenical poison, and it must accordingly be prepared and applied with discretion. The bait must be scattered in a very finely divided flaky state and not in lumps that can be picked by by stock. Fowls should not have access to it, and the utensils in which it has been mixed or in which it is stored should not be accessible to live stock. The position would appear to be that if intelligently applied the danger to stock is nearly negligible. Enormous quantities of poisoned bran bait are used throughout the world for the control of grasshoppers, and the general opinion seems to be that the element of risk entailed in its application is very slight. Of course, as already indicated, the bait must be used with discretion and every reasonable precaution taken to ensure its safe application, for obviously no guarantee can be given that nothing can possibly go wrong.

As already stated, the use of poisoned bran bait is the standard measure for grasshopper control. Another control measure is, however, worthy of mention as a temporary expedient—namely, the dragging of burning old bags or similar material over the dense swarms of young hoppers. Such bags may be sprinkled with kerosene, and on being lit and dragged over the infested area it will be found that large numbers of hoppers have been killed. Such a control measure is, of course, much more laborious and not nearly so efficient as the baiting system already described. Nevertheless it may serve a useful purpose until the necessary ingredients for baiting are obtained.

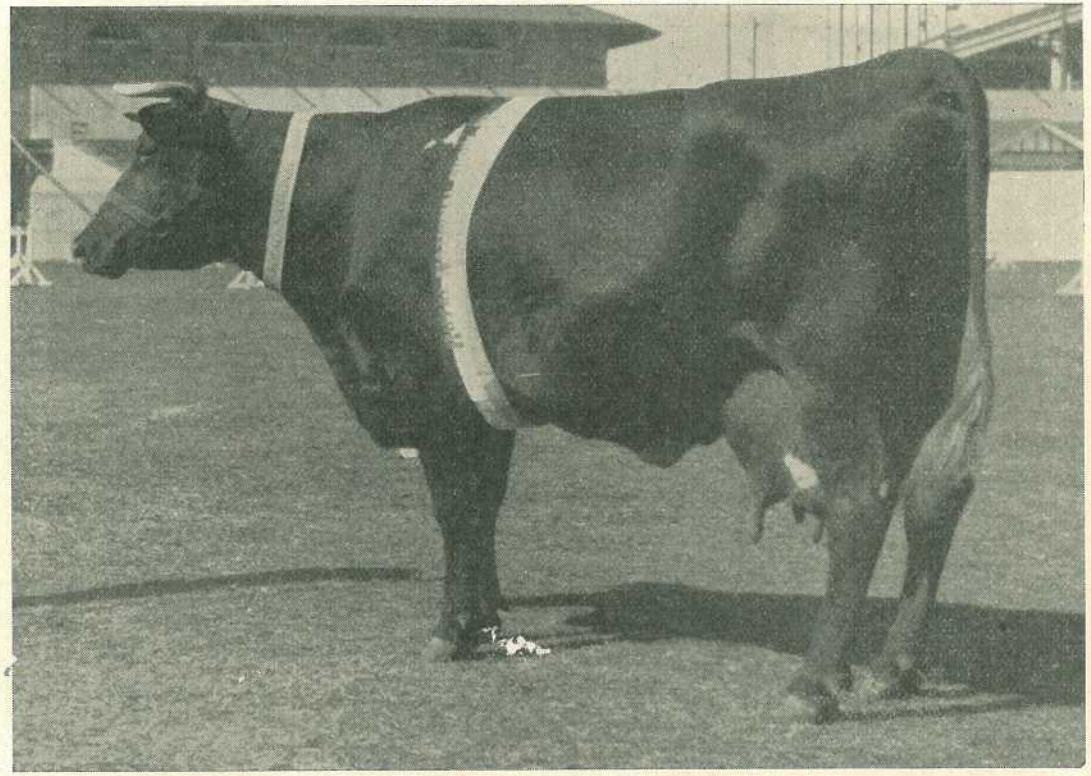


PLATE 218.
Champion A.I.S. Butter-fat Cow at the Brisbane Show, "Evelyn of Sunnyview," the property of Mr. J. Phillips, Wondai.

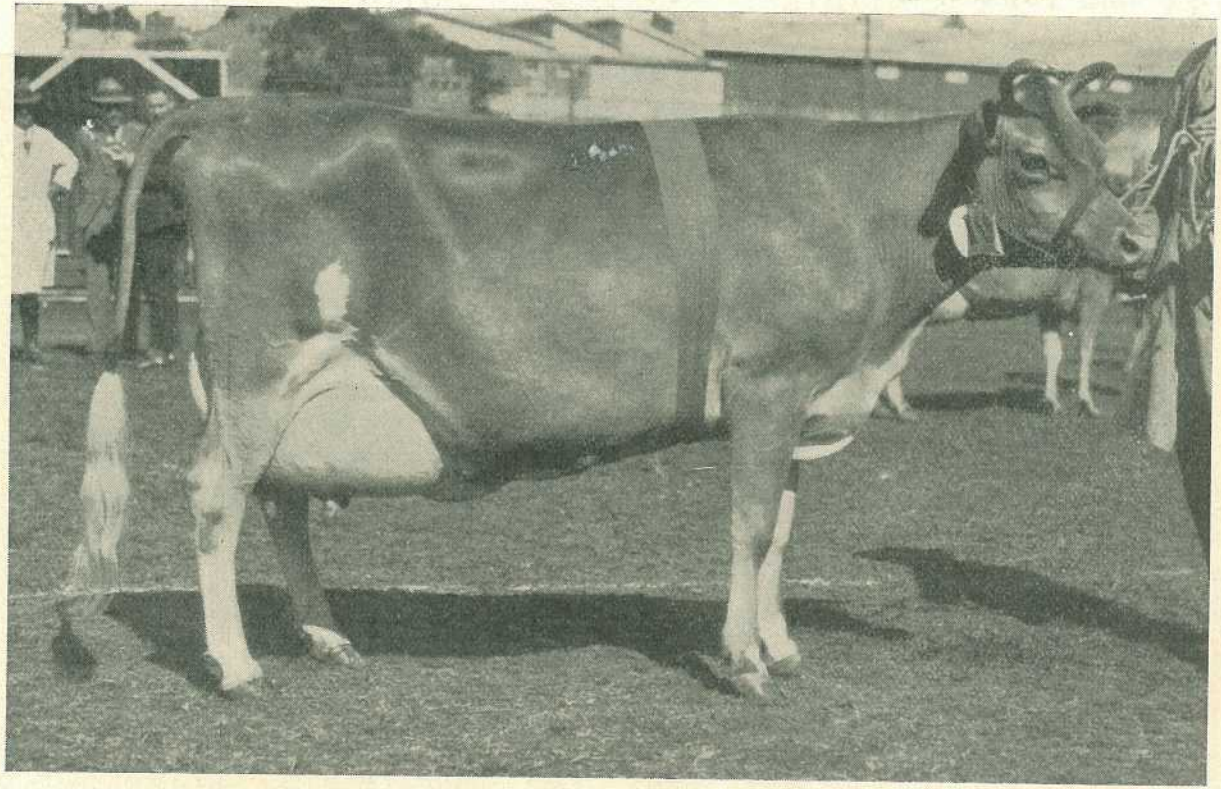


PLATE 219.

Champion Jersey Cow at the Brisbane Show, "Oxford Ginger Girl," the property of Messrs. E. Butler and Sons, Wanora, Brisbane Valley.

