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MUSHROOM GROWING AT ZILLMERE (SEE ARTICLE P. 227).

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Vealers on dairy farms ... do they pay?

By D. N. SUTHERLAND,
Director of Cattle Husbandry.

While market prospects for dairy products other than wholemilk are not promising, prices being realised for heavy vealers of the larger dairy breeds are satisfactory. This situation naturally leads to consideration of the practicability of increasing production of heavy vealers on dairy farms as a means of raising net income.

It has been found that:

- At present prices for dairy products and for vealers (20-1-59), gross returns from vealer production are considerably less than can be expected from dairying associated with pig raising.
- Vealer production requires less labour and for this reason it may offer net returns comparable with those from dairying on large farms with low output of butterfat per cow.
- Where labour released from duties associated with dairying is used to increase fodder production through pasture improvement and cropping, gross returns from vealer production could be increased substantially.
- There does not appear to be any application at present for the system of multiple suckling of calves on one cow for vealer production in Queensland.

The Price Range

The term heavy vealer usually refers to calves six to 12 months of age with carcass weight usually in the range 200–350 lb. The price range for this class of animal has varied over the past two years from £7 to £9 per 100 lb. carcass weight, giving a return of £14 to £30 a calf. Where vealers are reared in the conventional manner on their own dams this return has to be compared with the return per cow from butterfat or other dairy products, plus the price obtained for

TABLE 1.

RETURNS FROM A HERD OF 50 COWS.

Production/Cow. Lb. Commercial Butter.	Returns from Butterfat.	Value of Skim-milk for Pig and Calf Feed.	Return from Bobby Calves.	Return from Vealers.	Sale of Cull Cows.	Gross Return.
	£	£	£	£	£	£
(*a*) 150 lb.	1,250	225	80	..	300	1,855
(*b*) 175 lb.	1,460	262	80	..	300	2,102
(*c*) 200 lb.	1,670	300	80	..	300	2,350
(*d*) Vealer production (40 vealers)	..	..	..	880	300	1,180

the bobby calf and the value of the skim-milk for pigs.

Vealers or Butter?

In Table 1, estimates are given of the relative returns for a herd of 50 adult cows from butterfat at various levels of production with values for skim-milk for pig feeding and bobby calves, compared with returns from vealer production of a herd of similar size. These estimates as based on returns of 3s. 4d. a lb. for commercial butter, 4d. a gallon as value of skim-milk for pigs and £2 a head for bobby calves. It is estimated vealers are sold at nine months with average dressed weight 275 lb. and a price of £8 per 100 lb. dressed weight.

It will be seen that the gross returns from vealer production are less than can be obtained from dairying even at relatively low levels of butterfat production. But, as the amount of labour required is considerably less for vealer production, the net returns could under certain circumstances favour this enterprise. However, vealer production is likely to offer a satisfactory net return compared with dairying only in the case of large herds with moderate to low output per cow. In small herds gross returns from vealers would not give an adequate income, and in herds with high production per cow, the returns from butterfat should more than compensate for the cost of additional labour.

However, if the labour freed from duties such as milking and feeding of calves and pigs is devoted to increased fodder production through pasture improvement and cropping, a considerable increase in gross returns from vealer production could be expected.

As a Sideline

Vealer production may also be considered as an adjunct to dairying rather than a substitute. Two systems of production warrant consideration:—

1. On larger farms, the concentration of the dairying enterprise on improved areas of the farm close to the milking shed with the balance of the farm being used for the rearing of vealers.

2. The system of multiple suckling of a number of calves on a few cows with the remainder of the herd still being milked.

The application of the first of these systems is a matter which could be decided only in relation to its suitability for a particular farm. On

TABLE 2.

Stage of Lactation	Cow Producing 375 gal. Milk in 300 Days.		Cow Producing 750 gal. Milk in 300 Days.		Calf.	
	Milk.	D.P.	Milk.	D.P.	Live Weight.	Requirement of Protein/ day.
Days.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
1	15	·48	30	·96	70	·30
30	19	·61	38	1·24	95	·38
60	17	·54	36	1·08	130	·46
90	15	·48	33	·96	175	·55
120	13	·42	28	·84	220	·62
150	12	·38	25	·76	270	·67
180	11	·35	23	·70	320	·72
210	10	·32	20	·64	375	·77
240	9	·29	18	·58	440	·82
270	8	·26	16	·52	495	·84
300	7	·22	14	·44	550	·84

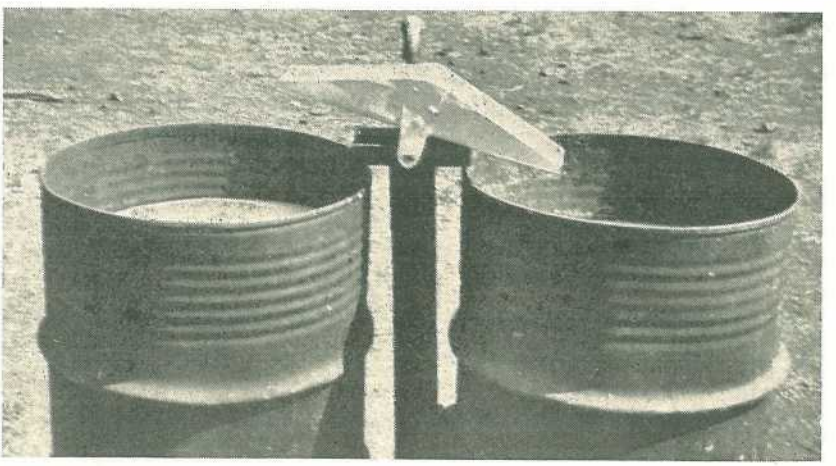
some farms it may provide the most economical method for use of resources such as land, labour and livestock.

Multiple Suckling.—The system of multiple suckling of a number of calves on one cow is reported to be used widely in the United Kingdom. By suckling four calves on one cow for the first three months of the lactation and three for each of the next three months, one cow can rear 10 calves up to the age of three months. There are two main requirements—the cow must be fed for high milk production and good feed must be available for the calves when they are weaned. These conditions do not apply to most properties in Queensland.

In Table 2 are given estimates of the daily milk production and its content of protein at various stages of lactation for cows at two levels of production together with estimates of the daily requirements of protein for a calf to be turned off at dressed weight of 275 lb. at nine months. The figures for milk production are based on a normal lactation curve where feed is available in accordance with the change in the cows' productive capacity at different stages of lactation. Under Queensland conditions, with wide fluctuations in availability of feed from pastures and crops, milk production would vary from the figures shown in this table.

At the lower level of production, the cow could be expected to rear one calf satisfactorily for the first three months and one for the second three months. At the higher level of production two calves could be reared in the first three months, but the cow would need additional feed during the second three months if two calves are to be reared.

One further calf could be reared in the third three-month period. It should be stressed that good feed such as improved pastures, crop or other supplements would be needed to keep the calves growing after they are weaned from the cow. Under Queensland conditions this could well be the critical factor in production of good quality vealers.



MR. ISEPPI at Bowenville, built this gadget for the end of his skim-milk pipeline because there is more than 44 gal. of milk. The equaliser dispenses with the necessity to be continually watching the one drum when it is nearing the full mark. There is no time lost in going down to the piggery to change drums. Also skim-milk losses are nil. Where more than one drum is being used, spillage may result. If necessary the drums can be easily moved. The milk runs from the pipe into one of the chambers. The chamber fills and upsets the balance, so that the equaliser tips to the left, bringing the right side under the pipe outlet to fill and tip, thus repeating the process and dividing the milk evenly between the two drums.

Bucket and Bail

IF you have to use antibiotics to control mastitis in your herd, remember that the milk from treated cows mustn't be used immediately after treatment. This is because traces of the antibiotic persist in the milk after treatment has been completed. As an easy-to-remember rule, withhold the milk from cows treated for mastitis with antibiotics for three days after the final dose. Milk containing even traces of antibiotic is a real problem in the cheese industry. Here, the antibiotic reacts with the cheese starter organisms, causing "slow vats" and lowered cheese quality.

Antibiotics have a very real place in curing mastitis if used with discretion. But any dairyfarmer who relies on them entirely to prevent mastitis can expect trouble.

—W. D. MITCHELL,
Dairy Technologist.

TO get best use from your milking machine vacuum pump, keep it clean and lubricate it properly. Dust drawn into the pump is held by the oil, and forms a thick, gummy mass which stops the blades from sliding in their guides. It forms an excellent abrasive to wear away the bearings and the pump barrell.

Firstly clean out the oil wells, fit a new piece of pipe cleaner and slide a piece of thin copper wire down each oil tube. Adjust the pipe cleaner ends, so that the oil well is nearly empty at the end of milking. Flush out the pump by pouring a soft drink bottle full of a mixture of half oil and half kerosene into the suction hole while the pump is revolving. Do these things at least every 6 months for best results from your pump.

—J. D. ELRINGTON,
Senior Adviser (Machinery).

Plan Now For May

TO dry off cows, stop milking them entirely.

Cows require 4–8 weeks' dry period before calving.

Prepare suitable calf paddocks for rearing young stock.

Have the mechanical efficiency of the milking machine checked during the winter months.

Cows In Merit Register

COWS that qualified for entry into the Herd Recording Section's Intermediate Merit Register (three successive lactations) during February were: Kenstan Sadie 3rd., A.I.S. cow owned by T. W. Fowler, Pittsworth; Yarranvale Myrtle 4th., A.I.S., J. Phillips and Sons, Kingaroy; Glen Erin Effort's Viola, Jersey, J. P. McCarthy, Greenmount; Yarallaside Countess, Jersey, R. S. and G. C. Postle, Pittsworth; Holm Park Lady Marion, Ayrshire, L. C. Norgaard, Nara.

Entry into the Lifetime Merit Register (2,240 lb. butterfat) was gained by Chelmer Lulu 7th., A.I.S. cow owned by A. R. Hayes, Tarampa.

Dairy Refrigerators Lift Milk Quality

By V. H. J. CALEY,
Assistant Dairy Technologist.

Farm dairy refrigeration was made economic in Murgon by a financial incentive, and its introduction caused the hygienic quality of raw milk to show a spectacular improvement. The proportion of milk with a methylene blue time of 4 hours or more increased from 42 per cent. in the nine months until March, 1957, to 86 per cent. in the nine months until March, 1958.

Farm dairy refrigerators to the value of £13,000 were installed last year on farms around Murgon. The farms involved are those supplying milk for pasteurising and bottling, and the refrigerators are used mainly for evening's milk, which is refrigerated and held overnight, and delivered with the morning's milk to the factory. Not one milk refrigerator was in the district at the time, so it might well

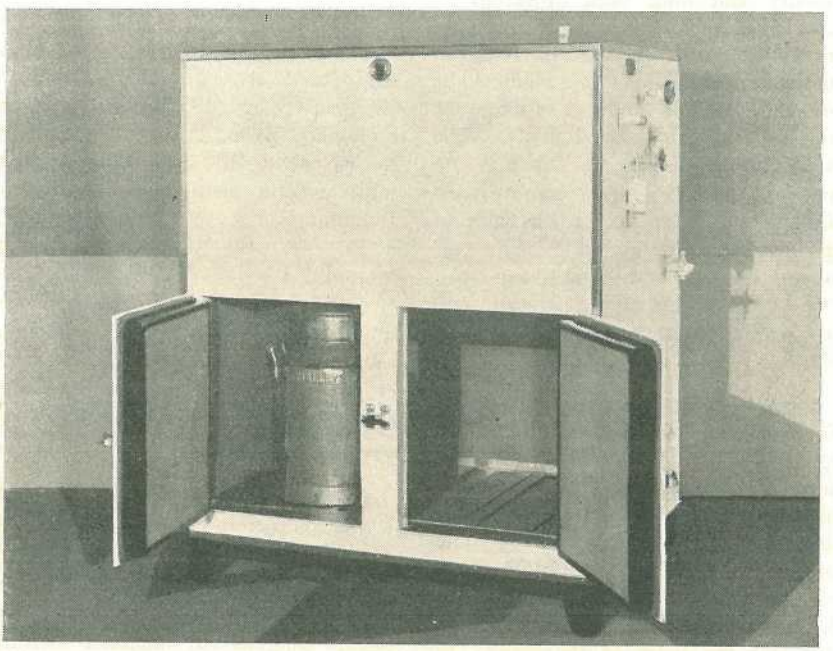


Plate 1.
Six-can Air Cooled Milk Farm Refrigerator.

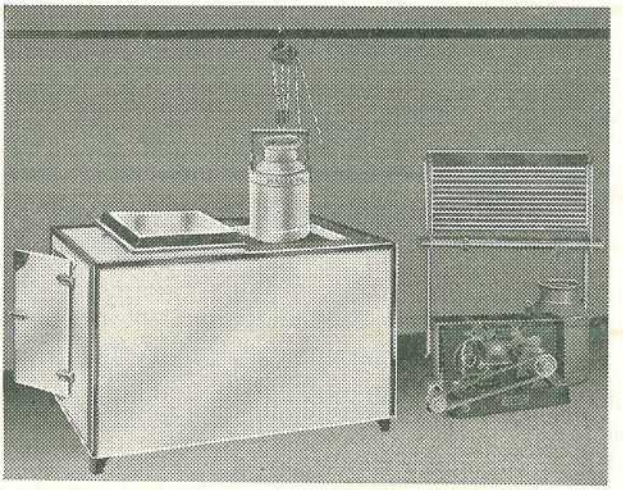


Plate 2.

Four-can Water Immersion Milk Farm Refrigerator, with Utility Section and Shock Cooler.

be asked how this sudden and general step forward came about.

The need for improved quality in summer had long been apparent to those grading the milk, for the proportion of milk meeting the required quality standard was less than half, and the task of finding satisfactory milk in summer was difficult. The cause of the poor quality was no mystery, being the 12 hours overnight storage on the farm without refrigeration, during which time the souring bacteria were able to multiply. Even milk which was produced with care, and then held overnight in summer, was unsatisfactory.

The answer was unquestionable. Nothing could keep the night's milk up to top quality but farm refrigeration. By this means alone could the milk be stored at a temperature below 40 deg. F., as is needed to stop bacteria from multiplying. Water cooling and tower cooling could reduce the temperature to 70 deg. F., but that was far short of the mark. So in order for the factory to receive a top quality raw milk for pasteurising and bottling it was essential for producers to install milk refrigerators. But how was this step to be implemented?

The course decided upon was that producing quality milk be made financially attractive, so that installing a refrigerator would become a sound economic proposition. Accordingly the Board of Directors established for milk with a methylene blue test of four hours or more a margin of 1s. 3d. a lb. butterfat above the price of unqualified milk. The financial incentive provided by the higher price for quality milk, aided by the goodwill of the producers, had the desired effect. Out of 29 farms supplying milk to the Murgon factory, refrigerators were installed on 20.

In the following summer the claims which had been made for refrigerators were substantiated. Where refrigerators were installed the proportion of milk which qualified rose to 100 per cent., whereas in summer without refrigeration the proportion of qualified milk was less than 25 per cent.

TABLE 1.

PROPORTION OF QUALITY MILK SUPPLIED.

—	Summer 1957.	Summer 1958.
	Per cent.	Per cent.
Suppliers who put in refrigerators in 1958	15	100
Suppliers who did not install refrigerators	11	22

Now farm refrigerators preserve milk quality in hot weather, and the milk delivered to the factory is top quality, which allows the factory to market top quality pasteurised milk. This progressive step to farm refrigeration was helped by providing a financial incentive.

The competitive market of today turns the spotlight on quality, and only from quality dairy products can the dairy industry look for prosperity. To preserve top quality in Queensland requires farm refrigeration, and the South Burnett Co-operative Dairy Association has demonstrated the effectiveness of a financial incentive in helping progress towards this goal.

Good-Looking Youngsters

Well-Bred Ayrshire Calves at Auchen Eden Have Their Own Paddock, Where Shade Is Provided For Them.

Herd Recording—Signpost To Success

By L. A. WILLIS, Cattle Husbandry Branch; and
K. FITZGERALD, Division of Dairying.

Herd recording results, applied to culling, feeding and calving policies, have shown two Rosewood dairy farmers the way to higher yields from their dairy herd. In four years of continuous herd recording, they have achieved a steady improvement, despite varying seasons.

Messrs. V. and N. Embrey, Tallegalla, via Rosewood, joined a Grade Herd Recording Group in 1953.

Despite the 1957 drought, they were able to maintain farm production at a high level. For the 1957-58 season, the average production per cow in their herd was 198 lb. of butterfat compared with an average of 138 lb. for the group in which their herd is recorded. They achieved this by good husbandry and farm management. Herd recording has provided the basis on which to work and measure results.

The whole herd was first recorded in 1954-55, and has now been recorded continuously for four years. The average production per cow is shown in the table:

Production figures quoted are herd recording figures, which are based on the recording season from October 1 to September 30 in the following year.

At first sight you might say that little progress has been made, since production per cow and herd numbers have not varied a great deal. But how does this record compare with the general picture in their district?

Messrs. Embrey Brothers supply cream to Booval butter factory. Here is the total butter production at that factory for the corresponding years, during which there was little change in the number of suppliers: 1954-55, 1,450 tons; 1955-56, 1,520; 1956-57, 1,184; 1957-58, 986.

Year.	Number of Cows.	Milk in Gallons.	Butterfat per Cow.	Butterfat.	Lactation Length.
			Lbs.	Per Cent.	Days.
1954–55	38	461	192	4·2	219
1955–56	37	474	211	4·5	237
1956–57	39	479	213	4·4	242
1957–58	36	429	198	4·6	265

There is a fall of 32 per cent. from 1954-55 to 1957-58; the drought was largely responsible for this. If the production on the Embrey Brothers farm had fallen to the same degree as district production, their herd average would have dropped by about 60 lb. per cow. It would have been 138 lb. butterfat instead of 198 lb.