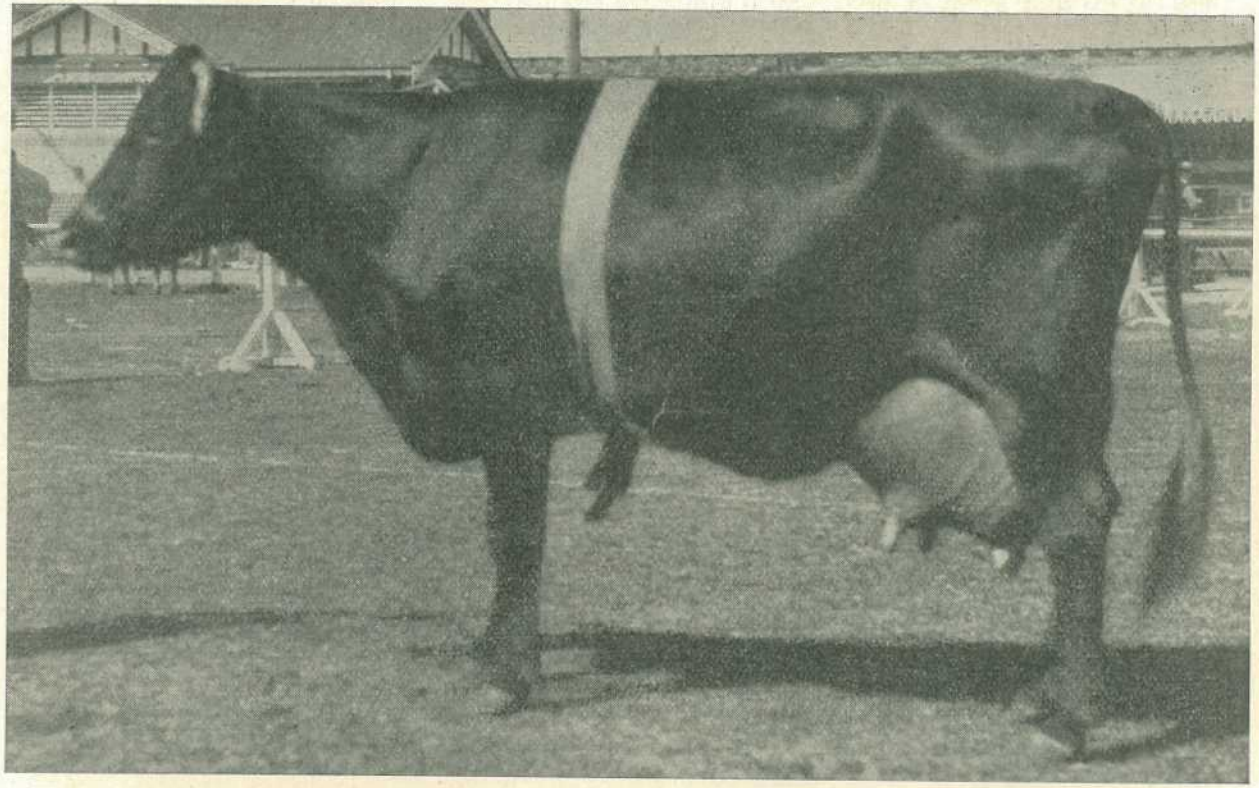


PLATE 220.

Champion A.I.S. Cow at the Brisbane Show, "Myrtle IV. of Lemongrove," the property of Mr. J. Phillips, Wondai.

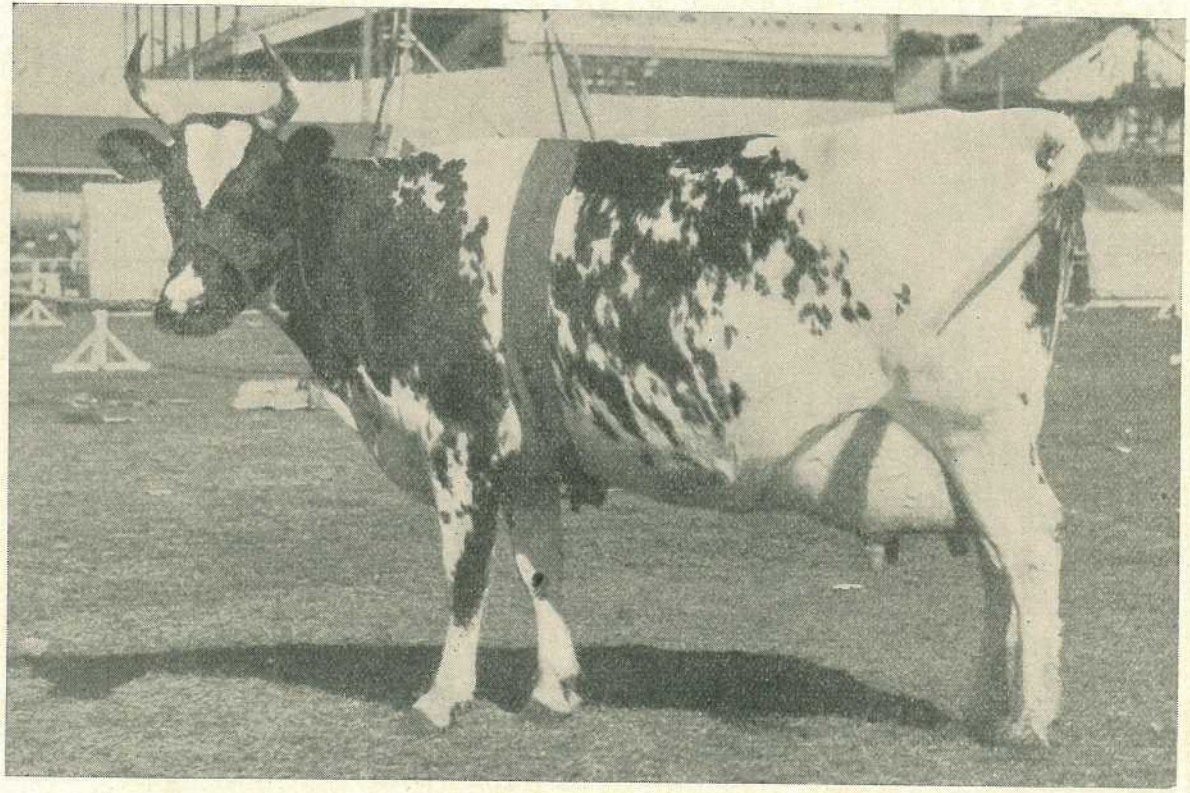


PLATE 221.
Champion Ayrshire Cow at the Brisbane Show, "Fairview Lady Bess," owned by R. M. Anderson, Myola, Southbrook.

Answers to Correspondents.

BOTANY.

Hexham Scent.

F.C. (Wynnum West)—

The specimen represents *Melilotus parviflora*, the Melilot or Hexham Scent. It is a plant resembling lucerne in appearance, and is quite common at this time of the year, growing until about October or November, when it dies off with the approach of hot weather. It was much boomed some years ago as a fodder under the name of King Island Melilot, but, on the whole, our experience in Queensland has been that stock do not take readily to it. It has a value for growing on land where other legumes will not thrive, but has the bad property of tainting milk and cream. It is quite common on the Darling Downs, and sometimes the seeds get mixed in with wheat, and, owing to their peculiar odour and flavour, cause a good deal of trouble.

Burr Trefoil; Prairie Grass.

W.G.B. (Bancroft)—

The specimens have been determined as follows:—

1. *Medicago denticulata*, Burr Trefoil. A vigorous-growing Trefoil, very common about this time of the year in parts of Queensland. It is quite a valuable forage, but dies out on the approach of the hot weather, about October or the middle of November. When it dies down it leaves a mass of burry pods, but these are greedily eaten by sheep, and the damage they do to the belly wool is more than counterbalanced by the forage features. In its green and luscious state it is apt to bloat stock rather badly.

2. *Medicago minima*, the small Burr Trefoil. Much the same remarks apply as to No. 1.

3. Prairie Grass, *Bromus uniolioides*. One of the best known winter fodders. It very often comes up spontaneously in cultivated ground. It is an annual grass, and dies out in early or late summer.

Portuguese Elm; Bauhinia.

E.J.C. (Caboolture)—

The specimens have been determined as follows:—

(*a*) *Celtis sinensis*, a native of Western China. It belongs to the Elm family and is often called in Queensland Portuguese Elm. It makes an excellent shade tree and the leaves are much relished by stock. The tree is propagated from seeds which are borne in abundance, if we remember rightly, about January or February. Though we have not tried to do it ourselves, we think there is a good possibility of striking the plant from cuttings.

(*b*) *Bauhinia variegata*, a native of India, China, and Java. A very handsome tree, much cultivated in tropical and subtropical countries on account of its showy flowers. There is a form with pure white flowers (*Bauhinia candida*).

The Scarlet Pimpernel; Groundsel.

M. D. O'D. (Gympie)—

1. *Anagallis arvensis*, the Scarlet Pimpernel, a common European weed now abundant in Queensland and the Southern States. It is recorded as poisonous, but is mostly left untouched by stock. Some years ago, however, we received a number of seeds from the paunch of a cow that had been poisoned at Buderim Mountain, evidently through eating this plant. Dr. Gilruth has also recorded poisoning of sheep in Victoria through it.

2. *Baccharis halimifolia*, the Groundsel Bush, very common now on the North Coast line, favouring country on the coast subject to inundation, but by no manner of means confined to such places, for it is found on the Blackall Range and in other localities. It has been accused of poisoning stock, but feeding experiments carried out with it some years ago at Yeerongpilly showed the plant to have no feeding value whatever, but not to be definitely poisonous.

Cape Cotton.

O.C. (Macalister)—

The plant is *Gomphocarpus fruiticosus*, commonly known as the Balloon Cotton or Bladder Cotton, and sometimes as Cape Cotton. It is a native of South Africa, and is now a common naturalised weed in parts of Queensland, particularly on coastal scrub farms. On odd occasions we have seen it as thick as Inkweed or Scotch Thistle. It is often grown as an ornamental plant, or as a curiosity on account of the inflated seed pods. It belongs to a dangerous family of plants, the *Asclepiadeæ*, and has been suspected of causing losses on one or two occasions. Stock, however, rarely touch it, or at least in sufficient quantities to cause trouble. The silky cotton which surmounts the seeds has no value for textile purposes, being too short and brittle, but the bark contains rather a strong fibre.

Grasses from South Burnett Identified.

Winter Fodder Club (Goomeri)—

The specimens have been determined as follows:—

(1) *Poa annua*, Annual Meadow Grass, a common European grass very common in Australia, mostly as a weed of cultivation, though in some localities it has invaded the ordinary pasture. It seems to be readily eaten by stock, and to be quite a useful winter and spring fodder, though not giving a great bulk of feed.

(2) *Bromus uniolioides*, Prairie Grass, one of the best known winter fodders.

(3) *Setaria glauca*, Pigeon Grass. Very closely allied to the grasses grown in Queensland under the name of Hungarian Millet, Italian Millet, Panicum, &c.

(4) *Vulpia myurus*, Rat's Tail Fescue, a common weedy grass of no value as a fodder, so far as we know. It is quite common as a winter and spring weed in cultivation in Southern Queensland.

(5) *Bothriochloa intermedia*, a species of Blue Grass, and a valuable grass in the mixed native pasture.

South-Western Grasses Identified.

W.I.B.B. (Dirranbandi)—

The specimens of grasses have been determined as follows:—

(1) *Eriochloa* sp., Early Spring Grass. Species of *Eriochloa* are particularly palatable and nutritious. We do not think, on the whole, however, that they are particularly drought-resistant. Though they are common during the summer months, they often come in with an early spring and provide succulent forage when other feed is scarce.

(2) *Panicum decompositum*, one of the commonest grasses in the West; sometimes known as Barley Grass, at other times as Native Millet. It is quite a good native grass.

(3) *Bothriochloa intermedia* (?). Better material required to be sure. *B. intermedia* and its allies are quite good pasture grasses.

(4) *Chloris truncata*, a species of Windmill Grass, as far as can be told from the very scrappy specimen. All the Chloris grasses are particularly good. They are generally abundant in cleared brigalow country and always afford a bite for sheep, making good basal growth, even during the autumn and winter months.

(5) *Atriplex Muelleri*, a species of Saltbush. This, we think, is the commonest Saltbush in Queensland. It is, generally speaking, not favoured by stock, though they seem to take to it more readily when it is dying off.

We are not too sure of the botanical names of your common Roley-poleys or Bindy-eyes, as these names vary so in different localities.

Regarding plants to try in your district, the only grasses we can think of at the moment are Woolly Finger Grass (*Digitaria eriantha*) for your sandy country, and Blue Panic (*Panicum antidotale*). Seed of the latter is obtainable from Messrs. J. Jackson and Co., seedsmen, Brisbane.

The sensitive plant referred to by you is purely a herb or fodder plant for the coastal districts of the State, particularly the northern or more tropical portions.

Groundsel.

E.L.P. (Cooroy)—

Your specimen represents the Groundsel Bush (*Baccharis halimifolia*), a very common weed on the North Coast line, smothering much of the swampy country between the line and the coast. It is, however, by no means confined to such places, and sometimes makes its way on to the scrub farms of the Blackall Range, D'Aguilar Range, and other high lands, but does not seem to spread to the same extent in those places as it does in the coastal swamps.

The plant is spread by seeds, which are borne on the female plant in tremendous abundance. They are white and feathery, and are often picked on this account by passing motorists and others for decorative purposes, are blown about the country, and this is one way by which the plant is spread. As a species of Baccharis in the Argentine has been proved poisonous to stock; feeding tests were carried out some years ago at the Animal Health Station, Yeerongpilly, with the present plant. Animals were fed for about a fortnight, and we should say they ate during that period a good deal more of the plant than they would under normal conditions. Generally speaking, stock do not take very readily to the plant, although occasionally, for some reason or other, they will punish it rather severely. So far as the feeding tests at Yeerongpilly are concerned, though the animals were very emaciated at the end of the tests, they recovered when put on to ordinary feed; hence we do not think that the plant is as poisonous as many suppose, but it has little or no feeding value.

Wild Verbena. A Species of Bassia.

A.C.B. (Alton Downs)

(1) The plant from Alton Downs is *Verbena tenera*, a native of South America. It has for many years been a common naturalised weed about some of the western townships, particularly about Roma and Wallumbilla. About Roma it is one of the commonest town weeds, but does not seem to have spread, so far as we know, to any great extent into adjacent farms. It was, no doubt, originally introduced as a garden flower. This is the first specimen we have received from Central Queensland. It is generally called Wild Verbena.

(2) The thorny plant from Theodore is *Bassia tricuspis*, a species of Bassia that seems very much on the increase. As you know, the Galvanised Burr belongs to the same genus, but some allied species, including the present one, seem to be becoming almost as serious pests. Bindy-eye is a name sometimes applied to it, but this name is rather loosely applied to quite a number of burr plants in Queensland.

Water or Wild Millet.

L.M. (St. George)—

The specimen of grass is *Echinochloa Walteri*, sometimes called Water Millet or Wild Millet. It is a useful pasture grass closely allied to such well-known cultivated fodders as Japanese Millet or White Panicum, but is only suitable for growing in wet situations. The specimen was of great interest to us, as it is the first we have seen from inland parts, although the grass is moderately common on the coast.

Burr Trefoil.

D.F.K. (Tara)—

The specimen is the Burr Trefoil (*Medicago denticulata*), a very valuable winter and early spring fodder. It should do quite well in the Tara district in an average winter, and is worth every encouragement. Stock seem to prefer the plant when it is dying off rather than when it is green and luxuriant, but even the dried plant covered with its little seed-pods is quite nutritious. The burrs that follow the seed-pods are rather objectionable in the belly wool of sheep, but the good qualities, we think, outweigh the bad. Once it becomes established on a property it generally spreads of its own accord, but if you wanted to sow seed, this is stocked by some nurserymen and is listed by Arthur Yates and Co., Sussex street, Sydney, who would give you particulars as to price, &c. Seed should be sown preferably in April or May.

General Notes.

This Month's Cover Design.—An Acknowledgment.

For the photographic print used in this month's cover design we are indebted to the Editor of the "Courier-Mail," who has courteously permitted us to reproduce the striking farm scene at St. Lucia, which appeared originally in pages of his paper.

Staff Changes and Appointments.

Messrs. K. R. Hack (Nerang) and J. Wilson (Hunchy) have been appointed Growers' Representatives on the Banana Industry Protection Board.

Mr. P. T. Smith, of Kiamba, has been appointed an Honorary Inspector under the Diseases in Plants Acts.

Sub-Inspector J. Henderson, Townsville, has been appointed also an Inspector under the Slaughtering Act.

The Officer in Charge of Police, Oakey, has been appointed also an Acting Inspector of Stock.

The appointment of Mr. A. E. Adcock (caretaker of the Wambo Shire Council Dip at Dalby) as an Acting Inspector of Stock will be cancelled as from the 1st October next.

Mr. G. W. J. Agnew, of Gatton, has been appointed an Inspector under the Diseases in Plants Acts, Department of Agriculture and Stock.

Mr. D. F. Keith, Inspector of Dairies at Crow's Nest, has been appointed Grading Inspector, Department of Agriculture and Stock.

Mr. H. B. Ford, Inspector of Stock, Ravensbourne, has been appointed also an Inspector under the Slaughtering and Dairy Produce Acts.