Need for Culling

The two Embrey brothers were quick to see from their herd production figures that drastic culling was needed. Low-testing and poor-producing cows were culled heavily after the first year of recording. Without herd recording, the low testing cows could not have been identified. They are a hindrance to efficient production. Replacements are bred and reared on the property and are selected from high-producing animals. Heifers reared on the farm have been available to replace the culled cows. In this way, herd numbers have been kept at a constant level.

The herd consists mainly of Jerseys, with a few Jersey x A.I.S., and is being graded up to the Jersey breed. Herd sires are purchased from high-producing herds. Cow families are examined closely when choosing herd sires.

Having culled out the worst producers, these two Rosewood farmers realised that good producers must have a continuous supply of good feed. Once again, individual production records of the herd were used to check the response of each cow to an improved feeding system. With the "star-boarders" gone, the remaining cows had more chance to show their worth. Herd recording sorted out the better cows—those which would more than repay the cost of a suitable ration all the year round.

Plate 1.

Maize Crop with Pumpkins.

Plate 2.

Typical Section of Farm Showing Pastures and Maize Crop.

This "year-round" feed supply is based on pastures.

Paspalum, with some clover, forms the main pasture sward on the farm. In favourable seasons these pastures provide good feed through the summer months. During the autumn and winter, the nutritional level of the paspalum declines, and this deficiency has to be made up with other feed. To provide an even plane of nutrition throughout the milking season, a variety of crops is grown.

Bolstering Pastures

Under dry farming conditions, 28 acres of lucerne are grown for both grazing and hay. The lucerne is grazed during winter and also during the summer months if needed. Surplus growth during the summer is mowed and stored as hay. An area of 6 acres is sown with oats every year to provide high quality winter grazing.

Ten acres of sweet sorghum and four acres of cow cane provide bulky green feed which is chopped up and fed with lucerne chaff and grain. The sweet sorghum is fed from May to November. The cow cane is normally cut every second year from June to December, but if the season is dry and feed in short supply it is cut every year.

Maize is grown each year on about 16 acres to provide grain for feeding both cows and pigs. Pumpkins are always grown with the maize to provide extra pig feed.

Crops of Japanese millet and giant setaria are sometimes grown to provide additional feed for the summer months. If not needed for grazing, these crops are stored as a reserve of hay.

To conserve hay and grain has always been a habit of these farmers and has made a considerable contribution towards maintaining an even plane of nutrition for the cows all the year round. During the recent drought, they were able to feed continuously without buying any feed. At the commencement of the 1956-57 drought, the conserved fodder consisted of 90-100 tons of lucerne hay and 300 bags of shelled corn.

Cows are fed as much as they will eat early in the lactation, the quantity of feed being decreased as the lactation progresses. Based on total feed consumption during a lactation, an average daily ration would be

approximately 28 lb. of a mixture of lucerne chaff, chopped sweet sorghum and cow cane, as well as 2 lb. of crushed maize.

Crop Rotation

This 125-acre farm is well subdivided, with 16 cultivation and eight grass paddocks. Subdivision allows for the sound policy of rotational grazing of pastures and crop rotation.

The crop rotation programme is designed to maintain soil structure and fertility. After a period of five years under lucerne, the lucerne is ploughed in the the land is sown to maize, oats and sweet sorghum for the next five years. The new lucerne is grown on an area which has just previously been under a crop of giant setaria. The giant setaria is either grazed or mown for hay depending on feed available. Sweet sorghum is never grown in the same paddock for more than two years in succession.

Embrey Brothers attribute the excellent results they have obtained from grain crops and lucerne to the regular application of fertilizer. Grain crops are fertilised with phosphatic and nitrogenous fertilizers, while superphosphate at two bags to the acre is applied to the lucerne each year.

Farm Management

Lucerne and oats are strip-grazed with the use of an electric fence to avoid wasting valuable feed.

The herd is dehorned to ensure contented animals in the milking yards, in feed stalls, and while they are strip grazing the crops.

For convenience in feeding, feeding stalls are adjacent to the hay and grain shed.

Dry stock and young heifers are grazed in well-grassed paddocks. Springing cows are run with the milking herd on good grazing for four to six weeks before calving.

Embrey Brothers have heeded the Herd Recording Branch's advice that seasonal calving makes the most profitable use of Queensland's summer pastures. Matings are controlled so that the cows start their lactations from July to September. Records show that the average lactation length of their cows has gradually increased from 219 days in the 1954-55 season to 265 days in the 1957-58 season.

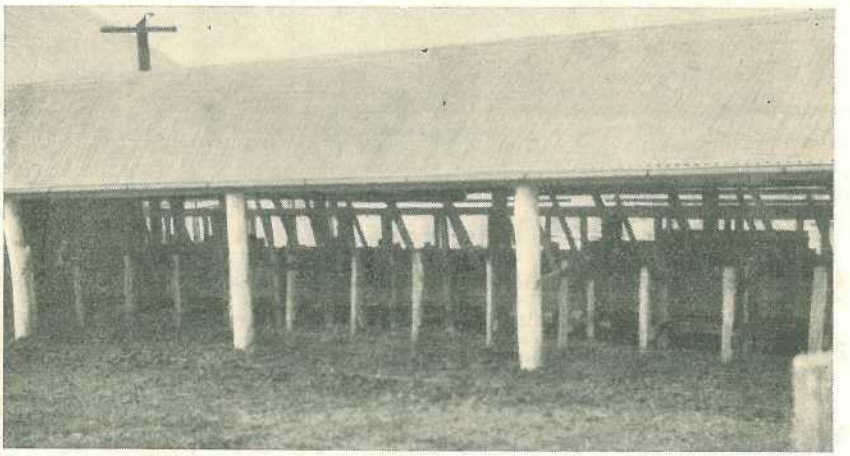


Plate 3.

From the Feed Store on the Left a Central Lane Leads Through These Feeding Stalls. Cows enter the stalls from both sides.

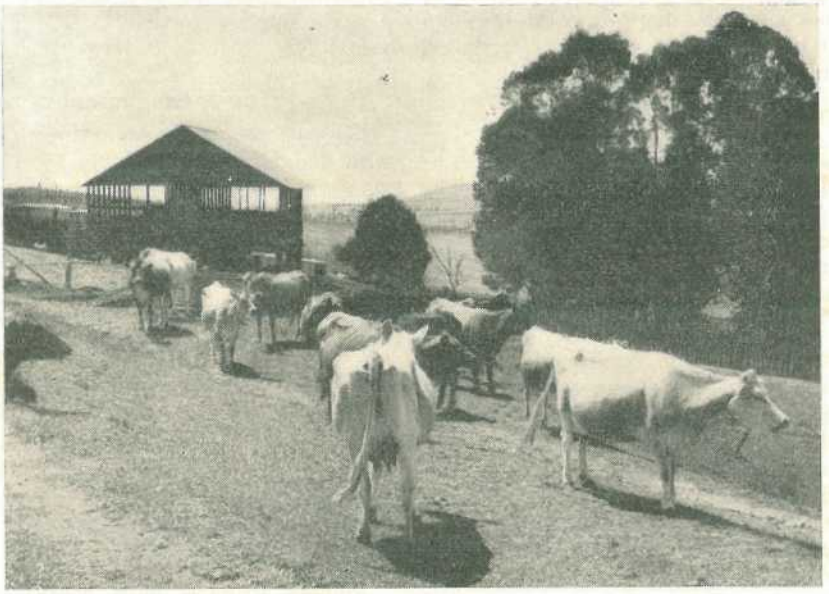


Plate 4.

Ample Water and Shade are Aids to High Production.

Pigs provide another important source of income on this well-managed farm.

Production records show the benefits that these men have gained from applying herd recording figures to their culling, feeding, and calving programmes. With continuous recording and the continued application of production records to their breeding and feeding policies, they can look forward to further improvement in the years ahead.

SAFETY FIRST

DUE to the mechanisation of rural industry, the accident rate to workers in the agricultural and pastoral industries exceeds that in all other industries, except mining.

The majority of fatal accidents to drivers of tractors are caused by the tractor rolling on drivers or back tipping. So, be careful when working on hillsides, in ditches and on uneven country; Drive Safely.
—Industrial Safety Advisory Service, Department of Labour and Industry, Queensland.

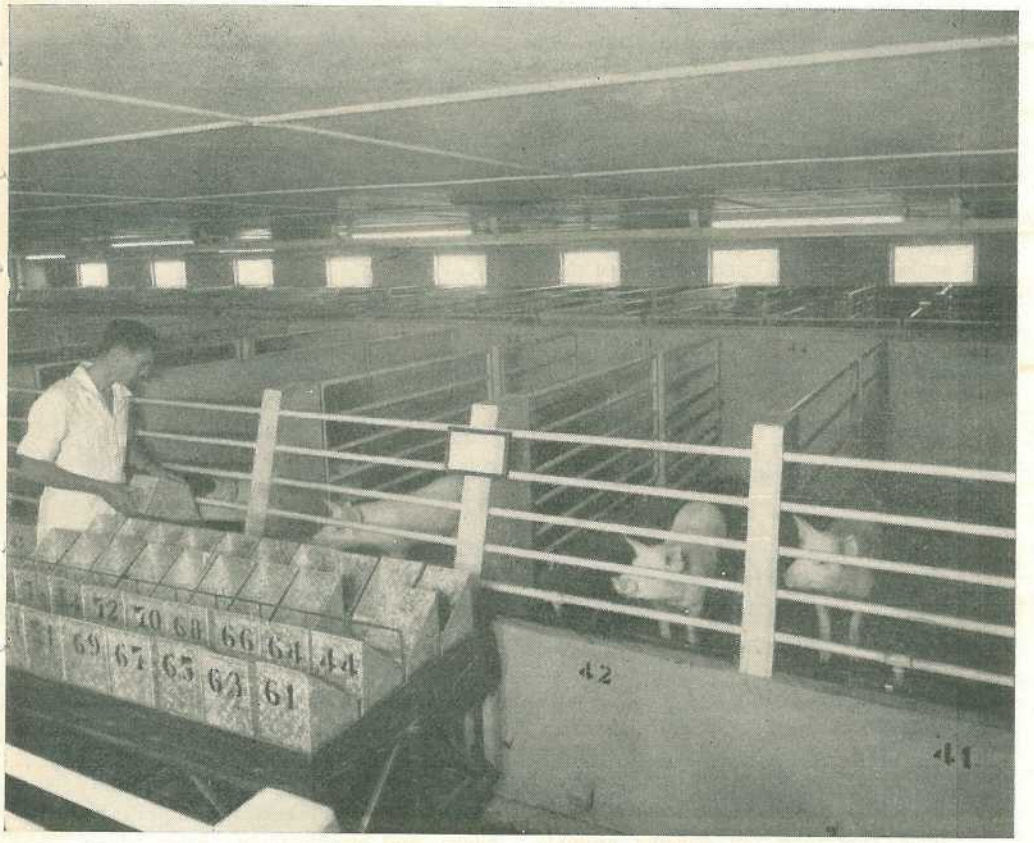


Plate 1: **Feeding Time at Rocklea Pig Testing Station.**

Pig Testing at Rocklea

By F. BOSTOCK,
Senior Husbandry Officer (Pigs).

Pig testing will give the producer true facts and figures on which to base his breeding plans.

THERE is little doubt that if the pig industry is to take its rightful place in the pattern of Queensland's agriculture, something must be done to ensure the production of uniform-type pigs, reduce the present heavy breeding losses and place the industry on a sound economic basis.

Pig production has been associated in the minds of many farmers with dairying, but in latter years, with increased demand for wholemilk for human consumption and the manufacture of dried milk powder and skim-milk powder, there is a tendency to extend the industry to grain growing areas, relying on protein supplies from abattoirs and meatworks.

It is to be regretted that the industry is not given closer attention, because pig raising is a valuable adjunct to both dairying and crop

growing, enabling the farmer to utilize by-products and surplus production to best advantage.

The days of "hit-and-miss" methods of building a successful industry have gone forever, and in these times of keen competition with other meat-producing industries, success can be achieved only if producers are prepared to study the demands of the consumer.

The foundations of a successful industry are uniform type and quality stock, well fed, housed and managed, and this can only be achieved, in the first instance, by careful selection of breeding stock. Too many farmers are content to use any sort of sow and very often a boar of doubtful ancestry, which reflects on the quality of the pigs forwarded to market.

Show-ring Guide

The show-ring is still our main guide to type, and unfortunately the merit of studs is assessed chiefly on the basis of awards and the high prices obtained for selected animals.

Show awards, however, do not attempt to measure the capacity of animals to transmit their carcass quality to their progeny, while prices secured are, at best, a form of advertising. Thus the major drawback of shows is that awards are made entirely on appearance and give minor non-commercial characteristics more emphasis than the production of good quality meat or the development of correct proportion of backfat and body length.

Selection of breeding stock is still made largely on appearance only, and the chances of selecting pigs which have attributes of commercial pigs are, to say the least, remote. Furthermore, there is no guarantee that such animals are capable of producing offspring which will yield carcasses suitable for present-day market requirements.

Such schemes as grading and litter recording are being used, with some measure of success, to improve breeding stock and ultimately commercial pigs, but each has its drawbacks, and circumstances arise which

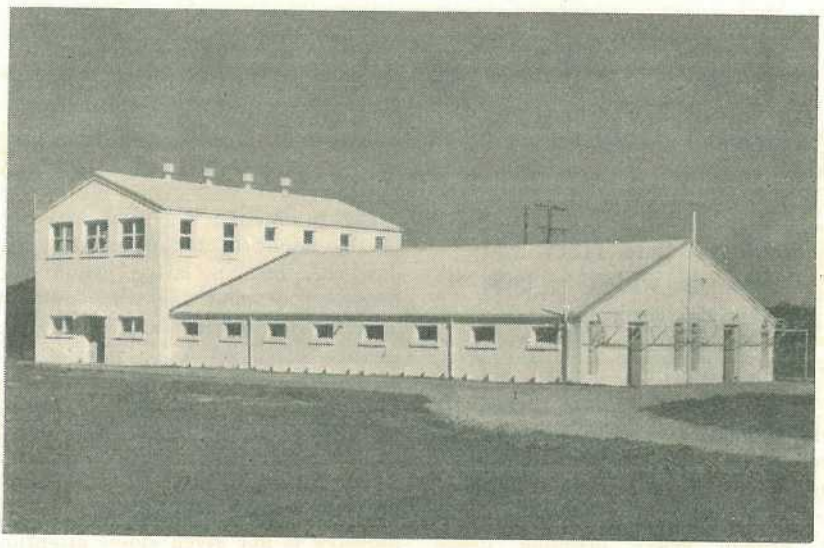


Plate 2.

Exterior of the Completed Pig Testing Station.

lead to the discontinuance of the schemes, with the result that much of the good secured, while the schemes were in operation, is lost.

As a result of this fluctuation in quality brought about by circumstances and in some cases a lack of understanding or interest, consumption of pig products slumps and the industry suffers a considerable setback, involving low prices to the producer. If, on the other hand, the quality of the product were maintained at a high level, and supply continuous, the industry would become more stable and a profitable undertaking.

Pig testing offers such a means and there is little doubt that once testing becomes properly established in Queensland there will be a marked improvement in the quality of the pigs and a big saving in production costs.

Proved By the Danes

Pig testing is not some new fantastic idea without any practical proof, because testing has been in operation in Denmark for about 50 years and the benefits which the Danes have secured in the economy of food conversion, speed of growth, improved uniformity and carcass quality are well known.

The Basic Aim of Testing

The Department of Agriculture and Stock feels that at its Pig Testing Station at Rocklea ideal conditions for testing are approached as closely as practicable, and the industry can be assured that pig testing there will be on an exceptionally sound basis.

The basic aim of testing pigs, namely, the measurement of the extent to which a boar transmits commercially important characteristics to his offspring, may be grouped under three main headings:

Characteristics primarily important to—

(*a*) The pig producer;
(*b*) The curer; and
(*c*) The consumer.

Under the first heading the two main points are speed of growth and economy of food conversion. The

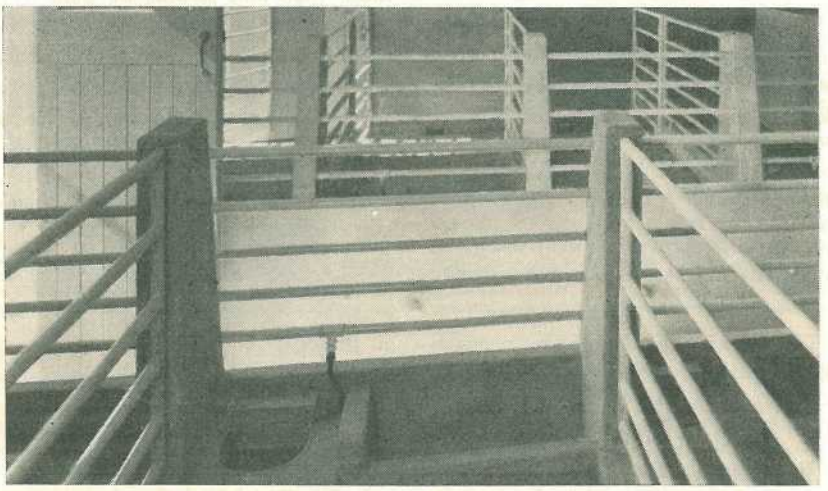


Plate 3.
Individual Pig Pens, Showing Automatic Waterer and Feed Trough.

Plate 4.
The Feed-Weighing Room.

importance of these need not be elaborated upon, but it must be pointed out that about 75 per cent. of the cost of production is represented by food, so that economy of food conversion is very important.

The second heading (*b*) applies particularly to bacon, because curers require a product which is uniform from year to year, and the retailer, quite reasonably, requires the largest possible proportion of the carcass to be in the highest priced cuts, with the right proportion of lean meat to fat and with a minimum proportion of low price cuts such as shoulders and heads.

Testing aims to do this by measuring the ratio of lean meat to fat. The importance of this balance in the carcass cannot be over-emphasised.

The third heading (*c*) refers to the modern housewife, who is mainly interested, apart from price, in the proportion of edible meat in the bacon rasher. She is not interested in fat; so testing aims to measure the amount of fat distributed throughout the carcass.

The aims of testing are to sort out those pigs and strains of pigs which are economical to the producer and at the same time satisfy the curer, retailer and consumer.

To the pig producer, one of the main advantages which testing will have over the present system of selection of breeding stock, is that it will provide authentic facts and figures upon which breeding operations may be based. This will be in place of guesswork which is the basis at present.

Pig Testing Rules

Rules that apply to the Rocklea Pig Testing Station are as follows:

1. Boars selected for testing must be standing in herds which have at least six breeding sows.

2. No certificate of performance will be given in respect of any boar until four litters sired by him out of different sows (none of which is a full sister to another) have been tested.

3. Breeders notifying their desire to have litters tested must do so two months prior to due date of farrowing. Any such litter must be the progeny of a boar and sow registered in the Australian Pig Herd Book.

4. Advice of the birth of a litter is to be given to the District Adviser (Pigs) or his agent as soon as practicable, but in any event not later than 12 hours after the birth.

5. All litters provisionally accepted for testing will be inspected and identified in an approved manner by the District Adviser (Pigs) or his agent within 48 hours after their birth. Litters will be again inspected within 24 hours of the due time of despatch of the four selected pigs to the testing station.

6. No litter will be accepted for testing which does not contain, in the case of first litter sows, seven pigs living, and in the case of sows on their second or later litter, eight pigs living, when the four test pigs are due for despatch to the testing station.

7. Litters to be tested must be not less than six weeks, and not more than nine weeks, old at time of despatch of the four selected pigs. The test pigs will comprise two castrated males and two females and each of the four must be not less than 30 lb. liveweight and not more than 40 lb. liveweight and as close to the average liveweight of the litter as possible at time of despatch. The males in a litter that are castrated (all males need not be castrated) must be operated upon when not more than five weeks old.

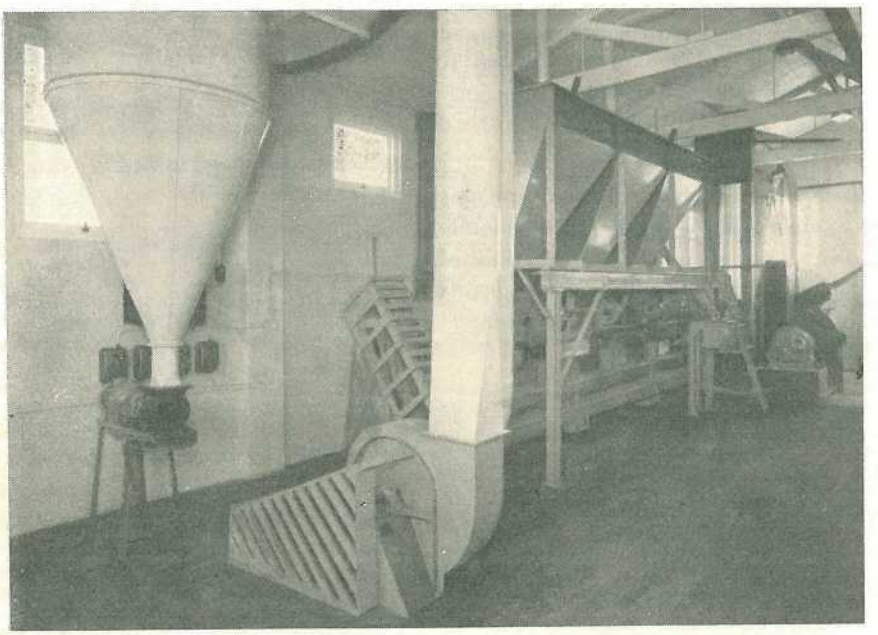


Plate 5.

Dust Extractor Unit, Mixing Bins, and Hammer Mill.

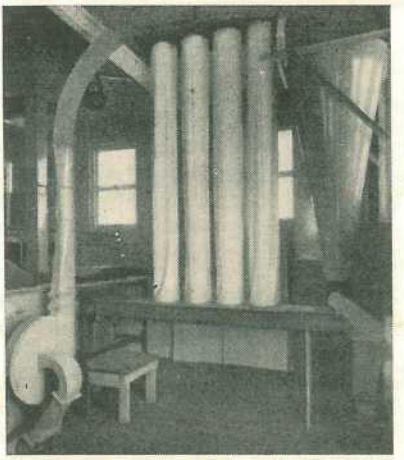


Plate 6.

Hammer Mill, Blower, and Grain Cyclone.

8. In special circumstances, permission may be granted for submission of uneven numbers of castrated males and females in the four test pigs.

9. One test pig may be removed from a test group on the grounds of ill health and the group allowed to continue under test but if two pigs have to be removed then the testing of the group will lapse.

10. Test pigs will be accepted only from brucellosis-tested herds and subject to a satisfactory inspection of the piggery of origin by an approved officer of the Department within 24 hours of time of despatch.

11. Test pigs will be purchased by the Department from their owners at a price per lb. liveweight to be determined from time to time according to the prevailing market, and the pigs will then become the absolute property of the Department. The liveweight on which payment will be made will be that of the pigs at time of despatch to the testing station.

12. Metal crates will be supplied by the Department for the transport of test pigs to the testing station and such transport will be the responsibility of the Department.

13. All pigs will be dewormed and sprayed upon arrival at the testing station.

14. No casual visitors or parties will be allowed to visit the testing station, but the Department will arrange inspection days at its discretion.

15. Feeding shall be twice daily and according to liveweight.

16. Any feed residue from a previous day's ration will be weighed back prior to putting out a new day's ration.

17. Testing will start as soon as pigs reach 45 lb. liveweight. The test pigs will then be weighed at seven-day intervals until they reach a liveweight of 200 lb.; they will be sent for slaughter to an approved bacon factory, where a carcass quality assessment will be made.

18. No test pigs will be disposed of in any way other than for slaughter as baconers unless so ordered by the Department.

19. All test pigs will be slaughtered, cut and trimmed by an approved standardised method and all carcasses will be assessed according to a system determined by the Department.

20. A report on the results of pig testing will be issued annually in the *Queensland Agricultural Journal* unless it should be impracticable to do so.

21. These rules may be altered or varied from time to time by the Department in the light of experience or changed circumstances.

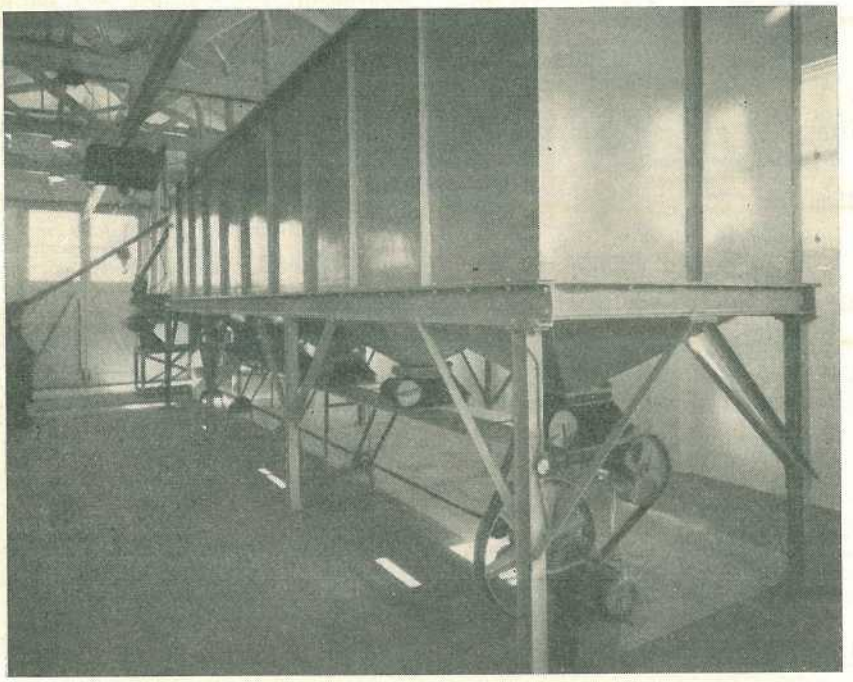


Plate 7.
Grain Storage Bins, Conveyor and Electric Hoist.

Feeding

All pigs are to be fed daily at 8.15 a.m. and 4.20 p.m. Three feed mixtures will be used and are based on the liveweight of the pigs:

Ration No. 1—*Pigs* 45–80 *lb. liveweight.*

(Mixture to contain 17 per cent. crude protein.)

Grain—90 per cent. wheat, 10 per cent. sorghum.

Meatmeal 55 per cent.—Sufficient added to provide a 17 per cent. crude protein mixture.

Mineral mixture—1 per cent. of mixture.

Vitamins A/D—100,000 I.U. of A, 10,000 I.U. of D per 100 lb. of mixture.

Riboflavin—100 mg. per 100 lb. of mixture.

Ration No. 2—*Pigs* 81–130 *lb. liveweight.*

(Mixtures to contain 15 per cent. crude protein.)

Grain—75 per cent. wheat, 25 per cent. sorghum.

Meatmeal 55 per cent.—Sufficient added to provide a 15 per cent. crude protein mixture.

Mineral mixture—1 per cent. of mixture.

Vitamins A/D—100,000 I.U. of A, 10,000 I.U. of D per 100 lb. of mixture.

Riboflavin—100 mg. per 100 lb. of mixture.

Fibre-Lucerne hay—5 per cent. of mixture.

Ration No. 3—Pigs 131–200 lb. liveweight.

(Mixture to contain 13 per cent. crude protein.)

Grain—50 per cent. wheat, 50 per cent. sorghum.

Meatmeal 55 per cent.—Sufficient added to provide a 13 per cent. crude protein mixture.

Mineral mixture—1 per cent. of mixture.

Vitamins A/D—100,000 I.U. of A, 10,000 I.U. of D per 100 lb. of mixture.

Riboflavin—100 mg. per 100 lb. of mixture.

Fibre-Lucerne hay—7½ per cent. of mixture.

Mineral Mixture.

50 lb. Ground limestone
50 lb. Fine salt
5 lb. Ferrous sulphate
1 lb. Copper sulphate

Note: As antibiotics are *not* to be included in the rations fed during the period of test, it is recommended that the litter from which the pigs are selected for testing should not be fed antibiotics.

Saving Stock From Salmonellosis

By B. PARKINSON,
Divisional Veterinary Officer,
Maryborough.

SALMONELLOSIS (pronounced sal-mon-el-o'-sis) is an infectious disease capable of affecting domestic, as well as wild, animals and birds. Human beings may also contract the disease, the possible sources being infected or carrier animals.

The disease is really a specific gastro-enteritis, that is, inflammation of the stomach and intestinal tract. The scientific name comes from the germ *Salmonella*. There are very many species of salmonella germs, of which several are commonly encountered as causing disease in cattle and sheep in Queensland. Infection with these germs is thus the cause of the disease.

Sometimes the common names of paratyphoid, typhoid fever, "gastro" or food poisoning are given to the disease in its various forms.

The usual source of infection is a "carrier" animal, that is, an animal which has recovered from the disease but still continues to discharge the germs. The introduction of a carrier animal into a clean herd or flock often causes an outbreak of disease. The germs inhabit the bowels of carrier animals, and all droppings are heavily infected. Contamination of the surroundings, including food and water, readily leads to infection of susceptible animals, especially where other factors favour an outbreak.

It must be remembered that salmonella germs are not specific for any one species of animal. Introduction of one species of carrier animal may readily cause disease in other species. Thus carrier pigs (and paratyphoid is very common in pigs) may be the source of infection of cattle.

Vermin, such as rats, mice, and cockroaches, are known to harbour the germs. It is suspected that many outbreaks, particularly in dairy cattle, have been caused through vermin contamination of feed. This can be understood when one considers the manner in which feed sheds, both commercial, and on the property, are open to vermin contamination.

Conditions.

Most animals have a certain amount of resistance to most diseases. It is only when the germs are too numerous, or the animal's resistance is lowered, that sickness may occur.

This applies to salmonellosis, and is particularly well seen in the case of dairy cattle. The disease in dairy cattle seems to occur mostly in winter months. The animal's resistance is lowered because of the cold, more so if it is wet. Hand-feeding with concentrates is more common during the winter. Hence exposure to source of infection, that is, contaminated feed, is more likely to occur. These factors

are believed to be responsible for the many outbreaks seen in a district like Gympie each winter.

Outbreaks of salmonellosis may occur during, or after, rail travel. Cases have occurred in cattle and horses, but outbreaks are more frequent in sheep. Several factors would appear to be related to such outbreaks as follows:

(1) Fatigue during the journey lowers resistance.

(2) Infection may be readily acquired at spelling yards through contaminated feed or water. Infection could spread further in the trucks after reloading.

(3) Feeding routine before and during the journey.

(4) Starvation, which may allow salmonella germs present in the intestines to multiply and invade the body, and which also lowers resistance.

In sheep the disease is commonly encountered at local slaughter-yards or off trucks. The usual practice in non-sheep districts on the coast is to purchase at one time sufficient sheep to kill over several weeks. Sometimes these sheep have travelled hundreds of miles and may have been exposed to infection at trucking or sale yards. It is not uncommon to find sickness in some batches of sheep on, or shortly after, arrival.

Salmonellosis has also been diagnosed as the cause of sickness and deaths in valuable rams or ewes transported from southern States to Queensland. Here diet is thought to be of prime importance. Usually the sheep have been on prime, succulent feed before their departure. The paunch of a sheep fed thus soon empties when the sheep is in transit. Appetite is only slowly regained. During spells, usually hay only is offered and the sheep have little appetite for this. This chain of circumstances seems to be a major factor in the onset of sickness.

Symptoms.

Infection usually takes place through the mouth, by swallowing contaminated feed or water. The germs lodge in the bowels and rapidly multiply. They may spread via the blood stream to other organs and multiply to such large numbers that the body defences are overwhelmed. Sudden deaths, with no prior symptoms, occur under these circumstances.

More often the course of the disease is protracted, during which time the germs damage the intestines. The most marked symptom is severe scouring. Mucus and even shreds of the lining of the intestinal wall are often seen in the scour. Blood is sometimes seen. The scour is particularly foetid.

Affected animals are dull. Appetite is lost, and, in milking cows, production drops off. Condition is rapidly lost—a prime beast may become poor in several days.

Initially there is a high fever—up to 105–106 deg. The temperature usually drops when scouring is severe, and may be between 103–104 deg F. Some cases with severe scouring may have normal or subnormal temperatures.

Death in most cases may occur in 2–7 days. Some cases may recover without treatment. They may scour for several weeks, and take many weeks to regain their condition.

Many recovered cases act as carriers of the germs, to infect other animals.

The post mortem changes are not very definite. The wall of the fourth stomach and intestines show severe inflammation, being more pronounced in the small bowel. Ulceration, and in severe cases, loss of the mucous lining may have occurred. Haemorrhages may appear under the lining of some of the body organs. The spleen may be swollen and somewhat pulpy.

Diagnosis.

Are these symptoms and post mortem findings the signposts of salmonellosis?

Other infections, such as coccidiosis and so-called "winter dysentery" produce similar symptoms. Worm infestation must also be considered. Poisoning, particularly arsenical and several irritant plant poisons, also cause much the same symptoms.

It is often difficult to be absolutely certain. Previous history must be taken into account. The presence of a fever is usually indicative of infectious disease. Poisoned stock seldom show fever. Thus the use of the ordinary clinical thermometer in taking the animal's temperature can provide a valuable aid to diagnosis.

Laboratory confirmation of diagnosis is most reliable. The germs in fatal cases can be readily found. Quite often it is possible to detect the germs in faecal samples from live animals exhibiting symptoms.

Modern Treatment.

Modern medicine has advanced a long way in the treatment of this condition in the past few years. Various drugs are available for treatment. As with all diseases, the length of time the beast has been affected before treatment commences is of prime importance in forecasting favourable results. Cost may be a governing factor in choosing some of the more effective forms of treatment. Ultimate choice depends upon the value of the animal.

Sulphonamide drugs, chiefly sulphadimidine, have been most useful in the past, and have the advantage of low cost. However, they are not always effective, particularly in advanced cases. The drug is best administered by using the 33⅓ per cent. solution, 100 ccs. (for an adult cow) being given daily for 3 to 4 days as an injection under the skin. For sheep, a daily dosage of 1 cc. for every 5 lb. live weight is used for 3 to 4 days.

The group of antibiotics known as tetracyclines are much more efficient, as is also another antibiotic, chloromycetin. Some are available as powder for dosing by mouth and some for injection purposes. The enonomic factor is obviously one of considerable importance here. A cost which can be reasonably sustained in the case of a stud bull would be prohibitive in flock sheep. The injectable form of antibiotics such as oxytetracycline (terramycin) or chloromycetin, are usually more effective, but more costly than types for oral use.

It is emphasised that the ultimate treatment of choice can only be determined according to the case. Veterinary surgeons or stock inspectors are best consulted before adopting any treatment.

To Prevent Outbreaks.

Preventive measures readily follow from an understanding of the conditions which favour the development of the disease. Avoiding the contamination of feed and water by vermin or infected or carrier stock is of prime importance. Any positively affected beast in a mob must be isolated to prevent further spread.

Feeding of travelling stock before departure must be considered. Instead of lush grazing, fibrous fodder such as cereal or lucerne hay, should be fed for several weeks before transit. Travelling stock should be spelled adequately and fed mainly roughage. Troughs and water facilities at trucking and spelling yards must be clean.