The Officer in Charge of Police, Tully, has been appointed also an Acting Inspector of Stock.

Mr. A. F. S. Ohman, Government Veterinary Surgeon, Brisbane, has been transferred to Toowoomba.

Mr. S. C. Allan, Inspector of Stock, Crow's Nest, has been appointed also an Inspector under the Dairy Produce Acts.

Mr. G. Ollett, Secretary of the Marian Mill Suppliers' Committee, has been appointed Canegrowers' Representative on the Marian Local Sugar Cane Prices Board in place of Mr. G. H. R. Dark, deceased.

Constable J. A. Schick, Bedourie, has been appointed also an Inspector under the Slaughtering Act.

Mr. H. B. Carney, Clerk of Petty Sessions, Ingham, has been appointed Chairman of the Macknade and Victoria Local Sugar Cane Prices Boards in lieu of Mr. J. A. Murray, resigned; also an Agent of the Central Sugar Cane Prices Board for the purpose of making enquiries under Section 5 (2A) of the Regulation of Sugar Cane Prices Acts in regard to sales and leases of assigned lands.

Mr. M. R. Muller, Inspector under the Stock, Slaughtering, and Dairy Produce Acts, has been transferred from the Oxley Bacon Factory to Gladstone; and Mr. G. R. Sigley, Inspector of Stock, Slaughtering, and Dairying, from Gladstone to the Oxley Bacon Factory.

The Peanut Board.

The Peanut Board election for two growers' representatives for Districts Nos. 1 and 3 for a term of two years resulted as follows:—

District No. 1 (Nanango and Wienholt)—
Leslie Vivian Young (Wooroolin) .. .. .. 163 votes.
Norman James Christiansen (Wooroolin) .. .. 157 votes.

District No. 3 (Rest of Queensland except Central Queensland)—
Albert George Whiting (Atherton) .. .. .. 62 votes.
Daniel Macdonald (Biboohra) .. .. 3 votes.

Mr. Christiansen, the present member for District No. 1, has been replaced by Mr. Young; and Mr. Whiting has been re-elected for District No. 3 by a considerable majority.

Police Reserve at Marlborough a Sanctuary.

The Police Reserve at Marlborough has been declared a sanctuary under the Animals and Birds Acts. Native animals and birds will, in future, be protected on this reserve.

Rural Topics.

The Art of Advertising.

"I do not pretend to be an expert," said the Prince of Wales the other day at the annual dinner of the Advertising Association, "but I have studied the questions of salesmanship and advertising, not from statistics, but from any years of travel, not only in this country but throughout the world, hearing for myself and seeing for myself. Experience has taught me that just as unmined gold has no value, so are manufactured goods, hidden away in warehouses and factories, useless until made known and made desirable by the art of advertising." The Prince also expressed the opinion that advertising is more urgently needed to-day than ever, and that upon the efficiency with which it performs its task much of our prosperity must depend; and it was evident from his references to advertising methods that he has given the subject very close attention.

A Typical Bull's Head—Illawarra Breed Type.

In all dairy breeds a good deal of importance is attached to the head of the bull. Mr. A. M. Hunt, president of the Australian Illawarra Shorthorn Society, recently described what he considered should be a good standard head. It should be masculine and full of breed character, clean cut and well moulded; of medium length in proportion to size of animal. Forehead broad and slightly dished between the eyes, of medium length, well moulded, and narrowing a little below horns. The hair on the forehad either curly or rather long, but should be of good quality. The horns either short or of medium length, set well apart on crown of head, and of a waxy or creamy appearance, oval shaped at base, and of medium thickness, gradually tapering and continuing forward on a level with top of crown, and with a slightly upward or downward tendency at points, the latter preferred. Coarse, over-long, heavy or cocky horns objectionable. Full, clear, prominent eyes of a bluish tinge, and set well apart, and encircled by an orange-tinted skin, either free of hair or with very fine short hair. The face, from eye to muzzle, should be of good length, strong and well chiselled, and not dished, joining on to a clean, square, fairly broad, flesh-coloured muzzle. Mouth of medium size, lips not heavy, but nostrils well defined and open. Cheeks and jaws flat and fine, covered with shortish hair. Under-jaw well developed and fairly flush with mouth, with very little loose skin underneath. The ears of medium size set on level and with short silky hair, and plenty of secretion inside. When viewed from any angle the head and horns should harmonise with the body and give the appearance of masculine strength, vigour, yet refinement.

Value of Good Udders.

Mr. Cuthbert Nairn, of Sycamore Farm, Pennsylvania (U.S.A.), has a word to say in the "Ayrshire Digest" about the need for maintaining breed type:—

"I want a cow that has striking breed character, ample capacity, real dairy type, and quality throughout her entire make-up. By capacity, I mean those important parts of a cow that are responsible for her being able to produce efficiently. I haven't much use for a cow that is now a profitable producer.

"I have never seen a real cow that did not have plenty of digestive capacity and the ability to handle an abundance of feed.

"The udder is the most important part of the cow. A poor udder is about the worst fault that a cow can have. . .

"There are real advantages in having udders built right. Udders that are so built are protected from injuries that come to udders that hang down where they are easily struck or stepped upon. They are easier to keep clean. It is easier to make clean milk from them and there is no question but what they wear better. . .

"Some cows become worthless because of their undesirable hind legs, which should be nearly straight when viewed from the rear with the hocks squarely set. If a cow has the right kind of feet and legs she can stand long years on concrete. . .

"You will agree with me that it is a lot easier for the cow that is built right to produce efficiently year after year than the cow that is not properly made. . . "

Safeguarding the Cow—Her Economic Value.

In the course of an article in the Ayrshire Cattle Society's Journal on "Producing the Milk," A. D. Buchanan-Smith, Institute of Animal Genetics, University of Edinburgh, said:—

"If a cow has the inherited potentiality of 2,000 gallons per lactation, it would probably be enough to feed her so that she yields just rather under that. It would be positively dangerous to try to force her above her potential production. There can be no doubt that the chairman of the Milk Marketing Board was correct in questioning the advisability of forcing cows to their uttermost limits, and not merely squeezing, but positively extracting, by torture, the last ounce of milk from them. On no account should the method of feeding adopted be beyond the inherited capacity of the cow.

"The other point that emerges quite clearly is this: High milk production in one lactation is not enough. What is required is an inherited capacity for high yield, plus long life. Supposing we have a cow capable of giving 1,200 gallons. If we force her so that she gives 1,300 gallons, we would possibly put her off her legs and she would not live long. Accordingly, she should be fed for rather under her hereditary capacity, and we should hope to get a long life out of her. Attention to the feeding question, however, will not alone make a cow live a long time. Not all cows die a natural death. They get troubled with their udders, with their feet, with their legs, and with their reproductive organs. It is those troubles which cause a cow to be put out of the herd, and so shorten her life. It is the cow who has the hereditary capacity for withstanding these troubles that is the economic cow. A good, hard-wearing udder, good legs, good feet, the capacity to reproduce regularly, are subject both to nutrition and heredity. The two must work hand-in-hand, and of course there must be adequate control of disease.

"How, then can we measure the economic value of a cow? The mere yield of a single lactation is not a very reliable indication. It may indicate a bad cow, but it cannot reveal a good one. What is of prime importance is that the cow should have given a good yield for a long period. Therefore, when we talk about the 10,000-gallon cow, or hear the Americans talking about the 100,000-lb. cow, then we are hearing about valuable animals, especially if those high yields have been compiled by an average of 1,000 gallons per year over a period of ten years. There can be very little room for doubt that such cows are truly economic and remunerative to their owners. From a productive standpoint, that is the ideal cow of the Ayrshire breed, the four thousand pound butterfat cow."

Mange Cure.

We are frequently appealed to for a remedy for dogs affected with mange. We recommend the following, which we have found very effective in almost every case where it has been applied in time. Don't wait until the dog is hopelessly affected before commencing treatment.

Wash affected parts with soft soap and warm water an hour before applying.

Apply 1 dr. creosote, 1 dr. liquor of potassa, 12 drs. olive oil. Repeat twice weekly.

Wanton Destruction of Wild Birds.