Public Health.

Because salmonella germs can infect humans, personal hygiene must be observed after handling affected animals. The germs can also cause a type of food poisoning. There is a danger to public health from the slaughter and sale of infected cattle or sheep at slaughteryards or abattoirs during an outbreak. Some carcasses may be affected. Fortunately, State slaughtering inspection services minimize the risk of carcasses likely to cause trouble being exposed for sale.

Brucellosis-Tested Swine Herds

(As at 1st April, 1959.)

Berkshire.

S. Cochrane, "Stanroy" Stud, Felton
J. L. Handley, "Meadow Vale" Stud, Lockyer
O'Brien and Hickey, "Kildurham" Stud, Jandowae East
G. C. Traves, "Wynwood" Stud, Oakey
Westbrook Farm Home for Boys, Westbrook
H.M. State Farm, "Palen" Stud, Palen Creek
A. R. Ludwig and Sons, "Beau View" Stud, Beaudesert
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
R. H. Crawley, "Rockthorpe" Stud, *via* Pittsworth
F. R. J. Cook, Middle Creek, Pomona
Mrs. I. M. James, "Kenmore" Stud, Cambooya
H. L. Stark, "Florida," Kalbar
H.M. State Farm, Numinbah
G. L. Gabanko and R. H. Atkins, "Diamond Valley" Stud, Mooloolah
L. Puschmann, "Tayfeld" Stud, Taylor
C. E. Edwards, "Spring Valley" Stud, Kingaroy
V. F. Weier, "La Crescent," Clifton
N. Rosenberger, "Nevrose," Wyreema
L. P. Orange, "Hillview," Flagstone Creek
W. Young, Kybong, via Gympie
E. J. Clarke, Mt. Alford, *via* Boonah
G. McLennan, "Murcott" Stud, Willowvale
C. F. W. and B. A. Shellback, "Redvilla" Stud, Kingaroy
J. C. Lees, "Bridge View" Stud, Yandina
F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert
A. C. Fletcher, "Myola" Stud, Jimbour
Q.A.H.S. and College, Lawes
E. F. Smythe, "Grandmere" Stud, Manyung, Murgon
E. R. Kimber, Block 11, Mundubbera
A. J. Potter, "Woodlands," Inglewood
Regional Experiment Station, Hermitage
J. W. Bukowski, "Secreto" Stud, Oxley
R. Astbury, "Rangvilla," Pechey
L. Pick, Mulgildie
D. G. Grayson, Killarney
A. French, "Wilson Park," Pittsworth
P. L. Pfrunder, Pozieres

Large White.

H. J. Franke and Sons, "Delvue" Stud, Cawdor
Garrawin Stud Farm Pty. Ltd., 657 Sandgate road, Clayfield
J. A. Heading, "Highfields," Murgon
R. Postle, "Yarralla" Stud, Pittsworth
E. J. Bell, "Dorne" Stud, Chinchilla
L. C. Lobegeiger, "Bremer Valley" Stud, Moorang, *via* Rosewood.
H. R. Gibson, "Thistleton" Stud, Maleny
H.M. State Farm, Numinbah
S. T. Fowler, "Kenstan" Stud, Pittsworth
W. Zahnow, Rosevale, *via* Rosewood
Regional Experiment Station, Biloela
G. J. Hutton, "Grajea" Stud, Cabarlah
H. L. Larsen, "Oakway," Kingaroy
A. Palmer, "Remlap," Greenmount
G. I. Skyring, "Bellwood" Stud, *via* Pomona
G. Pampling, Watch Box road, Goomeri
M. Hall, "Milena" Stud, D'Aguilar
K. B. Jones, "Cefn" Stud, Pilton road, Clifton
Barron Bros., "Chiltern Hill," Cooyar
K. F. Stumer, French's Creek, Boonah
Q.A.H.S. and College, Lawes
R. S. Powell, "Kybong" Stud, Kybong, *via* Gympie
C. Wharton, "Central Burnett" Stud, Gayndah
S. Jensen, Rosevale, *via* Rosewood
V. V. Radel, Coalstoun Lakes
H. R. Stanton, Tansey, *via* Goomeri
L. Stewart, Mulgowie, *via* Laidley
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
O. J. Horton, "Manneum Brae" Stud, Manneum, Kingaroy
Dr. B. J. Butcher and A. J. Parnwell, 684 Logan road, Greenslopes, Brisbane
R. Kennard, Collar Stud, Warwick
A. C. H. Gibbons, Mt. Glorious
A. Kanowski, "Exton," Pechey
L. C. and E. Wieland, Lower Cressbrook
P. L. and M. T. D. Hansen, "Regal" Stud, Oaklands, Rangeville, Toowoomba.
J. C. Lees, "Bridge View" Stud, Yandina
C. Assenbruck, Mundubbera
A. J. Mack, Mundubbera
J. & S. Kahler, East Nanango
C. P. Duncan, "Hillview," Flagstone Creek

Tamworth.

D. F. L. Skerman, "Waverley" Stud, Kaimkillenbun
A. C. Fletcher, "Myola" Stud, Jimbour
Salvation Army Home for Boys, "Canaan" Stud, Riverview
Department of Agriculture and Stock, Regional Experiment Station, Kairi
T. A. Stephen, "Withcott," Helidon
W. F. Kajewski, "Glenroy" Stud, Glencoe
A. Herbst, "Hillbanside" Stud, Bahr Scrub, *via* Beenleigh
F. Thomas, "Rosevale" Stud, M. S. 373, Beaudesert
H. J. Armstrong, "Alhambra," Crownthorpe, Murgon
R. H. Coller, Tallegalla, *via* Rosewood
D. V. and P. V. Campbell, "Lawn Hill," Lamington
S. Kanowski, "Miecho" Stud, Pinelands
N. R. Potter, "Actonvale" Stud, Wellcamp
L. C. and E. Wieland, Lower Cressbrook
J. D. Booth, Swan Ck., Warwick

Wessex Saddleback.

W. S. Douglas, "Greylight" Stud, Goombungee
C. R. Smith, "Belton Park" Stud, Nara
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
J. B. Dunlop, "Kurrawyn" Stud, Acacia road, Kuraby
M. Nielsen, "Cressbrook" Stud, Goomburra
G. J. Cooper, "Cedar Glen" Stud, Yarraman
"Wattledale" Stud, 492 Beenleigh road, Sunnybank
Kruger and Sons, "Greyhurst," Goombungee
A. Scott, "Wanstead" Stud, Grantham
G. C. Burnett, "Rathburnie," Linville
A. J. Mack, Mundubbera
J. Ashwell, "Greenhill," Felton South

Large Black.

E. Pointon, Goomburra

Stock and Station

THE grazier who is breeding beef cattle always seeks to increase the source of his main return, that is, the number of calves born and reared each year.

These tips on mating methods will help to raise the calving percentage—if you are in a position to undertake them.

Firstly, in mid-summer, bring the breeders into a comparatively small paddock. There's plenty of grass then, so the temporary heavy stocking won't do any harm and the cows will be found easily.

Then try putting out the bulls in two or three batches—say at intervals of two weeks. This gives a percentage of fresh bulls over the main mating period.

Avoid using all young, first-year bulls or all old bulls. Aim at a balanced proportion of first-year, medium age and older bulls. Use between three and five bulls for every 100 cows.

Finally, avoid overfatness in heifers, if possible, as it is one cause of a low calving rate in this class of animal.

—W. F. MAWSON,
Senior Adviser in Cattle Husbandry.

BENZENE HEXACHLORIDE (BHC) still has wide use as a tickicide. Like DDT, it is practically insoluble in water and its effectiveness in a dip depends on its proper dispersal in the water. Stirring, first with a shovel and then with a metal stirrer, should be carried out before stirrer cattle are put through the dip. Samples collected immediately after dipping has been completed should be sent regularly to the Animal Research Institute, Yeerongpilly, for analysis.

In a dip, the recommended concentration of BHC is 0.05 per cent. of the gamma isomer. This represents a concentration of approximately 0.5 per cent. of most commercial preparations. There's evidence that some ticks have become resistant to BHC. But don't be too hasty in blaming the BHC preparation for poor results in tick control when improper management of the dipping vat may be the real cause.

—S. G. KNOTT,
Divisional Veterinary Officer.

IF your pigs rub and scratch excessively, it's quite likely that sarcoptic mange has got into your piggery. This disease is caused by a mite that burrows into the pig's skin, causing intense itching and worry. Affected pigs take longer to make weight gains than healthy ones.

Mange often starts on the head and spreads over the rest of the body. The skin becomes dry and scurfy, and may wrinkle; hair falls out and raw patches may develop from rubbing.

BHC is recommended to cure mange. Treat affected pigs by spraying or dipping, using a 0.25 per cent. gamma BHC solution. In badly affected pigs, several follow-up treatments may be necessary. In spraying pigs, crowd them together so that they rub the preparation into each other.

—S. G. KNOTT,
Divisional Veterinary Officer.

EVERY year quite a lot of sickness amongst pigs occurs because of cold, wet floors. Our ideas on pig shed flooring have changed; wood is now considered unsatisfactory except for certain conditions. Boards absorb moisture, and are cold and slippery when wet. Disease organisms flourish in the moist surface layers.

Solid concrete floors don't have the slippery surface common with wood, and are easier to clean. However, these solid floors soon become damp and cold in the wet season, and pigs sleeping on them may develop pneumonia.

Best of all is the hollow concrete floor. One way of building it is by placing empty bottles flat on the prepared site, about 1 in. apart. The spaces between the bottles are then filled with concrete, and a layer not more than ¾ in. thick is placed over them.

This floor is warmer and drier than others, even without bedding, and is ideal for sow and litter or weaner pens. It reduces losses due to cold damp floors, and is relatively cheap to construct.

—*T. ABELL,*
Senior Adviser, Pig Branch.

Timely Tips For May

IT'S worth considering a strategic drench for worms in May. Whatever species of animals you have, may benefit from a drench this month to send them into the winter with a lighter burden of worms.

Many new drenches are on the market for different species of worms. This is the result of research work done in the last few years. You would be wise to discuss these drenches with your veterinary surgeon before deciding which one to buy.

Watch the food supply of "in lamb" ewes this month. A fall-off in food for these animals can trigger off pregnancy toxaemia. Symptoms of this disease are similar to "milk fever," but give no response to calcium injections.

Careful observation of the flock will reveal ewes showing symptoms while still on their feet. Drenching with glycerine or sugars before they go down is worthwhile. Once ewes are on the ground there's not much hope of treating successfully.

The real answer to pregnancy toxaemia is to make sure the feed is good through the pregnancy—and handle pregnant ewes carefully!

In the Upper Maranoa, Upper Burnett areas and Springsure areas, an increase in sawfly larvae in May might point to danger in June or July.

Have swellings in the scrotal region of pigs investigated. They may be hernia or infections from castrations. You can do something about both.

Distemper in dogs is always present in cities. In the country, it often runs through dogs as an epidemic in late winter. Now may be the time to have your dog immunised. In the bush, group vaccination is the shot. Get together with your neighbours and your local veterinary surgeon and organise a "distemper day."

Plate 1.

Outdoor Ridge Beds. Hessian and straw are being used to shelter the beds until the spawn grows through the compost. Beds in the far-background have been covered with casing soil and straw some time ago and are producing mushrooms.

Growing Mushrooms In Queensland

By G. J. P. McCARTHY,
Pathologist.

Because many difficulties lie in the path of the inexperienced mushroom grower, beginners should proceed on a small scale until they have gained proficiency.

The practice of gathering spawn of the edible mushroom (*Agaricus campestris*) from the field and planting it in prepared compost seems to have arisen in the seventeenth century. By this means, erratic crops of edible fruiting bodies were produced. Over the years, methods of culture have been gradually improved and strains of the mushroom have been selected for their desirable qualities. In more modern times, it has been customary to prepare these selected strains as pure culture spawn so that they are free from contaminants and undesirable forms.

Most areas in Queensland have a winter climate which is ideal for mushroom culture. Special houses and equipment are not needed and do not add much to the chances of success. On the other hand, the heat and heavy rainfall of the summer are two disadvantages which increase the cost of production in this season because expensive structures are necessary to

provide the required conditions for maintaining growth at this period.

Normally in south-eastern Queensland, composting should not commence until April when the worst of the hot, wet weather is over, and should cease in July so that the cropping period of the mushrooms does not extend into the following summer. With experience, growers in cool locations or with refrigerated sheds may be able to extend the growing season beyond these months.

Mushroom culture may not be difficult for an experienced producer but there are many pitfalls for the inexperienced. The prospective grower should therefore commence production on a small scale until he has acquired the necessary skill. The beginner will benefit greatly by keeping records of such things as compost preparation, casing soils, crop management and production, and the times involved in each operation. These details will form the basis for increasing efficiency later.

PREPARING THE COMPOST

The compost should be prepared in a place where it can be protected from cooling and drying winds, from heavy rain, and from any surface water. However, any protective structures should still allow plenty of air to circulate around the heap, as aeration is essential for composting.

A concrete floor can be easily cleaned and forms the best base for composting. If the compost is prepared on soil, it is necessary to sterilize the soil to free it of pests, diseases, and weeds. Commercial formalin diluted at the rate of 1 part to 50 parts of water can be used for this purpose. The solution is watered on the soil until it is wet thoroughly for a few inches down. The area is then covered with wet bags for two or three days after which it is aired until the smell of the formalin has disappeared.

The best materials for preparing the compost are horse manure and wheat straw. For every 3 volumes of horse manure there should be 7 volumes of straw. If only old, poor-quality horse manure is available, a greater quantity will be needed.

Other manures (such as fowl, cow, or sheep manures) can be used. The volume should be halved for fowl manure. Other types of straw beside wheat straw can be used but a material which will remain open and not become greasy and soggy should be selected.

If the manure and straw must be kept before they are used in the compost, they should be dry and piled high so that they remain reasonably dry even if some rain falls on the heaps.

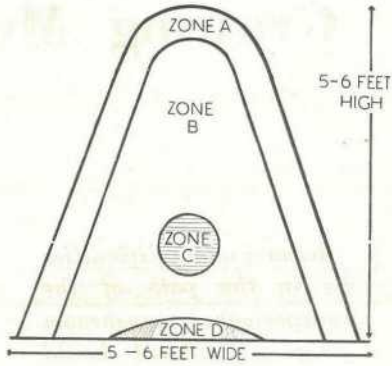


Plate 2.

Cross Section Through a Compost Heap Indicating the Dimensions of a Heap and the Zones of Different Composting Action. Zone A: Temperature is 120 deg. F. or less; conditions are aerobic. Zone B: 120 deg. F. to 140 deg. F; aerobic; this is a zone of most favourable composting. Zone C: 140 deg. F. or more; aerobic; present if heap is too wide and dense. Zone D: 120 deg. F. or less; anaerobic insufficient aeration); present if heap is too wide.

Compost Heaps

The compost heap should be long (a minimum of 6ft.) and narrow. The width of the heap may be varied to suit different materials and climates. A narrower heap should be made with compacted (poorly ventilated) compost than with loose (well ventilated) compost. Also the heap should be made wider if it is not well protected from cold westerlies or if the weather is very cold.

The materials for the compost are mixed evenly and piled into a heap of the shape shown in Plate 2 (a moveable frame can be used to shape the sides of the heap). It is better to prepare two heaps rather than have one made of different composting materials. As the heap is prepared it should be given as much water as possible before the first turning, but not so much that water runs through the heap. This is better than watering too lightly at first and having to give large quantities of water near the end of the composting process. The condition to be aimed at is described later under characteristics of a good compost.

It will be found that fresh, unused straw is difficult to wet. This straw can be wet before it is mixed with the manure and even then several shortly spaced turnings of the heap may be required before sufficient water has been absorbed by the materials in the compost.

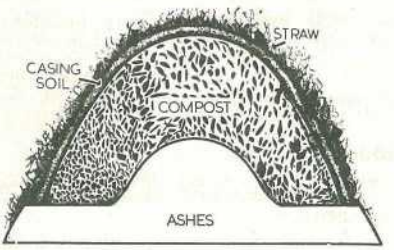


Plate 3.

Cross Section of a "Ridge Bed."

Plate 2 indicates how a number of zones with different composting action can occur in the compost heap. For preference the heap should be turned so that material in Zones A, C, and D will be placed in the area of Zone B in the reconstructed heap. However, growers should construct their heap so that overheating or anaerobic composting (Zones C and D) are absent or at a minimum. With experience this is easily achieved and the heap may then be turned in a random manner either mechanically or by hand and still compost satisfactorily.

The grower should make a record each day of temperature of the heap at various distances from the outside. Plate 2 depicts the zones of different temperatures and composting actions to be found. The heap will be ready for turning after the gradual settling of the heap has slowed down and the temperature of Zone B has fallen to near 120 deg. F. The period before the first turning is usually the longest and may be as long as seven days. The final turn may be due only three or four days after the previous turn. During turning, any lumps in the compost must be broken up and any dry areas must be watered lightly. Usually four or five turnings and three weeks of composting are needed before the compost is ready to go into the beds. However, it is important to realise that unnecessarily prolonged composting will reduce the food value, the texture, and the yields expected of the compost.

If good composting does not commence before the first turning, further manure should be added during the turning. Fowl manure is excellent for this purpose.

Other substances which should be added to the compost are as follow:

(1) 20-25 lb. powdered gypsum per ton of compost added evenly when the heap is first being made or during

Plate 4.

First Turning of a Compost Heap on Mr. R. Bacchi's Mushroom Farm at Zillmere. A fork lift on the tractor is being used to prepare the new heap on the left from the heap on the right.

the first turning to improve the structure of the compost.

(2) 3 lb. of 10 per cent. benzene hexachloride dust to each ton of compost added evenly during the last turning of the compost. (A light dusting of this insecticide can be given to the outside of the heap after the last turning.)

(3) Up to 10 lb. of powdered superphosphate to each ton of compost may be added evenly when the heap is being prepared if the manure is of poor quality. Fowl manure or good quality horse manure should have sufficient phosphate, and the addition of superphosphate to these may even reduce yields.

(4) Some growers have experimented with synthetic materials such as urea and nitrogen fertilizers which can be used instead of, or to supplement, their other manure supplies. Generally the quantities needed for one ton of compost, if no manure is used, are of the order of 60 lb. urea, 15-25 lb. potassium chloride, 30 lb. gypsum and 200-400 lb. of some type of grain. If half the required manure is available, these fertilizers are reduced accordingly. However, use of these materials gives the grower new problems. For example, the addition of too much nitrogen will reduce yields.

As a guide when making these additions, a grower can estimate that a ton of freshly assembled compost will have a capacity of approximately 2½ cu. yd. It should be remembered that this amount of compost will lose some of its bulkiness and will be sufficient for only from 60 to 70 sq. ft. of mushroom bed prepared 6 in. deep.

Good Compost

The characteristics of a good compost are:—

(*a*) The foul, ammoniacal odour characteristic of fresh manure should be no longer present. (By this time

the alkalinity should be down to a measurement of 7.5 to 8.0 on the "pH" scale.)

(*b*) The compost should be a chocolate-brown colour, slightly speckled with white. The straw should have lost its bright yellow colour.

(*c*) Straws should be soft and pliable. It should be possible to tear them rather easily, indicating that the fibres have partly disintegrated.

(*d*) The compost should hold its shape when pressed into a ball and yet should break up easily again. Although the moisture from a piece of compost should wet the hand when it is squeezed, water should not run away. The compost should be open and not heavy and greasy.

(*e*) About 1 ft. from the outside of the heap, there should be an area in which the straw appears to be flecked with a powdery, whitish flour. This is called "fire-fang" and is due to the presence of an organism which requires good aeration, a temperature of from 110 deg. F. to 140 deg. F. and moderate dryness. Excessive fire-fang indicates that the compost may be a little too dry.

GROWING SITES

Mushrooms grow best under controlled conditions. Special mushroom houses with wooden trays in tiers are often used by the large growers. However, many local growers have found it expedient and economical to have the beds in the open. Others have beds in a variety of places such as under houses or in disused sheds. The beginner or the small grower would be unwise to construct expensive houses.

Outdoor Beds

Outdoor beds are called "ridge beds" and should be raised off the

Plate 5.

Outdoor Ridge Beds. Mushroom spawn has just been planted in the far bed. Spawn has grown through the compost in the near bed which is due to be covered with casing soil.

Plate 6.

Outdoor Bed. Here straw has been attached to a movable hessian roof.

ground. A few inches of ashes will protect them from the majority of contaminants from the ground and from any flowing water. Beds are about 3 ft. wide and 2 ft. high and ashes are heaped in the centre (Plate 3) to avoid an excessive depth and waste of compost in the centre of the bed. On top of the ashes is placed the compost which should form a semi-circular heap and be firmed down well. Spawning and covering with casing soil is carried out as described for indoor beds.

A loose covering of fresh straw at least 3-4 in. deep is placed over the ridge beds and watered frequently to maintain the desired humidity on top of the casing soil. The beds should be situated so as to be sheltered from cold, dry, westerly winds. Even in sheltered positions, the straw can dry rapidly, and watering two or three times a day is often required. The straw protects the beds from light rain, but if prolonged wet weather occurs further protection will be necessary.

If the straw cover for the beds is attached to a frame instead of being heaped loosely on the surface of the bed, there are obvious advantages. Firstly, the beds can be exposed more quickly for operations such as watering of the casing soil (an operation performed at approximately three to four day intervals), inspecting the maturity of the crop, checking for and control of pests, and picking the crop. Secondly, the beds can be made on a wider base with a more level and wider upper surface. The frame holding the straw can be erected at an angle steep enough to shed rain even while the mushroom bed below is almost flat.

Indoor Beds

Sheds used for mushroom culture should provide good insulation. Walls made from breeze blocks are excellent but many other materials are suitable. A ceiling with good space between it and the roof helps insulate and ventilate the shed. Also the ceiling prevents condensation from the inside

of the roof dripping on to the top bed. Hinged flaps in the ceilings and on the end walls (both above and below the ceiling) should be provided but situated so that there are no draughts on any of the beds to dry them out. It is advantageous to have the sheds made so that the walls are shaded from the sun, particularly during the afternoon. The floor of the shed should drain well.

Preparing Trays

Indoor mushroom growing is usually carried out in trays. If these are about 4 ft. wide they can be conveniently handled. To utilize the space fully, the trays should be in tiers but the lowest tray should be from 6 to 12 in. from the floor to avoid the excessive moisture and foul air which often collects on the ground.

The sides of the trays should be at least 7 or 8 in. high. If the bottom of the trays is made of slats and is removable, the spacing between the top of one tray and the bottom of the one above it need only be 18 in. However, if the shelving on the bottom of the trays is fixed, a space of 24 in. will allow easier filling with compost. The side boards of the trays should be removable so that the spawn can be examined periodically as it grows.

The compost should be spread evenly in the trays to a depth of 10 in. and then pressed down firmly with a piece of wood to leave a depth of about 6 in. The temperature of the compost should then rise slightly and only when it has fallen again should the spawn be added to the bed.

If the compost is very dry, a very small quantity of water can be added before spawning. It is necessary to water as lightly as possible and repeat the watering if necessary. The spawn will not grow in a compost which is too moist.

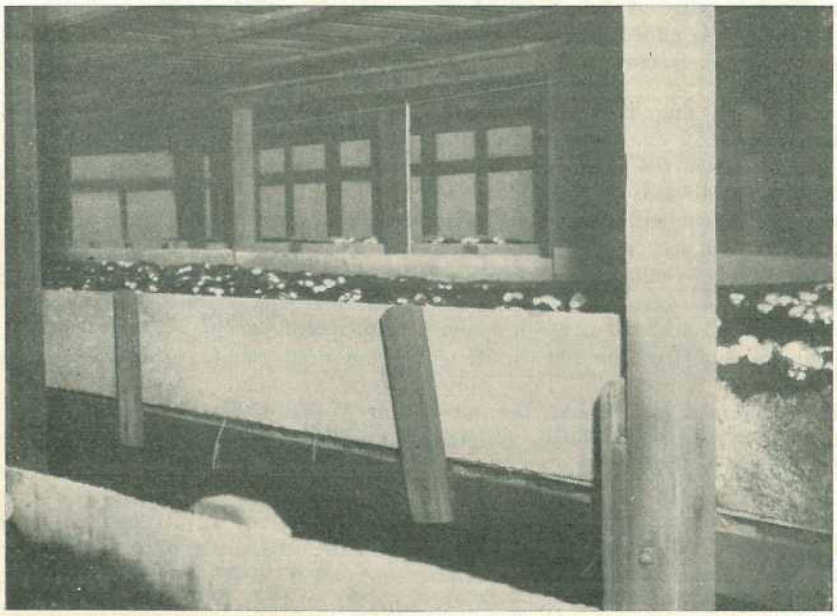


Plate 7.

Tiers of Indoor Beds. The side walls and bottom of the trays are made from sheets of fibro and are easily removed (see to right of post).

If a shed is used for the cultivation of mushrooms it should be sterilized between crops. The simplest way to do this is to spray the inside of the shed with commercial formalin solution diluted at the rate of 2 gal. of formalin to 100 gal. of water. This spray is rather irritating to the operator and the parts of the shed farthest from the door should be treated first. The trays should receive particular attention. Immediately after spraying, the shed should be closed for two days and then ventilated until the formalin has escaped.

SPAWNING

The spawn commonly used in Queensland is pure culture "grain" spawn which is grown on wheat grain in bottles or similar containers under sterile conditions to protect it from moulds and pests. Once the spawn is removed from the bottles, it will deteriorate rapidly. The spawn is damaged by temperatures exceeding 90 deg. F. and for this reason 80 deg. F should be the absolute maximum temperature of the compost beds when spawn is added. A temperature of 75 deg. F. is more desirable.

Holes are dug into the compost from 10 to 12 in. apart and from 5 to 6 in. from the sides of the beds. These holes should be 2 in. deep so that the spawn will receive adequate moisture. In very moist compost the holes can be shallower. A heaped teaspoonful of grain is adequate for each hole and a quart of grain spawn should be sufficient for 100 sq. ft. of bed of good compost. If the quality of the compost is in doubt, the holes could be spaced more closely and the spawn used more heavily.

After spawning, a sudden drop in temperature will slow down spawn growth. The spawn should grow through the compost in three weeks if the temperature is allowed to drop gradually to 60 deg. F. Inspection can easily be made if the side boards of the trays are removable. There is likely to be some loss of moisture from the compost while the spawn is growing and the beds should be covered lightly with sheets of paper. These should, however, not be packed on tightly enough to exclude air.

THE CASING SOIL

After spawning, the bed should be covered with 1½ in. of moist, loose casing soil which, when pressed down firmly must have a uniform depth of 1 in. A good casing soil must absorb water readily and must not cake or go lumpy. It must be capable of holding a reasonable amount of water. These requirements are filled by a dark clay loam or loam which has a high organic matter content, and good structure. Soils with low organic matter content should be tried on a few small areas before being used extensively.

It is preferable to select the soil from virgin land and not from a field which has been continuously cultivated.

The physical and not the nutrient properties of the soil are important. It may be best for a start to test in different mushroom beds several soils which fulfil the requirements. The most suitable can then be chosen for future use. The soil should be screened through a 1 in. screen after it has been broken into a loose, friable, moist condition.

Most soils available for casing the beds are acid and must be neutralized with powdered limestone. The limestone used should have a low magnesium content. Most growers aim for a pH of 7 (neutral point). A guide to the amount of lime required is that 4 lb. of limestone will raise the pH of a cubic yard of an average soil from 6 to 7. It will be necessary to test the pH of the soil before, and some weeks after, adding the lime. Checking the acidity of the soil cannot be carried out immediately after the lime is added because a delay of four to six weeks is often necessary before neutralization is completed.

When the acidity has been corrected, the soil should be spread less than 1 ft. deep on a hard, level surface and sterilized by wetting with 2 per cent. formalin (made by adding 1 part of commercial formalin to 50 parts of water). Wet bags should be immediately laid over the soil and left for three days before removing. The soil should then be left uncovered until the smell of the formalin has disappeared. This may take 10 to 14 days.

After the soil has been sterilized, it should be handled only with clean implements. Moulds and insects can be reintroduced very easily into the sterilized soil, and shovels and containers for the soil should be washed with 2 per cent formalin.

The soil, when added to the beds, should be friable and moist. If a moist compost has been prepared, the casing soil can be drier than otherwise.

CARE OF THE BEDS

It is important to water the beds, through a fine hose, with water of good quality. The spawn will be killed if the watering is too heavy and water seeps through the casing soil into the compost. The mushrooms are produced in flushes and the times of watering should be adjusted to suit the picking of the crop. Thus one watering is given just after picking.

The sheds need to be ventilated so that the air in the shed is replaced several times each day. The times for doing this are important. Mushrooms grow best at a temperature of 60 deg. F. If the temperature of the shed is high, the maximum amount of ventilating should be performed at times when the air is cool. On the other hand, if the sheds are below the most favourable temperature, ventilation so that the warm air of the daytime is allowed into the shed is beneficial. There is one caution—warm, *moist* air will permit harmful condensation of moisture on beds and mushrooms if allowed to enter a cool shed.

In practice, a constant but small amount of ventilation is often possible. Besides recharging the house with fresh air another aim of ventilation is to provide a relative humidity of below 90 per cent.

HARVESTING

When picking the mushrooms, the stem and base of the plant should be twisted from the soil and the base cut off and placed into a container which is later removed from the shed. The cap should be placed in a clean container. They may need brushing before being packed for sale. After picking the crop, the soil should be levelled again.

Yields of mushrooms heavier than 2 lb. a sq. ft. of bed are often obtained. *Growing operations should be examined for faults any time yields do not exceed 1 lb. a sq. ft., and the experienced grower should aim for higher yields than this.

DISEASES AND PESTS

Diseases can appear in a bed. The surest way of dealing with them is to soak thoroughly the diseased area and 1 ft. to each side with a solution of 2 per cent. formalin, and cover with wet bags to retain the fumes. Further advice on particular diseases can be obtained from the Department of Agriculture and Stock.

Pests are a constant trouble in mushroom sheds. Commencing with the filling of the beds, a routine dusting with 2 oz. of 10 per cent. benzene hexachloride dust to each 6 sq. yd. of bed should be given every five days. Further information on uncommon pests may be obtained from the Department of Agriculture and Stock.

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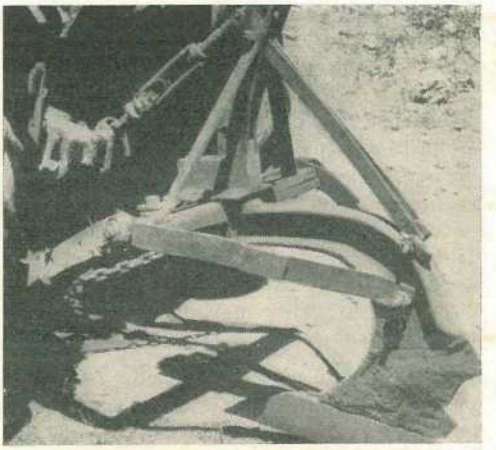
* *The price to growers at the present time averages 6s. a lb. But the Queensland market for mushrooms is a specialised one, and intending growers would be well advised to pre-arrange an outlet for their crop.—Editor.*

3-Point Ripper

The photo. on the right shows how Mr. H. Beasley, of Chinchilla, converted a road plough into an efficient three point linkage ripper. Mr. Beasley has used this implement to contour rip his pasture to encourage water absorption. In combination with his farm dozer it has also been used extensively in the construction of farm ponds and turkey's nest dams. For trench silos, which Mr. Beasley and neighbouring farmers consider essential, a ripper of this sort is invaluable.



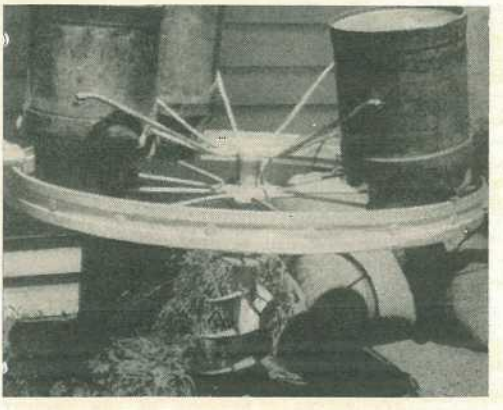
Water Pressure For The Dairy

Low water pressure means a lot of broom work when it comes to cleaning the dairy. Mr. Beasley looked for a way around the problem, hence the 44 gal. drum on the top of a 25 ft. pole. The drum is filled by a small diameter pipe coupled to the milk pump. Water from the dairy is pumped into the drum during milking. After milking, the water from the drum feeds back to the dairy by a 2-in. pipe. This gives tons of pressure, which means that brooming is done quickly and effectively.

Can Drainer

Mr. Beasley has found an old farm wheel a simple and efficient stand for draining his cream cans. Alternate spokes on an old combine wheel were cut and pulled up to provide a frame to hold the cans. The axle was secured in the ground. This left the wheel free to turn when the cans were being loaded.

• *Contributed by*
R. F. S. KELSEY,
Soil Conservation Officer.



Pasture and Crop

PALATABLE and highly nutritious silage can be made from cowpeas and other high protein crops, but the job calls for a little extra care.

For good silage, sufficient lactic acid must be formed during the fermentation process. This means that the crop must have a high content of sugar or starch that can be converted into sugar. Cowpeas and other high protein crops are rather low in sugar.

There are several ways of overcoming the shortage of sugar. Perhaps the simplest is to wait until the crop is fairly mature. Cut cowpeas for silage when the first pods have filled, and lucerne at the early bloom stage. Another remedy is to mix the high-protein crop with one low in protein like maize, sorghum or mature grass. The addition of sugar, fermentable starch, mineral acid or sodium metabisulphite to the green material is another solution. For information on these methods, consult your local Adviser in Agriculture.

—*J. E. RAWSON, Agronomist.*

SUMMER pastures need adequate food as well as moisture. The two plant foods most needed by pastures in Queensland are nitrogen and phosphorus, and unthrifty pastures should be topdressed with fertilizers containing these two elements. If your pastures need topdressing, consult your local Adviser in Agriculture. He will tell you the best fertilizer to use and the most economical rate of application for your particular soil. When you can't consult an agricultural adviser, try a mixture of equal parts of sulphate of ammonia and superphosphate at 2 to 3 cwt. an acre.

—*A. HEGARTY, Agrostologist.*

LAST year's tobacco stalks and volunteer plants in the fields, around barns, sheds and houses are a menace to the industry. They allow diseases and insect pests to survive from one season to another. All these stalks and plants should be destroyed.

Surely it is not necessary for every grower to be actually compelled to destroy old tobacco plants before he will do so. In their own interests, all growers should be very thorough in doing this job. It pays to keep the farm clean, because it has been shown repeatedly that dirty farms are the first to suffer from insects and diseases and then they infect their neighbours' farms.

—*E. J. McDONALD, Adviser, Tobacco Culture.*

CULTIVATION performs four useful functions—it eradicates competing weeds, allows better penetration of rain, reduces evaporation and assists growth by aerating the soil.

In the case of cotton, clean cultivation pays off particularly, because soil moisture is usually at a premium. Competing weeds or grasses draw heavily on soil moisture. This may result in a setback to the crop which may not have occurred had there been no competition.