Extract from the Annual Report of the Queensland Society for Prevention of Cruelty:—This is a matter about which the society has been much concerned, because we were aware of the extent to which the cruel destruction of harmless birds took plase, mostly at the hands of thoughtless school boys, and in some cases the sons of parents who subscribe to the society—yet they provide their sons with pea rifles and shanghais to go out shooting birds. Perhaps the mother bird of a nest of fledglings is maimed or killed, leaving the little family to die of starvation.

We have in the past endeavoured to stop or check this by appealing through the schools, but we only met with a small measure of success. Now, however, we are glad to learn that action is being taken by Mr. Bulcock, the Minister for Agriculture, and we are hopeful that before this report is in print, a proclamation will have been issued by the Government making the Greater Brisbane area one big sanctuary. At present there are nearly thirty different sanctuaries, which makes it impossible to check those breaking the law. But when this one sanctuary scheme becomes an accomplished fact, then any person found with a gun, pea rifle, shanghai, &c., within the area, will be committing an offence.

We heartily compliment the Government on its humane action.

Another phase of cruelty is involved in the many instances of trapping and traffic in birds that are purchased by no doubt well-meaning people, and then caged for the rest of their lives. Why do we do it? [The whole of the Greater Brisbane area has since been proclaimed a sanctuary for protected bird life.—Ed.]

The Home and the Garden.

OUR BABIES.

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

HOUSEKEEPING IN HARD TIMES.

SPEND YOUR MONEY WISELY AND ECONOMICALLY.

(*In writing this we are indebted to a booklet by Dr. Phyllis Cilento and to other kind friends who have made a special study of economical housekeeping. We write with special reference to conditions in Brisbane.*)

THERE are two reasons why so many children are poorly nourished—want of knowledge and want of pence. It is quite possible to give children as much as they want to eat and yet feed them so badly that they cannot be really healthy. These children are thin, undergrown, easily tired, slow at school, constantly suffer from colds and coughs, often develop diseased tonsils and adenoids, and have a poor chance of developing into healthy men and women.

The Right Feeding of Families.

The right feeding of families on relief wages is difficult; yet it is surprising how much can be done by a woman who is a good manager and has some knowledge of the values of foods. Everything depends on the housewife and the care and skill with which she spends the slender stream of shillings and pence which form the family income. It will help her very much if she makes use of the following hints:—

Do not live from hand to mouth. Think out carefully the week's rations of your family—what you will need and what you will pay for it.

Buy the food supplies yourself. Local cash shopping centres are cheap, and tram fares are more than saved by lessened cost and better quality. Watch the market prices and buy what is cheap and in season. Pay cash and you can buy where, how, and when you like.

Buy wisely. It is not the costly foods that are most valuable. The cheaper cuts of meat, if properly cooked, are just as nourishing as the more expensive. Liver, kidneys, heart, and sweetbread are more valuable foods than chops, steaks, and joints, and they are much cheaper.

Choose the fruit and vegetables that are plentiful and cheap. The best vegetables are those that you grow yourself. Even a few lettuces and tomatoes grown in tubs or tins are a great help. On a very small piece of ground you can grow enough vegetables to support a family, and save two or three shillings every week. Lettuces, silver beet, carrots, and tomatoes are the most valuable and easy to grow. If besides these you can grow cabbages, beans, peas, marrows, turnips, parsnips, and onions, you are well off indeed. Every backyard should grow a lemon tree and a few pawpaws, together with a choko vine. This applies specially to Brisbane and the coastal districts from Bundaberg southwards. With water laid-on it is easier, but even without this you can use the bath water, and in good seasons the rain will help you.

Do not waste your money on cooked or tinned foods, biscuits, rusks, or fancy breakfast foods. Wheatmeal is the best breakfast food, oatmeal comes next, and both are inexpensive. Both of them may be used for scones, cakes, and puddings; if flour alone is used, add some large spoonfuls of cooking bran.

The one thing of which you should always buy enough is milk. Every child under six should have one pint of milk daily; from six to fourteen half a pint is the least that can be advised; over fourteen a quarter of a pint should be the minimum.

Though dried skimmed milk is no substitute for milk, it may be used with butter or dripping in puddings. Condensed milk is half sugar and is never economical. Mixed, as it usually is, with much water, it is very poor nourishment.

Instead of puddings, give the children sometimes junket mixed with sliced or shredded uncooked fruit—apples, oranges, pineapple, papaw, tomatoes, &c.

Butter is the most valuable fat. Next to it comes dripping, which is cheaper. You should carefully save your own dripping. This will not be much, and you will probably need to buy some. Margarine is inferior to dripping and costs more.

Use sugar and golden syrup in moderation. Too much of them may possibly satisfy your children's hunger but leave them undernourished and unhealthy for want of better food. Home-made jam (cost of fruit, sugar, and fuel) is much cheaper than bought jam.

It is better to spend a penny or two on carbonate of soda and cream of tartar than to throw away money by buying self-raising flour. Wholemeal bread and flour cost more than they should. We, therefore, advise you to buy cooking bran (1½d. a lb.) to add to porridge, puddings, and scones; or it may be taken simply moistened with milk or water. The daily allowance is two heaped teaspoonfuls for each person. In a family of five 1 lb. should last twenty-five days.

Prepare the right quantities for each day, but never throw away food unless it is bad. "Leftovers" may be used in many ways. Sour milk can be made into scones and saves using cream of tartar. Porridge may be made into milk puddings. Stale bread and scones may be made into trifle, with junket or custard and jam, or they may be baked into rusks, or they may be fried. Crumbs are always useful for cooking. Pineapple peelings make a nice acid drink. Cold potatoes may be sliced for salads, made into soup or into scones. Outside lettuce leaves, turnip tops, and silver beet are as good as spinach. Bones and fishbones and trimmings of bones and fish are good for soup; so also is any water that drains away from cooked vegetables. Pea pods boiled soft and strained are a useful vegetable for soup.

Save fuel by arranging your meals so that several dishes may be cooked at the same time. Remember that raw fruits are better than cooked fruits. Well-washed lettuces with sliced tomatoes or shredded young carrots should sometimes replace cooked vegetables. Cold meat is better than twice-cooked meat (though that is good) if it is fresh, but it must not be kept over twenty-four hours in the summer.

If vegetables are grated or cut up small, they need less cooking.

Next month we will give some economical weekly diet sheets.

IN THE FARM KITCHEN.

PINEAPPLE RECIPES.

Pineapples can be used to give zest and variety to meals which have, perhaps, become a trifle monotonous.

Their valuable dietetic properties are becoming more and more widely recognised, and, as an article of diet for both adults and children, they are rapidly increasing in favour.

Pineapple Plain.

Pineapple served in its own shell is very attractive. Cut off the bottom of the pineapple at the point where the sides begin to narrow downwards, and at the point where the sides begin to narrow upwards cut off the top. Take a very long sharp knife (a saw-knife is best) and detach the whole of the rest of the skin in one piece. Slip it off and cut the pineapple into round slices, without allowing them to fall apart. Stand the shell upright and very carefully replace the slices. Keep any juice, add to it a little liqueur, and serve separately. When shredding pineapple, the easiest way is to cut the pineapple in half, and with a stainless or silver knife chop and shred it within the skin before scooping into a dish. It is thus possible to get every bit of fruit and juice, leaving only the core, skin, and eyes behind.

Pineapple Dessert.

Peel a ripe pineapple and carefully take out the core with a silver knife. Pour into the cavity some sweet white wine and let it stand for twelve hours. Cut in slices and serve with caster sugar.

Pineapple Slices.

Take some peeled and cored pineapple slices and stew them in a thin syrup flavoured with rum. Cut slices of stale plain cake the same size as the pineapple and fry them in butter. Dust over with caster sugar, arrange them alternately on a dish with the pineapple and pour over it all the syrup and serve hot.

Pineapple Cup.

Squeeze the juice from a large pineapple and add to it a breakfastcupful of well-made barley-water and a wineglass of Kirsch. Let it stand for half an hour and add soda-water if liked.

Pineapple Salad.

Mix 1 cup tart chopped pineapple with a shredded grapefruit and half cup chopped nuts or celery. Add fresh or preserved cherries and serve on lettuce with mayonnaise dressing.

Pineapple Soup.

Take 2 tablespoons sago, 1 pint water, 1 stick cinnamon, 1 cupful chopped raisins, sugar to taste, cupful pineapple, juice half lemon, pieces of chopped pineapple. Put the sago in a pint of water and let it cook in a double saucepan with the cinnamon until transparent. Add the chopped and seeded raisins, sugar, pineapple, and lemon juice. Serve in glasses very cold with small pieces of pineapple floating in it. (A delightful dish for luncheon on a hot day.)