On the other hand, excessive cultivation or movement of the soil can result in a loss of soil moisture by evaporation. Deep inter-row cultivation of cotton where moist soil is brought up to the surface should be avoided. For this reason, cultivate before weeds have formed a good root system. At this stage, shallow cultivation is effective without disturbing the lower moisture-holding layer of the soil.

Early cultivation is easier, faster and cheaper.

STONES, roots and small tree branches can seriously damage mechanical cotton pickers.

A few days spent in cleaning up new cultivations can save a lot of time and trouble later on. While the crops are small, it is easy to see these obstructions, and a trailer can be pulled down the rows without damage to the plants.

On old cultivations, the butts of last year's plants may also cause interference particularly where late preparation has prevented the trash from rotting down.

—*W. G. STEELE,*
Senior Adviser in Agriculture.

RUST, the silent enemy of all farm machinery, can cause serious damage. The best form of protection is to store the machinery in a dry place immediately after use. Application of grease isn't enough, as over a period it gives only partial protection. It's far wiser to use one of the rust-preventing preparations being sold commercially. Many of these preparations cost less than lubricating oil and are cheap compared with the costly damage they prevent. The time to apply a rust-preventing preparation is immediately after the machine finishes its seasonal work.

—*C. G. WRAGGE,*
Agricultural Engineer.

Pastures For Ridges And Flats

"M.S.", of Morayfield, seeks a pasture mixture for sandy ridge country and for fairly dry tea-tree flats, and inquires if Townsville lucerne and molasses grass can withstand couch grass invasions.

Answer: Townsville lucerne and molasses grass will withstand blue couch grass invasion for up to four years under good management.

Before planting these species, it is important to prepare the ground well. Do not graze them heavily or continuously, as such treatment will quickly result in their decline and so aid the couch invasion.

On the sandy soils in the Caboolture district, Rhodes grass has performed well and can be recommended.

A pasture mixture which should give good summer and winter growth in the district is as follows:—

New Zealand white clover	2 lb.	per acre
Montgomery red clover	1 lb.	
H1 rye grass	4 lb.	
Phalaris arundinacea	2 lb.	

When planting this mixture on the flats, add 8 lb. of paspalum to the acre, and, when planting the ridges, omit the paspalum in favour of 8 lb. Rhodes grass or 5 lb. green panic to the acre.

Where irrigation is not possible, the mixture should be planted between late January and mid March.

Paspalum is an excellent grass to grow on alluvial flats and the better quality ridges.

Machinery For Hay And Silage - II.

By Officers of
The Agriculture Branch.

In moving the crop from the field into storage, different methods are used and these vary from farm to farm.

The hand loading method is used on farms where the volume of hay or silage to be handled is relatively small. With this method the cost of equipment is low, but the labour demand is high and the work is strenuous. For handling larger tonnages, a wide range of machinery is available.

This includes hay loaders, hay sweeps, hay stackers, buckrakes, hay balers, bale loaders and stackers, forage harvesters, blowers and elevators.

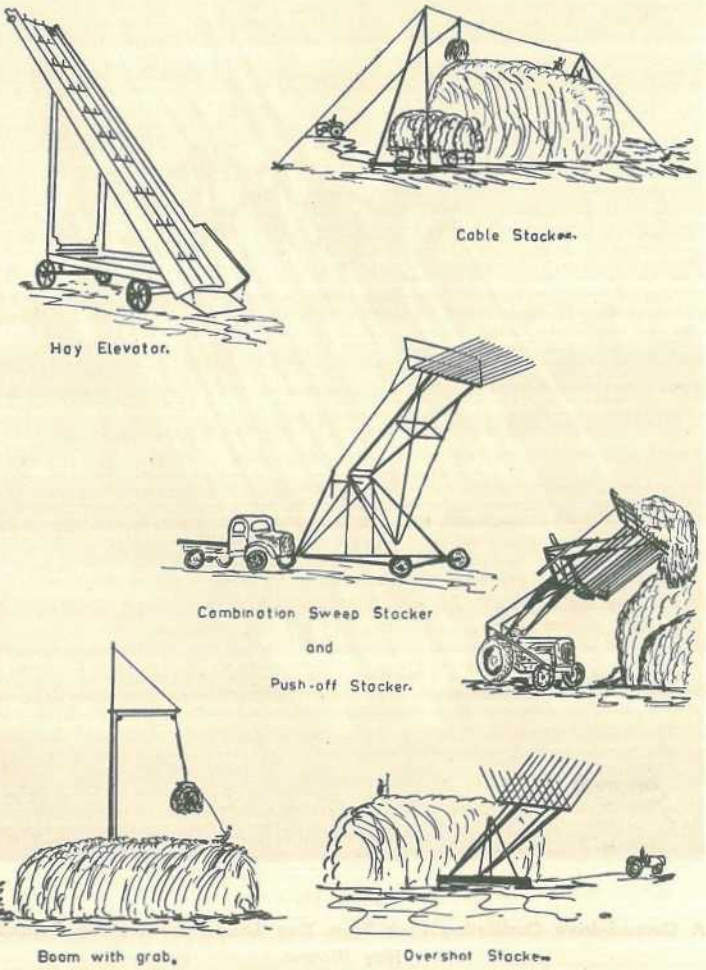


Plate 14.
Various Types of Hay Stackers.

Hay Loaders.

The hay loader is a transportable forking and elevating mechanism which, when hitched behind a wagon, picks up the hay from the swath or windrow and delivers it on to a wagon. It saves time and manual labour in loading loose hay on to wagons.

Hay loaders are made in two general types—the oscillating fork type, and the continuous apron type with a cylindrical device to pick up the hay.

The oscillating fork type (Plate 15) is the most popular because of its simplicity. It is usually less expensive than the conveyor type. It continues to force the hay on to the load even when the loader operator does not keep the delivery end clear.

The conveyor type handles the hay more gently than the fork type. However, it tends to drag the hay back with it unless the delivery end is kept clear.

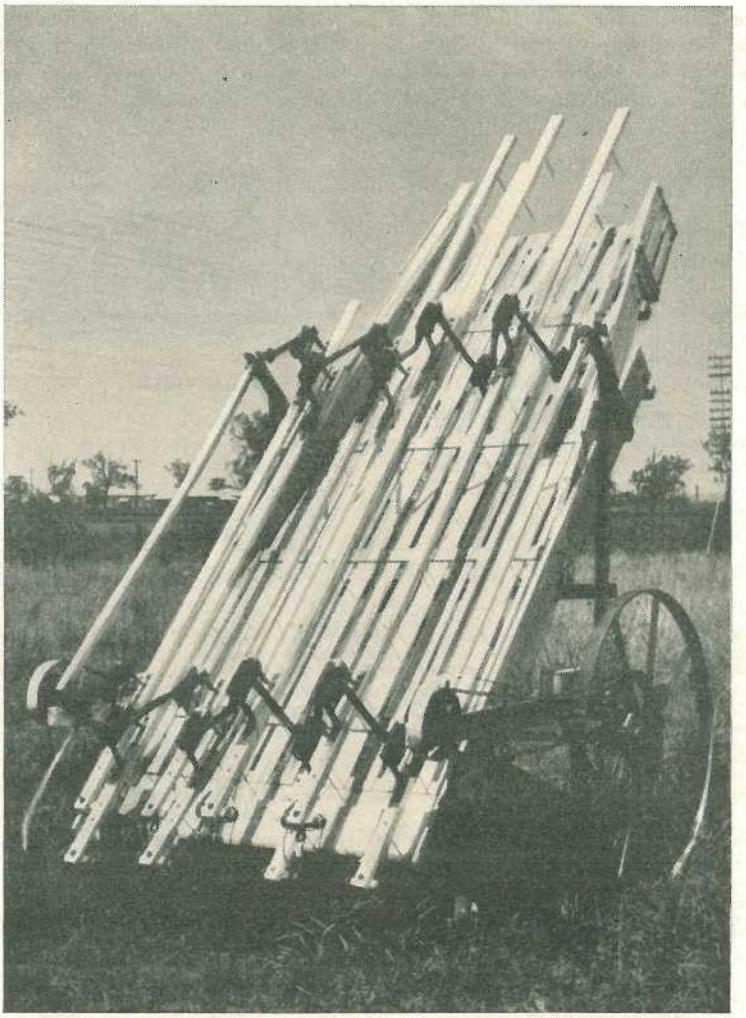


Plate 15.

A Ground-drive Oscillating Fork Type Hay Loader for Trailing Behind a Hay Wagon.

Hay Sweeps.

When hay is to be stacked in or adjacent to the paddock in which it is made, the sweep is a useful labour-saving device. This method of collection may be used where the hauling distance is less than half a mile and where paddocks are reasonably smooth and firm.

Sweeps of various types and sizes can be mounted on tractors and even cars, usually in front (Plate 16).

A hay sweep consists of a frame with a set of long wooden teeth, about a foot apart, projecting forwards. The teeth should be made of suitable timber fitted with metal shoes at the tips. The tips of the teeth should be tapered from the top and bottom, not just from the bottom. Teeth tapered only from the bottom tend to function like slide runners and ride over the hay rather than under it.

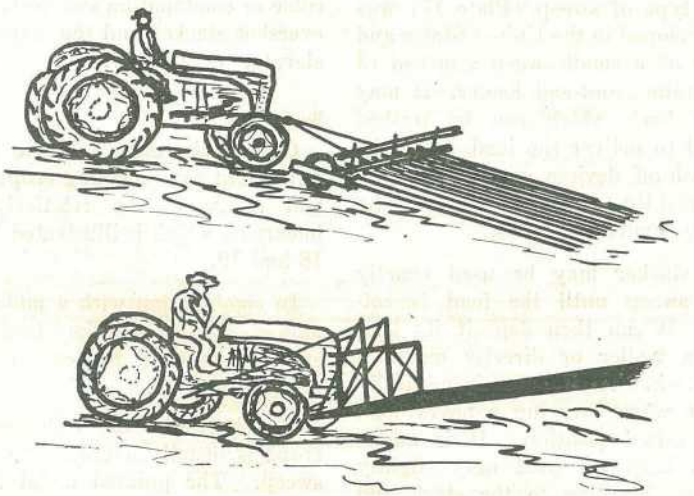


Plate 16.

Pivoted Sweep (top) and Mounted Sweep (bottom).

Sweeps are normally 10-12 ft. wide and are capable of carrying loads of up to half a ton of hay.

Hay may be picked up from either the swath or the windrow. Most operators prefer to pick up from a windrow as this permits the gathering of a larger load.

In gathering hay from a swath, two 6 ft. swaths may be gathered simultaneously.

The sweep generally follows the direction the mower has travelled.

Some types incorporate a lifting mechanism operated off the tractor hydraulic system. With these, double loads may be carried. The operation consists in depositing a second load on top of half a load previously gathered and dumped.

Many tractor sweeps are successfully used without any lifting mechanism.

Hay Sweep Stackers.

Combination sweep stackers mounted on two wheels (Plate 14) are available. These are pushed by a tractor, truck or car, and are capable of elevating hay to a height of 20 feet. Lifting is achieved either by hydraulic ram or by cable. Cable-operated sweep stackers are ground-driven by the sweep wheels.

Plate 17.

Hydraulically-operated Hay Sweep Stacker Attachment to a Front-end Loader in Position to Dump.

Push-Off Tractor Sweep and Stacker.

This type of sweep (Plate 17) was first developed in the United States and consists of a small sweep attached to a hydraulic front-end loader. It may have a back which can be pushed forward to deliver the load. The lift and push-off devices can be operated independently, being actuated by separate hydraulic rams.

The stacker may be used exactly like a sweep until the load is collected. It can then deposit its load on to a trailer or directly on to a small stack. The tractor is naturally unstable when carrying a heavy load in the raised position. It is advisable to keep the load only slightly raised on journeys to the stack and to avoid making sharp turns.

Push-off stackers may supersede other types of sweeps. They utilise the hydraulic front-end loader and are efficient in operation.

Apart from those mentioned above, numerous types of devices may be used to assist stacking. These include boom with grab, derrick with grab, cable or combination sweep stacker, the overshot stacker and the standard hay elevator (Plate 14).

Buckrakes.

One of the most valuable types of implement for collecting crops for hay and silage is the relatively cheap buckrake, which is illustrated in Plates 18 and 19.

In combination with a mid-mounted mower, the buckrake becomes an effective one-man fodder conservation unit.

The buckrake for collecting green crops is usually narrower than a hay sweep. The pointed metal tines are shorter, and it is important that they be smooth and perfectly straight.

Buckrakes may be mounted either at the rear of the tractor or on the hydraulically operated front loader. In the latter case the buckrake may be used for loading the green crop into trucks or trailers for long haulage (Plate 18).

Rear mounting is usually advantageous where silage crops are to be transported. The weight of the load on the rear wheels improves traction. This makes it possible for the tractor to be run right over the silage in the trench or clamp, thus aiding consolidation.

Some buckrakes can be used either at the front or at the rear. Where a mechanical catch for the rear-mounted buckrake is fitted, the tractor can carry a front and a rear load.

The buckrake may not pick up cleanly in very short crops and some difficulties in picking up may occur also where the ground is uneven or soft. Loss of material through dropping during transport may be considerable with short crops, but with long crops the amount dropped will be small.

Normal loads are only about 5-6 cwt., and generally it is not economical to carry loads of this small size more than a quarter of a mile.

Two undisturbed 5 ft. swaths can be gathered in one operation, with the buckrake travelling in the same direction as the mower. If a 6 ft. mower is used, it is advisable to fit swath boards at each end of the cutter-bar; otherwise the width of the two swaths will be greater than the width of the buckrake.

Very light crops may be picked up more cleanly by travelling across the swaths or by first putting several swaths together with a side-delivery rake.

Heavy crops should not be windrowed, as the crop is then usually more difficult to gather.

Plate 18.

Rear-mounted Three-point Linkage Buckrake with Centre Tine Removed to Assist Dumping of Kikuyu Grass Being Ensiled. Cowcane in Adjoining Paddock.

Plate 19.

Buckrake Load of Italian Sweet Sorghum being Backed up on to Stack Silo at Mandanyi, Chinchilla. Typically Uneven Load.

For efficient operation the points of the tines must follow the ground closely. All tines should therefore be in alignment, particularly at the points. Bent tines should be straightened or replaced, and rusty and dirty tines polished to facilitate picking up soft green material. The beam should be set just clear of the ground and the height and angle of the tines adjusted by making the necessary alterations to the top link of the hitch. If the beam is set too high, trouble may be encountered through tines digging into the ground. This trouble may also occur with bent tines, or when working on soft ground. When the points dig in, always drive forward away from the load to avoid damage.

Balers.

The stationary type of hay baler has long been used for baling hay or straw from the stack or for baling in the paddock in conjunction with hay sweeps or buckrakes.

The advent of the pick-up baler, however, meant a big advance in fodder conservation methods, as it eliminated the prior haulage and/or stacking of the hay.

The pick-up balers in common use are either P.T.O.-driven or engine-functioned. A rectangular bale is produced which is tied automatically with wire or twine. Machines producing rolled cylindrical bales are also available.

Engine-functioned types can handle uneven windrows and can be towed by a small tractor. P.T.O.-driven

Plate 20.
Tractor and Engine-functioned Hay Baler Baling Bush Hay at Colwell Station, McKinlay.

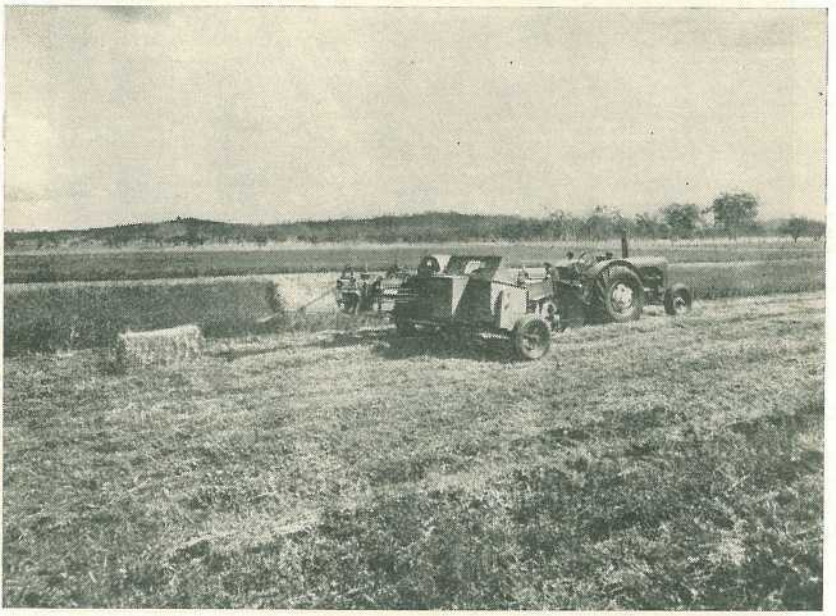


Plate 21.
An Automatic-tying Pick-up Baler in Action in Lucerne.

types require a tractor of 30-35 h.p. for satisfactory operation. Self-propelled balers capable of a high rate of work are available overseas and are usually employed where contract work is done on a large scale.

In addition to handling hay and straw, the pick-up baler can be used to bale green crops for silage if suitably modified.

Bale Loaders and Stackers.

Bale loaders are now manufactured which can be used either for loading or for loading and stacking.

Loaders mounted on pneumatic-tyred wheels are either ground-driven or engine-functioned. They may be

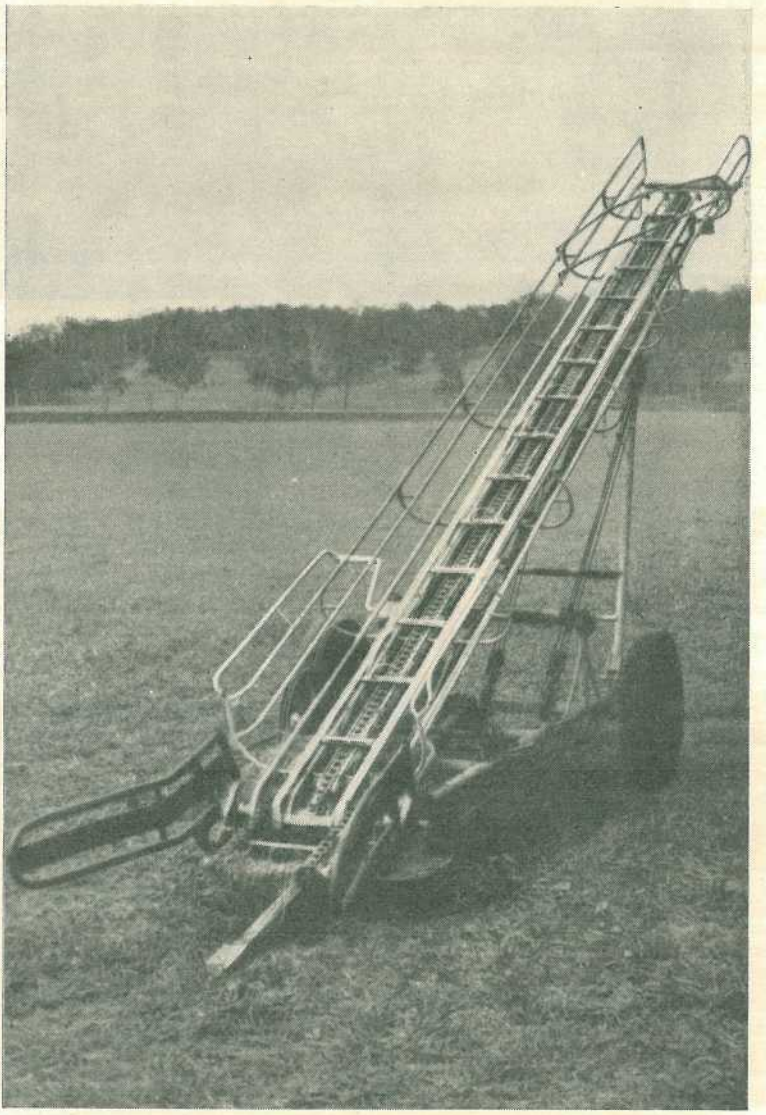


Plate 22.

An Engine-functioned Hay Bale Loader and Stacker.

flexibly attached to the side of the truck or trailer. Bales are automatically picked up and conveyed to a platform from which they are removed by hand for stacking.

Combined loaders and stackers are engine-functioned and hitched in a similar manner to the side of a truck or trailer, or mounted over a truck or tractor. When employed as a stacker unloading from the truck, the front elevator of a hinged-type loader-stacker is raised to the desired height and the direction of drive reversed. With the non-hinged type, the whole elevator is raised to the desired height with the direction of drive unaltered.

Forage Harvesters.

The forage harvester is the most versatile machine for handling crops for conservation purposes. It is designed to harvest row crops such as sorghum and maize for silage, and in addition will handle pasture and the smaller crops that are grown for hay and silage. In all cases the harvested material is chopped up in the machine and discharged into a trailer while the forage harvester is in motion.

Forage harvesters available in Australia may be divided into three main groups which differ in the type of cutting mechanism employed.

Group A includes all types incorporating a conventional reciprocating cutter-bar (Plates 23-25).

Group B employs horizontally rotating cutter plates or blades which also assist in elevating the material into a laceration chamber (Plate 26).

Group C relies on a horizontal rotating shaft to which are attached a series of swinging bar cutters somewhat similar to

Plate 23.

A Row-crop Forage Harvester Operating in a Maize Crop at Nerang.

those in a hammer mill (Plate 27) or 7 in. x 3 in. cutter blades each of which is suspended from the shaft.

The majority of forage harvesters in Group A require separate attachments for harvesting row crops, broadcast forage or pasture crops and windrowed crops. The basic unit of Group B harvesters will handle all crops with the exception of row crops, for which an attachment is available. Harvesters in Group C rely on the one basic unit for all crops whether standing, in swaths or in windrows.

With the exception of one type in Group C which is a self-contained unit comprising the cutter and self-emptying trailer, all forage harvesters require separate trailers or trucks into which the chopped material is blown.

It will be seen that forage harvesters may combine all operations from cutting to loading into transport. If self-emptying trailers are used, the crop can be put into a trench or clamp without any manual handling at all. If the material is to be stored in tower silos or stacks, it must be fed into a forage blower.

Forage harvesters are either P.T.O.-driven or engine-functioned. Where heavy crops are to be handled, the engine-functioned type is favoured, because most P.T.O.-driven models require a tractor of 35 h.p. or more.

The output of a forage harvester varies according to the size of the machine, the power supplied, the type and yield of crop involved and the permissible speed of operation. It depends primarily on the yield of the crop.

Medium-sized units have an output of 3-4 tons of chopped hay per hour, 5-10 tons of grass silage per hour, and 7-15 tons of maize or sorghum per hour.

The capital investment in a forage harvester is about the same as that in equipment for making and handling baled hay.

Plate 24.

Cutting a Maize Crop with a Forage Harvester for Feeding Green to Dairy Stock at Mannuem.

Plate 25.

Tractor, Row-crop Forage Harvester and High-sided Wagon Used for Ensilage Making and Feeding Stand-over Sorghum to Dairy Stock.

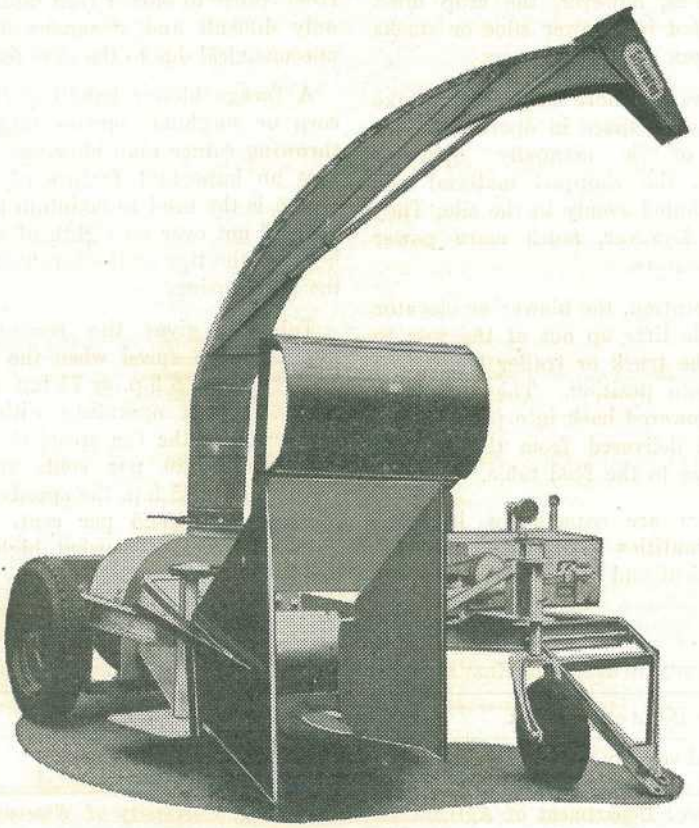


Plate 26.

Forage Harvester With Horizontally Rotating Cutter Plates.

Plate 27.

Forage Harvester With Swinging Bar Cutters.

Forage Blowers and Elevators.

Loads of chopped forage can be dumped into pit or trench silos. In other cases, however, the crop must be elevated into tower silos or stacks by blowers or by elevators.

Blowers are more compact and take up less yard space in operation. By means of a manually operated deflector, the chopped material can be distributed evenly in the silo. They require, however, much more power than elevators.

In operation, the blower or elevator feed table lifts up out of the way to enable the truck or trailer load to be moved into position. The feed table is then lowered back into position and the load delivered from the rear of the trailer to the feed table.

Blowers are capable of handling large quantities of chopped material. For efficient and economical operation, it is desirable that self-emptying trailers be used in conjunction with blowers. Hand forking of the material from trailer to blower feed table is not only difficult and strenuous but also uneconomical due to the slow feed rate.

A forage blower handling chopped corn or sorghum elevates largely by throwing rather than blowing. Therefore an important feature of blower design is the need to maintain a clearance of not over an eighth of an inch between the tips of the fan blades and the fan housing.

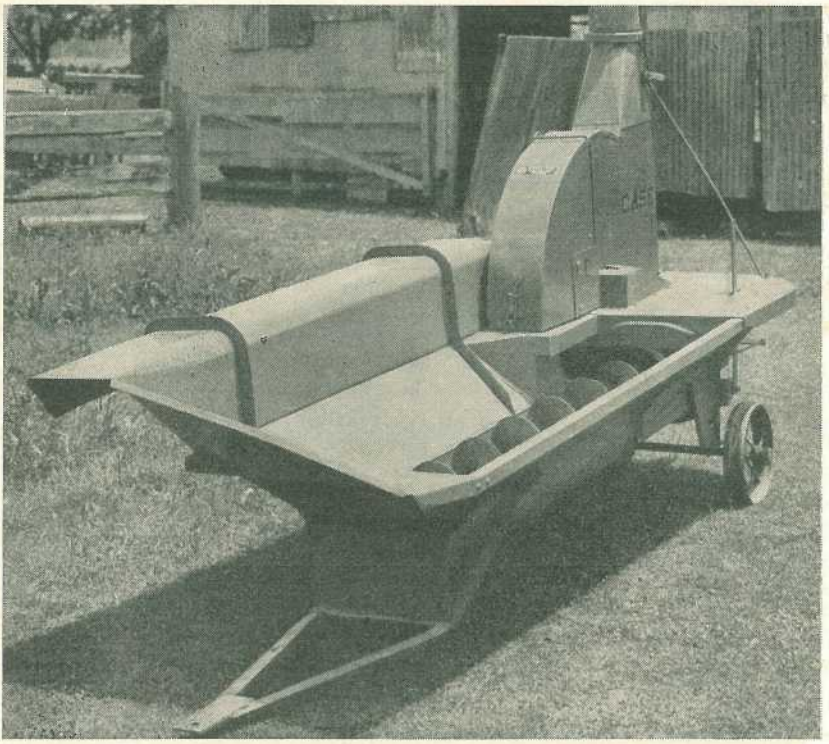
Table 3 gives the recommended minimum fan speed when the blower is driven by a 5 h.p. or 7½ h.p. electric motor. When operating with 15-25 h.p. tractors, the fan speed should be increased 10-20 per cent. and for tractors over 25 h.p. the speeds should be increased 15-25 per cent. Grass crops require a somewhat higher fan speed than maize or similar crops.

TABLE 3.

MINIMUM SPEEDS FOR ELEVATING CORN INTO SILOS OF DIFFERENT HEIGHTS.

Height of Silo in Feet.	30	40	50	60
Peripheral velocity of fan in ft./min.	4,160	4,788	5,416	5,887

Source: Department of Agricultural Engineering, University of Wisconsin.



Pate 28.

Ensilage Blower with Hopper and Auger Feed.

Blower delivery pipes vary in size from 7 in. to 9 in. in diameter. It is generally considered that all sizes are suitable for silage, but in the handling of chopped hay the 8 in. and 9 in. sizes are preferable.

For elevating silage, a 180 deg. short radius elbow is used at the top of the delivery pipe. For hay and straw, a long radius closed elbow is desirable. Frequently only a curvature of 60 deg.-75 deg. is needed for delivering hay or straw into a stack.

A satisfactory blower should have a capacity of 20-30 tons of silage material or 8-10 tons of dry chopped hay per hour. Blower power requirements may be calculated at the rate of 1 h.p. per ton per hour. In other words, a 25-30 h.p. tractor or motor is required to operate the blower at full capacity.

A *molasses pump attachment* is obtainable for some types of blowers. It is driven from the feeder drive so that it starts and stops with the feeder. It draws the molasses mixture (equal parts of molasses and water) from the drum or tank and drops it on to the feed as it enters the blower. The steady flow from the pump by means of a metering device and the violent mixing action of the blower fan are claimed to spread the molasses evenly as a coating on the chopped feed.

Table 4 gives the recommended rates for using molasses as a preservative for silage.

An average-sized wagon or trailer 7 ft. x 14 ft. will carry approximately 1 ton of green chopped forage per foot of depth. This figure can be used to estimate the amount of preservative needed for each load in cases where molasses pumps are not used. The molasses mixture may be watered over the load of chopped forage before it is unloaded into the silo.

TABLE 4.

RECOMMENDED RATES IN POUNDS/TON.

Preservative.	Legumes.	Legume-Grass Mixture.	Grass-Cereal Mixture.
Molasses–Liquid	80–100	70–80	60–70

One gallon of molasses weighs approximately 13 lb.

Source: Agricultural Extension Services, Iowa State College.

[TO BE CONTINUED.]

Precious Water

Water that cannot be absorbed by the soil should be held for stock or irrigation.

Tuberculosis-Free Cattle Herds.

(As at 1st April, 1959.)

Aberdeen Angus.

G. H. & H. J. Crothers, "Moorenbah," Dirranbandi
A. G. Elliott, "Ooraine," Dirranbandi
W. H. C. Mayne, "Gibraltar," Texas

A.I.S.

M. E. & E. Scott, "Wattlebrae" A.I.S. Stud, Kingaroy
F. B. Sullivan, "Fermanagh," Pittsworth
D. Sullivan, "Bantry" Stud, Rossvale, *via* Pittsworth
W. Henschell, "Yarranvale," Yarranlea
Con. O'Sullivan, "Navillus" Stud, Greenmount
H. V. Littleton, "Wongelea" Stud, Hillview, Crow's Nest
J. Phillips and Sons, "Sunny View," Benair, *via* Kingaroy
Sullivan Bros., "Valera" Stud, Pittsworth
Reushle Bros., "Reubydale" Stud, Ravensbourne
A. C. and C. R. Marquardt, "Cedar Valley," Wondai
A. H. Sokoll, "Sunny Crest" Stud, Wondai
W. and A. G. Scott, "Welena" A.I.S. Stud, Blackbutt
G. Sperling, "Kooravale" Stud, Kooralgin, *via* Cooyar
C. J. Schloss, "Shady Glen," Rocky Creek, Yarraman
W. H. Thompson, "Alfa Vale," Nanango
S. R. Moore, Sunnyside, West Wooroolin
H.M. State Farm, Numinbah
Edwards Bros., "Spring Valley" A.I.S. Stud, Kingaroy
D. G. Neale, "Grovely," Greenmount
A. W. Wieland, "Milhaven" A.I.S. Stud, Milford, *via* Boonah
W. D. Davis, "Wamba" Stud, Chinchilla
Queensland Agricultural High School and College, Lawes
C. K. Roche, Freestone, Warwick
Mrs. K. Henry, Greenmount
D. B. Green, "Deloraine" Stud, Durong, Proston
E. Evans, Wootha, Maleny
T. L. and L. M. J. Cox, "Seafield Farm," Wallumbilla
J. Crookey, "Arolla" A.I.S. Stud, Fairview, Allora
M. F. Power, "Barfield," Kapaldo
A. H. Webster, "Millievale," Derrymore
W. H. Sanderson, "Sunlit Farm," Mulgildie
R. A. and N. K. Shelton, "Vuegon" A.I.S. Stud, Hivesville, *via* Murgon
R. R. Radel & Sons, "Happy Valley," Coalstoun Lakes
C. A. Heading, "Wilga Plains," Maleny
G. S. and E. Mears, "Morden," M.S. 755, Toogoolawah

Ayrshire.

L. Holmes, "Benbecula," Yarranlea
J. N. Scott, "Auchen Eden," Camp Mountain
E. Mathie and Son, "Ainslie" Ayrshire Stud, Maleny
B. Goddard, Mt. Tyson, *via* Oakey
C. E. R. Dudgeon, "Marionville" Ayrshire Stud, Landsborough
G. F. H. Zerner, "Pineville," Pie Creek, Box 5, P.O., Gympie
T. F. Dunn, Alanbank, Gleneagle

Friesian.

C. H. Naumann, "Yarrabine" Stud, Yarraman
D. J. Pender, "Camelot," Lytton road, Lindum
S. E. G. Macdonald, "Freshfields," Marburg

Guernsey.

C. D. Holmes, "Springview," Yarraman
A. B. Fletcher, Cossart Vale, Boonah
W. H. Doss, Degilbo, *via* Biggenden
A. C. Swendson, Coolabunia, Box 26, Kingaroy
C. Scott, "Coralgrae," Din Din Road, Nanango
R. J. Wissemann, "Robnea," Headington Hill, Clifton
G. L. Johnson, "Old Cannindah," Monto
A. Ruge & Sons, Woowoonga, via Biggenden
G. Miller, Armagh Guernsey Stud, Armagh, M.S. 428, Grantham
N. H. Sanderson, "Glen Valley," Monto

Jersey.