Pineapple Cream.

Take a large ripe pineapple, cut it in half, and shred all the pulp. Press half of it through a sieve, add to it the juice from the other half, and make it hot. Dissolve in it ½-oz. gelatine, add 3-oz. caster sugar and the rest of the shredded pineapple. Whip half pint of cream until stiff, and when the pineapple mixture is cool, stir together and keep stirring gently until it begins to set. Pour into a mould.

Pineapple Fritters.

Prepare the pineapple in advance by peeling, coring, and cutting it into medium slices. (The slices may be cut in half or left in rounds.) Sprinkle well with sugar, pour over them a wineglass of brandy if liked and let them stand for three hours. Make a thick batter by putting 6 tablespoons sifted flour into a basin with a pinch of salt, and adding to it yolks of 2 eggs and quarter pint of cold milk. Mix until very smooth, then add the whites of 3 eggs which have been beaten to a stiff froth. Dip each piece of pineapple into the batter and fry in boiling lard until a nice golden brown. Dredge well with caster sugar.

Pineapple Savouries.

(1.) Take a slice of pineapple, one-third of an inch in thickness, peel and core it, and cut into small cubes. Take some salmon, mash it up finely with seasoning and a dash of mayonnaise. Arrange a little on each cube of pineapple, garnish with chopped mint or capers, and place on each piece a toothpick for handling it. Arrange in a lettuce leaf or in paper cases.

(2.) Take cubes of pineapple, as in the previous recipe, dip them in flour seasoned with pepper and salt, and fry them in hot bacon fat. Fry also some narrow strips of bacon, and serve with pineapple on a fried crouton.

Pineapple Cake.

Take a round or square cake-tin and butter it very liberally. Put a thick coating of brown sugar and some more small pieces of butter, then half cup pineapple cut into small pieces. Pour in a plain Madeira cake mixture and cook in the usual way. Turn out when cooked, and, when cold, serve with whipped cream.

Pineapple Snow.

Take a small ripe pineapple, cut in half and shred as directed. Place in a saucepan with half cup sugar, and cook for a few minutes. Thicken with 1 dessert-spoon of arrowroot mixed with a little water. When thick remove from fire, and, when cold, fold in the whites of 2 eggs which have been beaten to a very stiff froth. Place in ice chest to become thoroughly cold and serve with custard made from the yolks of the eggs.

Pineapple Chutney.

Take 4 lb. unripe pineapple (peeled and cut into pieces), 1 lb. sultanas, 1 table-spoon green ginger, 1 oz. garlic, 1 lb. onions, 2 oz. salt, 1 oz. mustard-seed, 2 bottles vinegar, half tin golden syrup. Sprinkle the pineapple with salt overnight, drain, put it into the vinegar, and simmer over the fire for half an hour. Add all the other ingredients except the golden syrup, allow to cook slowly for another hour, add the syrup, and continue to cook for another half hour. Put into small jars and cork down when cold.

Crystallised Pineapple.

Take pineapples which are ripe, but not overripe. Peel them and cut into slices, taking out the core. Weigh the fruit and allow equal weight in sugar. Place in a dish and sprinkle them with part of the sugar. Leave for twenty-four hours, take the juice from the fruit, the remainder of the sugar, and quarter pint water to each pound of sugar. Boil gently for ten minutes, put in the pineapple, and boil two minutes. Turn all into clean dish, leave for two days, then boil the syrup again and pour it over the fruit. Next day boil up the syrup and, once more, when boiling, put in the fruit and boil for five minutes. Let stand again in the syrup for twenty-four hours, then spread on trays to dry, either in the sun or in a cool oven. When partly dry sprinkle with sugar and keep turning until quite dry. Pack between layers of paper.

AN ANT-PROOF DEVICE.

Here is an idea for keeping ants from climbing the legs of the safe, table, &c., in search of food. The device is inexpensively constructed, and when finished will look quite tidy and keep in good working order for a very long time without further

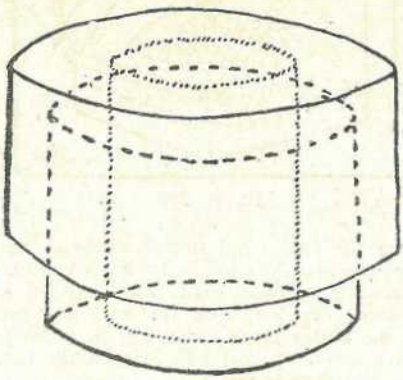


Plate 222.

attention. The materials required for each preventer are: One round piece of wood 1½ inches in diameter and 2 inches long, one round tin 2½ inches by 1½ inches, one round tin 3½ inches long by 1½ inches deep, a few strong tacks, and a quantity of light cup grease.

The round block of wood must be squarely cut off on each end and is tacked to the bottom of the smaller tin in the centre. There will now be at least half-an-inch clearance all round the block of wood, and it will project half-an-inch above the top of the tin. The grease is to go in the space round the block, but before filling in the grease it is advisable to solder the heads of the tacks over to prevent leakage, which may occur on a hot day. The larger tin is fitted over the top of the wood and tacked in place. This top tin could be left off, but without it the baffler would not look finished, and would not be as effective, for the top cover keeps the dust from settling on the grease. The measurements given above are ideal, but may be varied to suit the materials at hand; but at all times there should be sufficient clearance so that the ants cannot bridge across.

A BUTTER COOLER.

A useful butter cooler to hang on a verandah can be made from a kerosene tin, cut as shown in Fig. 1 in the illustration, allowing 2 in. for the roll. On one side allow the full height of the tin; on the opposite side cut to 5 in., and slope the remaining sides. Place a ¼-in. iron rod along the edge, grip with a footprint wrench or pliers, and roll downwards till the dotted line is reached (BB in Fig. 2). Treat

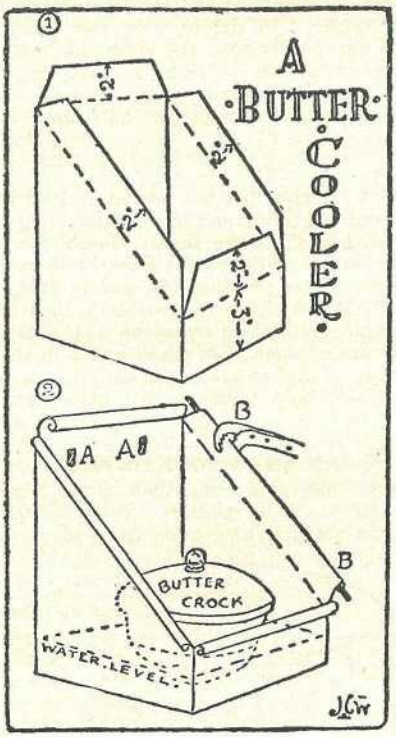


Plate 223.

all sides the same except the back; roll that inwards so that the tin will lie flat against the wall, then punch two slots in the back (AA, Fig. 2) with a screwdriver or cold chisel, about ½-in. wide by 1½ in. high. Scribe to the wall with a pencil, then screw two square-shouldered cup hoops on the wall and hang on. Put in about 2 in. of water; put in the butter crock covered with a damp cloth. If hung in a draughty place the butter will keep cool and firm on the hottest days, and it only needs unhooking to clean and change water.

FERTILIZERS FOR THE HOME GARDEN.

FOR the maintenance of fertility the city gardener has to place his chief dependence on chemical fertilizers, and the grower who lacks information as to the plant food content of his soil, and who desires to grow a wide range of crops of whose requirements he knows little, should play safe by using a high-grade "complete" fertilizer, and give a liberal application. Though he applies more than the plants actually require, the increased cost is so slight that the assurance of having enough is worth the additional expense.

A complete fertilizer is one supplying nitrogen, phosphorus, and potash in forms readily available to plants. A generally applicable complete fertilizer for home garden use consists of a mixture of dried blood, superphosphate and sulphate or chloride of potash. These substances in the proportions by weight of 3, 4, and 1 respectively give a 5-11-6 fertilizer, or one containing 5 per cent. nitrogen, 11 per cent. phosphoric acid, and 6 per cent. oxide of potash. On light-textured soils potash could be increased by using the same substances in the proportions of 2, 3, and 1, when a 4-11-8 fertilizer would be obtained.

Dried blood has many advantages as a source of nitrogen. It does not damage seeds or seedling roots, becomes available when the root system is developing, and is therefore not lost. It is a useful basal form of nitrogen application, carrying plants up to the stage where it may be advantageous to apply forcing soluble nitrogenous fertilizers.

Sulphate of ammonia may be used in place of dried blood in the complete mixture, but should be used in two-thirds the quantity. The use of sulphate of ammonia results in loss of lime from soils, and in time develops strong acidity. These harmful effects are easily overcome by liming, but it is not advisable to use this fertilizer on acid, lime-deficient soils.

The tendency in home gardens is to use quantities of manure without the application of potash and phosphate, and results in a bad nutrient balance, which accounts for the frequent reports of plants producing excessive vegetative growth, with poor flower, fruit, or tuber production. Under such conditions the addition of a mixture of four parts of superphosphate and one of sulphate or chloride of potash would result in a better nutrient balance.

For crops such as lettuce, cauliflower, cabbage, Brussels sprouts, spinach, and celery, where vigorous growth must be maintained, liquid fertilizers can be applied when the plants are well established. The following flowers, provided a complete fertilizer has been used initially, have been found to respond to nitrogenous top-dressing:—Dahlia, chrysanthemum, calendula, Iceland poppy, sweet pea, primula, &c. The soil should be moist before the application of liquid fertilizers.

The most efficient forms of nitrogen for liquid applications are nitrate of potash, nitrate of soda, or a mixture of these salts, and nitrate of lime. Sulphate of ammonia, phosphate of ammonia, or a complete liquid fertilizer consisting of nitrate of potash and superphosphate may be used. These substances are soluble in water (superphosphate will leave a considerable residue) and can be dissolved at the rate of 1 to 2 oz. per gallon, and the solution run along the rows from a water-can with the sprinkler removed, or applied with a measure in the case of larger, spaced plants.

If the liquid comes in contact with the leaves, these may be hosed down after the application has been made, to obviate the possibility of injury.

The practice of broadcasting fertilizers is wasteful, since much of it will not come within the absorbing range of roots. When seeds are planted in drills, these should be opened up several inches broad at the bottom and from 1 to 3 inches deeper than the seed is to be placed. The fertilizer is then distributed along the bottom of the row, at the rate of an ounce or two to the yard, the drill filled in to the desired depth, and the planting made.

With large growing plants that are spaced, such as tomatoes, cabbages, and potatoes, a hole a foot in diameter and several inches deep can be made with a spade, and a small handful of fertilizer scattered in the hole before filling in and planting above the fertilizer. Fertilizers for potatoes should be slightly below and in a ring about the tuber, rather than directly beneath it.

Orchard Notes for November.

THE COASTAL DISTRICTS.

NOVEMBER is somewhat of a slack month for fruit in the coastal districts, as the citrus crop, excepting a few Valencia Late oranges, off-season lemons, and a few lines, is over. Pineapples are also scarce, as the late spring crop is finished, and there are only comparatively few off-season fruits ripening. The main summer crop of fruit in the principal producing districts is only in the flowering stage, though that in the more tropical parts is ready for marketing. It is also a slack month for bananas, as the summer fruit is not yet fully developed, and the bunches that make their appearance are usually poor. They have been slow in developing on account of the comparatively cool weather of winter and early spring, when the suckers were more or less at a standstill. Young suckers should, however, be making vigorous growth now, and the plantation will require constant attention to prevent the stools being overcrowded with too many suckers. Keep the land well worked and free from weeds of all kinds, as good growth now means good bunches in the autumn and early winter. Where there is a danger of the soil washing badly with heavy rain, rows of Mauritius, velvet, or other suitable beans should be planted at right angles to the fall of the land, as the growth they make will tend to hold the soil, and thus save any from being washed away. When planting beans of any kind, either to prevent washing or for green manuring, don't forget to manure them, as thereby you will get a much greater yield, and as none of the manure is removed from the soil, as the crop is allowed to lie and rot on the ground, it is all made use of eventually by the permanent crop.

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

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

Fruit fly must be systematically fought whenever seen, and special care must be taken to gather and destroy any early ripening peaches or other fruit that may be

infested. If this is done systematically by all growers, as provided by the Diseases in Plants Acts, there will be many less flies to attack the later crops of mangoes and other fruits.

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

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

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

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

Farm Notes for November.

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

Growers are advised to make every preparation to work up the surface of the ground immediately after the removal of their crops, so that the soil may be put into good condition to receive any rain which falls, the conservation of which is the best guarantee for the success of the next succeeding crop. Such initial preparation also encourages the early growth of all foreign and weed seeds, and permits of their eradication by the implements used to produce the desired soil mulch. In such manner paddocks are kept clean and the purity of crops is maintained. The careful preparation of areas intended for maize-planting cannot be too strongly impressed upon growers. Deep and thorough ploughing, followed by cross-ploughing and subsequent cultivation of the soil, must precede sowing if success would be attained; and all efforts must be concentrated to obtain a good surface mulch. Failure to follow up the subsequent sowings by harrowing prior to the appearance of the young plant conduces to weed growths and very often entails, by neglect of this operation, subsequent hand-hoeing between the plants in the drills. Harrowing should be discontinued before the plant breaks through the surface, otherwise damage will accrue to the tender shoots of the young plants. When the young maize plant has hardened up it may, with advantage, be lightly harrowed in the direction of the drills, but such practice must discontinue once the plant has attained a height

of 6 inches. Close cultivation by inter-row cultivation implements is necessary after every shower to conserve moisture and to prevent weed growth, care being taken to ensure each cultivation being shallower than the preceding one, and so prevent damage to the root system of the plant, which is extensive. Inter-row cultivation should cease with the advent of the cob on the plant; and, if proper attention has been given to the crop, it should, at this period, be unnecessary. Where crops are planted on the check-row principle, inter-row cultivation is facilitated, and more even crops result.

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

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

Crown Land for Grazing Selection.

WEELAMURRA RESUMPTION.

CUNNAMULLA LAND AGENT'S DISTRICT.

THE eastern end of the holding, together with an adjoining surrendered selection, comprising in all about 29,000 acres of good mulga country, will be opened for Grazing Homestead selection at the Land Office, Cunnamulla, on Monday, 12th November.

The term of lease will be twenty-eight years, and the annual rental 2d. per acre for the first seven years of the term.

The area is situated about fifty-five miles south-easterly from Cunnamulla, and comprises partly nice open plains, coolibah, gilgai, and sandy mulga and pine country interspersed with box. Good herbage is available in favourable seasons, and the country is fattening.

The country is well watered by bore drains from an adjoining selection, and present supplies are sufficient.

The improvements, embracing homestead and outbuildings, fencing, yards, and bore drains are valued at £1,034.

The selection will require to be stocked to its reasonable carrying capacity with the applicant's own sheep within a period of three years, and proof must be furnished of the financial standing and pastoral or land experience of the applicants.

The selection must be enclosed with a rabbit-proof netting fence during the first three years of the term.

Free lithographs and full particulars may be obtained from the Land Agent, Cunnamulla; the Land Settlement Inquiry Office, Brisbane; and the Government Intelligence Bureaux, Sydney and Melbourne.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

Table showing the Average Rainfall for the month of August, in the Agricultural Districts, together with Total Rainfall during August, 1934, and 1933, for Comparison.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Aug.	No. of Years' Records.	Aug., 1934.	Aug., 1933.		Aug.	No. of Years' Records.	Aug., 1934.	Aug., 1933.
North Coast.	In.		In.	In.	*Central Highlands.*	In.		In.	In.
Atherton	0·89	33	0·29	2·71	Clermont	0·70	63	..	0·66
Cairns	1·75	52	0·53	2·77	Gindie	0·66	35	..	1·02
Cardwell	1·25	62	1·96	1·83	Springsure ..	1·06	65	0·16	1·59
Cooktown	1·23	58	0·23	1·02					
Herberton	0·65	48	0·37	1·22					
Ingham	1·43	42	1·29	1·93					
Innisfail	4·93	53	1·56	6·18					
Mossman Mill ..	1·42	21	0·87	4·30	*Darling Downs.*				
Townsville	0·52	63	0·27	1·84					
					Dalby	1·20	64	0·95	1·31
Central Coast.					Emu Vale ..	1·10	38	0·51	0·60
					Hermitage ..	1·19	28	..	0·38
Ayr	0·58	47	0·22	1·88	Jimbour	1·16	46	1·23	1·24
Bowen	0·66	63	0·59	2·18	Miles	1·13	49	0·26	1·52
Charters Towers ..	0·54	52	0·62	0·37	Stanthorpe	1·77	61	2·46	1·15
Mackay	1·05	63	0·42	1·93	Toowoomba ..	1·65	62	1·40	1·50
Proserpine	1·36	31	1·01	3·87	Warwick	1·46	69	0·85	0·61
St. Lawrence ..	0·82	63	..	0·58					
South Coast.									
					Maranoa.				
Biggenden	1·09	35	1·31	2·41					
Bundaberg	1·28	51	1·64	1·58	Roma	0·93	60	0·07	1·21
Brisbane	1·99	83	1·26	0·90					
Caboolture	1·53	47	1·63	1·20					
Childers	1·21	39	1·59	1·69					
Crohamhurst ..	2·18	41	1·20	1·40					
Esk	1·48	47	1·56	0·96					
Gayndah	1·15	63	1·80	1·46					
Gympie	1·72	64	1·42	1·25	*State Farms, &c.*				
Kilkivan	1·45	55	0·98	1·45					
Maryborough ..	1·70	63	2·02	1·80	Bungeworgorai ..	0·76	20	0·21	0·98
Nambour	1·83	38	1·59	1·37	Gatton College ..	1·13	35	1·01	0·73
Nanango	1·32	52	2·23	1·58	Kairi	0·94	20	0·30	2·45
Rockhampton ..	0·84	63	0·46	0·88	Mackay Sugar Experiment Station	0·90	37	0·27	1·66
Woodford	1·69	47	0·47	1·40					

GEORGE G. BOND, Divisional Meteorologist.

CLIMATOLOGICAL TABLE—AUGUST, 1934.

Compiled from Telegraphic Reports.

Districts and Stations.	Atmospheric Pressure, Mean at 9 a.m.	Shade Temperature.						Rainfall.	
		Means.		Extremes.				Total.	Wet Days.
		Max.	Min.	Max.	Date.	Min.	Date.		
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cooktown	29·99	79	32	82	18, 19, 20, 24, 25, 27, 28, 29,	51	14	23	2
Herberton	..	73	49	80	15	35	7	37	2
Rockhampton	30·12	77	52	84	15	40	8	46	5
Brisbane	30·13	70	51	77	14	41	5	126	4
Darling Downs.									
Dalby	30·13	68	42	78	28	30	5, 7	95	3
Stanthorpe	..	60	36	72	28	22	6	246	11
Toowoomba	..	63	43	72	14	32	7, 8	140	8
Mid-Interior.									
Georgetown	30·02	84	55	91	26	44	7	Nil	..
Longreach	30·12	76	45	90	26	35	6	Nil	..
Mitchell	30·12	71	40	82	26	28	6	75	2
Western.									
Burketown	30·05	82	55	90	18, 19	48	14, 23	Nil	..
Boulia	30·11	76	47	94	26	38	23	9	2
Thargomindah	30·10	69	46	89	27	37	2, 4, 6	99	2

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON AND A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	October, 1934.		November, 1934.		MOONRISE. Oct., 1934.	Nov. 1934.
	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					a.m.	a.m.
1	5·33	5·51	5·3	6·9	12·50	1·16
2	5·32	5·52	5·2	6·10	1·35	1·46
3	5·31	5·53	5·2	6·11	2·13	2·15
4	5·29	5·54	5·1	6·11	2·45	2·45
5	5·28	5·55	5·0	6·12	3·17	3·16
6	5·27	5·56	5·0	6·12	3·46	3·49
7	5·26	5·56	4·59	6·13	4·15	4·26
8	5·25	5·57	4·58	6·14	4·46	5·8
9	5·24	5·57	4·57	6·15	5·17	5·58
10	5·23	5·57	4·56	6·16	5·31	6·56
11	5·22	5·58	4·56	6·16	6·30	8 0
12	5·21	5·58	4·55	6·17	7·14	9·5
13	5·20	5·58	4·55	6·18	8·6	10·14
14	5·19	5·59	4·54	6·19	9·4	11·19
						p.m.
15	5·18	5·59	4·54	6·20	10·9	12·23
16	5·17	5·59	4·53	6·21	11·13	1·25
					p.m.	
17	5·16	6·0	4·52	6·21	12·21	2·26
18	5·15	6·0	4·52	6·22	1 28	3·28
19	5·14	6·1	4·52	6·23	2·32	4·30
20	5·12	6·2	4·51	6·24	3·38	5·34
21	5·11	6·2	4·51	6·25	4·38	6·35
22	5·10	6·3	4·51	6·26	5·40	7·35
23	5·9	6·3	4·50	6·27	6·46	8·30
24	5·8	6·4	4·50	6·28	7·52	9·20
25	5·7	6·5	4·50	6·28	8·59	10·4
26	5·6	6·6	4·50	6·29	9·48	10·41
27	5·6	6·6	4·50	6 29	10·42	11·16
28	5·5	6·7	4·49	6·30	11·28	11·47
29	5,4	6.7	4·49	6·30	a.m.	a.m.
30	5·4	6·8	4·49	6·31	12·10	12·14
31	5·3	6·9			12·45	

Phases of the Moon, Occultations, &c.

9 Oct.,	● New Moon	1 5	a.m.
16 ,,	☾ First Quarter	5 29	a.m.
23 ,,	○ Full Moon	1 1	a.m.
30 ,,	☽ Last Quarter	6 22	p.m.

Apogee, 3rd October, at 7.54 a.m.
Perigee, 19th October, at 12.18 a.m.
Apogee, 31st October, at 3.24 a.m.

When the Sun sets on the 10th Mercury, being at its greatest eastern elongation, 25 degrees, will be well above the western horizon (which it will reach 1 hour 43 minutes later) at a point 11½ degree further south at 4 o'clock next morning, Mercury will be only 2 degrees north of the Moon, so that when the Moon rises 2½ hours later the distance between the two will be between 3 and 4 degrees.

Jupiter, which may be said to have been an evening star, in Virgo, since early in April, will be lost to sight in October, as it will be in a line with the Sun on the 27th. It will then be on the far side of its orbit and at a distance of more than 550 million miles from the Earth.

Saturn, which may also be said to have been an evening star since June, keeping very near the border line of Capricornus and Aquarius, but with a slight retrograde motion, from Right Ascension 22·3 to 21·37, will become stationary on the 27th, and then again move very slowly eastward, without, however, getting so far as it was in June.

The brilliant planets Venus and Jupiter will be in very close conjunction on 2nd November, when the apparent distance between them will be only 3 minutes. This would form a very interesting spectacle if it were not that they will seem to be so close to the Sun as to be within 3 degrees of it.

The path of the Moon will be—in Gemini on the 2nd and 3rd of October; in Leo from 3rd to 6th; in Virgo from 7th to 10th; in Libra on the 11th; in Scorpio 12th; in Orphineus 13th; in Sagittarius 14th to 16th; in Capricornus 16th to 18th; in Aquarius 18th to 20th; in Pisces 20th to 22nd; in Aries 23rd and 24th; in Taurus 25th and 26th; in Gemini 27th to 29th; in Cancer 30th, and in Leo on the 31st.

Mercury sets at 7.39 p.m., 1 hour 48 minutes after the Sun on the 1st; on the 15th it sets at 7.44 p.m., 1 hour 55 minutes after it.

Venus rises only 32 minutes beforethe Sun on the 1st, and only 20 minutes before it on the 15th.

Mars rises at 3.19 a.m. on the 1st, and at 2.51 a.m. on the 15th; Jupiter sets at 7.24 p.m. on the 1st, and at 6.43 p.m. on the 15th. Saturn sets at 3.35 a.m. on the 1st, and at 2.38 a.m. on the 15th.

7 Nov.	● New Moon	2 44	p.m
14 ,,	☾ First Quarter	12 39	p.m.
21 ,,	○ Full Moon	2 26	p.m.
29 ,,	☽ Last Quarter	3 59	p.m.

Perigee, 12th November, at 10.54 p.m.
Apogee, 28th November, at 12.18 a.m.

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

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

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