Queensland Agricultural High School and College, Lawes
J. S. McCarthy, "Glen Erin" Jersey Stud, Greenmount
J. F. Lau, "Rosallen" Jersey Stud, Goombungee
G. Harley, Hopewell, M.S. 189, Kingaroy
Toowoomba Mental Hospital, Willowburn
Farm Home for Boys, Westbrook
P. J. L. Bygrave, "The Craigan Farm," Aspley
R. J. Crawford, "Inverlaw" Jersey Stud, Inverlaw, Kingaroy
P. H. F. Gregory, "Carlton," Rosevale, *via* Rosewood
E. A. Matthews, "Yarradale," Yarraman
A. L. Semgreen, "Tecoma," Coolabunia
L. E. Meier, "Ardath" Stud, Boonah
A. M. and L. J. Noone, "Winbirra" Stud, Mt. Esk Pocket, Esk
W. S. Conochie and Sons, "Brookland" Stud, Sherwood road, Sherwood
Estate of J. A. Scott, "Kiaora," Manumbar road, Nanango
F. W. Verrall, "Coleburn," Walloon
C. Beckingham, Trouts road, Everton Park
G. H. Ralph, "Ryecombe," Ravensbourne
Mrs. I. L. M. Borchert, "Willowbank" Jersey Stud, Kingaroy
Weldon Bros., "Gleneden" Jersey Stud, Upper Yarraman
D. R. Hutton, "Bellgarth," Cunningham, *via* Warwick
J. W. Carpenter, Flagstone Creek, Helidon
H. G. Johnson, "Windsor" Jersey Stud, Beaudesert
S. A. Cramb, Bridge st., Wilsonton, *via* Toowoomba
J. A. & E. E. Smith, "Heatherlea" Jersey Stud, Chinchilla
W. C. M. Birt, "Pine Hill" Jersey Stud, Gundiah
T. Nock, Dallarnil
P. Fowler & Sons, "Northlea," Coalstoun Lakes
F. Porter, Conondale
H.M. State Farm, Palen Creek
B. T. Seymour, "Upwell" Jersey Stud, Mulgeldie
R. N. Burrows, Box 23, Wondai
W. T. Tatnell, Cedar Pocket, *via* Gympie

Poll Hereford.

W. Maller, "Boreview," Pickanjinnie
J. H. Anderson, "Inverary," Yandilla
D. R. and M. E. Hutton, "Bellgarth," Cunningham, *via* Warwick.
E. W. G. McCamley, Eulogie Park, Dululu
Wilson and McDouall, Calliope Station, Calliope

Poll Shorthorn.

W. Leonard & Sons, Welltown, Goondiwindi

Molasses Grass - Centro Useful In Mackay District

By N. E. GOODCHILD,
Senior Adviser in Agriculture.

Pasture trials conducted on the property of Mr. A. Thomas, Funnel Creek, Sarina, show that a molasses grass-centro pasture mixture has a useful part to play in portions of the Mackay district.

In January, 1955, a number of pasture species were planted on the forest ridges in the Funnel Creek area in order to ascertain the most vigorous and most persistent mixtures for this type of country. The average rainfall for this area is about 60 in. a year, of which 75 per cent. falls during the first three months.

The grasses planted comprised, guinea grass, green panic, Rhodes, paspalum and molasses grass, each planted with the well-known tropical legume, centro.

GOOD SEED BED

The Trial area was about 6 acres and the soil was a grey clay loam.

The land was ploughed to the depth of 6–8 in., disced and harrowed so that it provided a reasonably good seed bed.

All seed was thoroughly mixed, and sawdust was added to increase the volume of material to be sown.

The seed mixture was planted in January, 1955, through a sod seeder, and covered in by inverted diamond harrows drawn behind the sod seeder.

Planting was followed by 30–40 in. of rain during February.

BEST HIGHER AND DRIER

A good strike was obtained. Rhodes grass made the fastest growth and dominated the pastures for the first two years and then declined. Guinea grass and green panic never flourished and rapidly declined in vigour and plant population. Molasses grass, paspalum and centro, however, made steady and persistent growth which developed into a regular pattern depending on the soil drainage.

Within three years, paspalum dominated the lower and wetter portions of the ridge, whilst molasses grass and centro dominated the higher and drier areas.

Accurate stocking figures are not available. The paddock was used chiefly as a holding paddock when dipping or before marketing beef cattle. The pastures were, therefore, subjected to heavy grazing pressure for short periods. This type of treatment is required for molasses grass, which in the Cooroy district in south-eastern Queensland has yielded well under similar management.

OTHER PLACES TOO

The persistence and growth of the molasses grass-centro pasture on the drier portions of the forest ridges on Funnel Creek, near Sarina, indicate that this mixture should provide valuable pasture in similar situations which are found on the Sarina Range, Blue Mountain and Bolinbroke districts.

Molasses grass and centro should also be tried on the drier ridges of the coastal country between Mackay and Bowen.

Potted Facts—V

Egg Marketing Boards

By K. C. GUYATT,
Division of Marketing.

With the aim of stabilizing returns to growers, an egg marketing board was set up in Southern Queensland as long ago as 1923. A second board was established in Central Queensland in 1947. Together, these boards controlled the marketing of over eight million dozen eggs in 1957-58.

One of the strongest motives leading to the setting up of a primary products marketing board is the desire to stabilize returns to farmers by ironing out the effect of production surplus to local demand. This certainly was the case with the egg marketing boards.

Unstable market conditions were aggravated by the highly perishable nature of the commodity, and a large body of relatively small producers with no mutual protection who were dependent largely on egg dealers whose activities also embraced the selling of other farm produce and livestock feedstuffs.

The First Board

In such circumstances The Egg Marketing Board was established on June 19, 1923, to market eggs produced by farmers in that portion of south-eastern Queensland within an area of roughly 200 miles radius of Brisbane. Originally the board controlled the produce of flocks of 100 birds or over (including domesticated fowls, ducks, turkeys, or guinea fowl with or without the males and young), but from 1926 the number was reduced to 50 birds. Since this time, similar egg marketing boards have been set up in all Australian States.

Plate 1.

Packing Eggs for Export. Here eggs are coming off a grading machine and being packed for export by staff at the South Queensland Egg Marketing Board.

In 1947, a second autonomous board was set up in Queensland which exercises jurisdiction over an area roughly embraced in a radius of 250 miles of Rockhampton. The establishment of this board followed from the experience of organised market control under the defence powers during the war years, and the growth of the grain growing industries in the Burnett and central Queensland.

Eggs, in addition to being the first commodity for which a board was set up under the general marketing

legislation in Queensland (the State Wheat Board was constituted under the Wheat Pools Acts in 1920) are the only commodity for which a board now exists in every Australian State.

Australian Egg Board

Following wartime control of egg marketing, the Australian Egg Board was set up by the Commonwealth Government in 1948 to control the marketing of exports and to act as agent of the Commonwealth Government in connection with the intergovernmental bulk contract with the United Kingdom. This agreement was terminated in 1953. Since that time the board has been re-organised to provide for direct State Board representation, while provision has also been made for the Australian Egg Board to operate export pools. At present all liquid frozen eggs produced by the State Boards and sold in the United Kingdom and Europe is marketed through The Australian Egg Board. With respect to eggs in shell, however, New South Wales has so far refused to join the pool.

Exports to other markets are shipped under licence with the approval of the Australian Egg Board and, to avoid unnecessary price competition, are subject to certain determinations as regards minimum prices.

Eggs Handled

Even within the Boards' area of control, all eggs are not necessarily physically handled by the Boards or their appointed agents. In accordance with the provisions in the legislation, the Boards grant certificates of exemption to certain producers who, under certain conditions, may market their own production. In 1957-58 some 887,902 dozen eggs were sold through these channels in south Queensland. During this year the South Queensland Board itself received 6,620,333 dozen eggs. This compares with 11,085,700 dozen in 1945-46, the year of highest intake, and 1,398,817 dozen in 1924, the first year of operation. In 1957-58, 4,392,519 dozen eggs and 1,160,440 lb. of liquid frozen egg were sold locally. In addition to this, 715,515 dozen eggs and 405,804 lb. of liquid frozen egg were exported overseas.

To ensure continuity of supply throughout the year, 350,130 dozen eggs were held in cold storage for winter requirements.

The gross payment by The (South Queensland) Egg Marketing Board to producers for 1957-58 was £1,395,058, which averaged 4s. 2.57d. a dozen. After the deduction of handling charges and equalising losses sustained as a result of low export prices, a net average payment of 3s. 7.36d. a dozen was paid. An indication of how the net figure is influenced by low export prices is given by a comparison of local and export prices. In 1957-58 local prices for eggs in shell which fluctuated seasonally realised an average of 4s. 8.3d. a dozen. The net return to the Board on eggs exported to Europe, however, was only 2s. 11.39d. a dozen.

C.Q. Board

During 1957-58 The Central Queensland Egg Marketing Board marketed 411,875 dozen eggs of which 21,600 dozen were through producers selling under a certificate of exemption. All these eggs were sold locally in shell or as liquid frozen egg, with an average gross return of 4s. 8.43d. a dozen and 3s. 11.25d. a dozen net to the producers supplying the Board.

Since the Board was established in 1947, the intake, after reaching almost 600,000 dozen in 1948-49, declined to 113,716 dozen in 1952-53, but has subsequently recovered.

Living Space For Carrots

By K. M. WARD,* Senior Horticulturist.

The costs involved in the production of vegetables these days are so high that the grower wants to be sure his methods will bring the greatest reward. Maximum crop yield in itself will not always achieve this result. Market or consumer preference for high quality produce with specific characteristics is an important factor that must be borne in mind.

Investigations on vegetables have shown that both yield and quality may be influenced by the spacing of the plants in the field. By and large, if overcrowding occurs, quality may be affected and, if spacing is unnecessarily wide, yield will suffer.

With carrots, distance between plants within the row is usually controlled by hand thinning in the early seedling stage; though sometimes low seeding rates are used to avoid a dense stand of plants and reduce the amount of hand work involved.

In Queensland, hand thinning is widely practised and the problem is to decide on a spacing between plants which will give the best yield of the type of carrot most in demand. That demand, at present, is for moderately sized, well-formed roots, crisp in texture and bright in colour.

In 1956 and 1957, experimental work gave some pointers on the effects of spacing within the row on root size, yield and culinary properties. The work was done in field trials conducted on a red-brown clay loam, at the Redlands Experiment Station, between April and mid-September each year. The variety used was Topweight. Growing conditions were satisfactory, and irrigation was applied as required. Weeds were controlled with white spirit.

How is Root Yield Affected?

A preliminary trial showed that whilst individual root size increased as spacing in the row increased, total yield per acre of marketable roots decreased.

In subsequent experiments, the distance between plants ranged from 1 to 7 in. and, for comparison, control plots were unthinned. The effect of different spacings on the amount of roots in each grade †is shown in Plates 1 and 2.

No. 1 *Grade Roots*

Plate 1 shows at which spacing the greatest yields of large, medium and small No. 1 grade roots were obtained. The greatest quantity of large roots was produced by spacing at 3 in. of medium at 2 in., and of small at less thas 1 in.

**This article is based on work conducted by Mr. I. S. Wilson, who before his death, was Officer in Charge of the Redlands Experiment Station.*

†In measuring yields (tops off), marketable roots were graded for size—

No. 1 *Grade*—
Large
Medium
Small
} Not less than 1½ in. diameter and not less than 4 in. in length.

No. 2 *Grade.*—Not less than 1 in. diameter and not less than 3 in. in length.

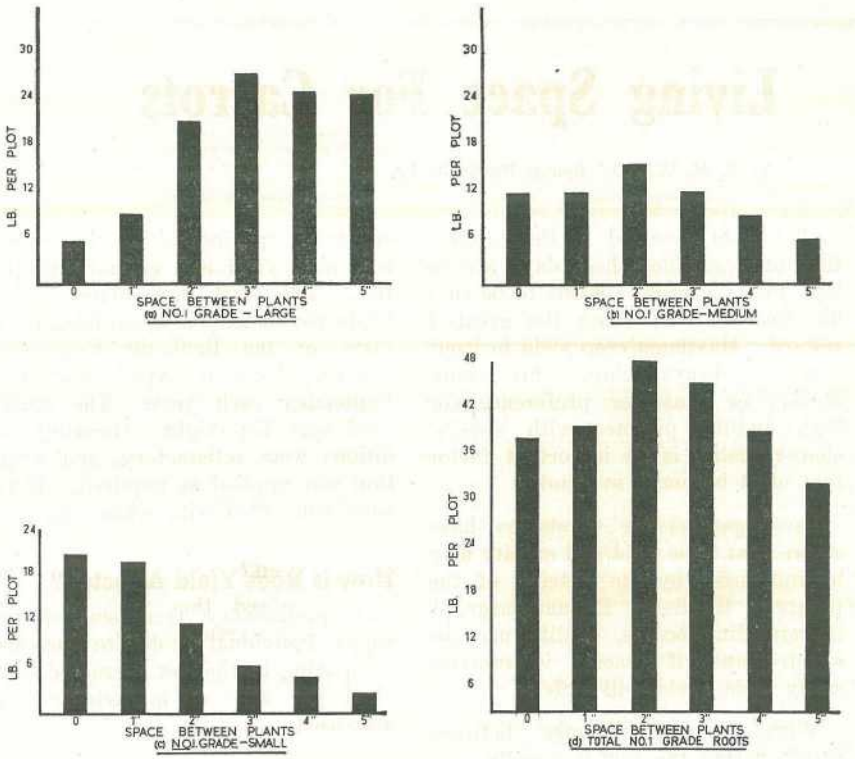


Plate 1.

Effect of Plant Spacing in the Row on Yield of No. 1 Grade Carrots.

The maximum total yield of No. 1 grade (large, medium and small) carrots was given at the 2 in. spacing, and thereafter there was a steady decline in yield as distance between plants increased. Thus yield at 3 in. was 7 per cent. less than at 2 in. and, at 4 in. it was 20 per cent. less. When the space was increased to 7 in. yield declined by 57 per cent.

No. 2 Grade and Unmarketable Roots

The greatest quantity of No. 2 grade carrots was obtained when no thinning was done. At the 2 in. spacing, the amount of roots in this grade was almost negligible, the crop being almost wholly No. 1 grade roots.

The unmarketable roots were too small or too misshapen to meet market requirements. At 2 in. and wider spacings, the amounts of this type of root were not affected by distance between the plants.

Total Yield of Marketable Roots

Plate 2 shows that the maximum yield of marketable carrots (Nos. 1 and 2 grades) was obtained when no thinning was done.

On an Acre Basis

The experiments have shown that the proportion of carrots in the various size grades varies with the spacing between plants. How does this affect over-all yield? The answer is given in Table 1 in which the yields are expressed on a per-acre basis.

Firstly, with *No. 1 grade* carrots, the highest yield of *large* roots (6.2 tons) occurs at the 3 in. spacing, as against the 4.8 tons at 2 in. The

TABLE 1.

WEIGHT OF ROOTS PRODUCED PER ACRE (TONS).

Spacing.	No. 1 Grade.		No. 2 Grade.	Total Marketable Yield.
	Large Only.	Total.		
0 in	1·3	8·2	4·2	12·4
1 in.	1·9	8·5	2·6	11·1
2 in.	4·8	10·4	0·9	11·3
3 in.	6·2	9·7	0·5	10·2
4 in.	5·7	8·3	0·3	8·6
5 in.	5·4	6·9	0·4	7·3

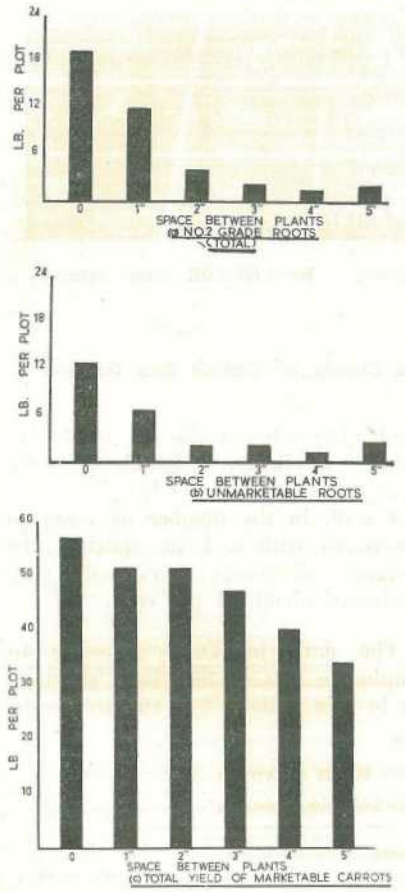


Plate 2.

Effect of Plant Spacing in the Row on Yields of:—a. No. 2 grade; b. Unmarketable; and c. Total Marketable (No. 1 + No. 2 grade) Carrots.

total yield of No. 1 grade roots (large, medium and small), however, is highest (10.4 tons) at the 2 in. spacing, as compared with 9.7 tons at the 3 in. spacing. The total yield of marketable roots (Nos. 1 and 2 grades) begins to decline sharply at spacings wider than 2 in.

How is Size of Root Affected?

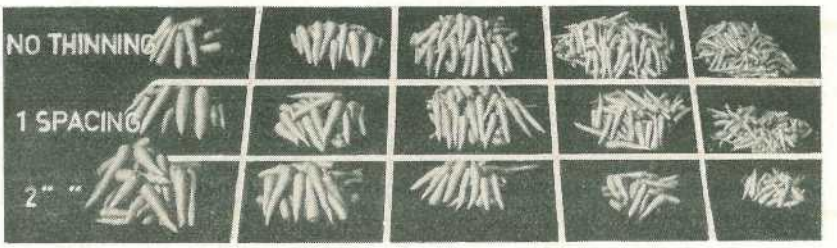
In assessing the effects of spacing on root size, a major point of interest is the proportion of carrots falling into the various size groups.

The average weight of roots in each of the classes into which the crop was sorted was as follows: No. 1 grade—large, 9.1 oz.; medium, 5.9 oz.; small, 3.8 oz. No. 2 grade—2.9 oz.

As spacing was increased, there were marked changes in the groupings. This is shown in Table 2 and Plate 3.

The proportion of *large* No. 1 grade roots showed a constant increase up to the 6 in. spacing but no further increase in the amount occurred above that figure. With *medium* No. 1 grade roots there was no increase above 2 in. At spacings of 2 and 3 in., the great bulk of the crop (83–91 per cent.) consisted of No. 1 grade roots, but the proportion of this grade was not increased by widening the distance between plants to more than 3 in.

The quantity of No. 2 grade roots fell off sharply at spacings above 1 in., but no matter how wide the spacing, it did not fall below 8 per cent. of the total crop.



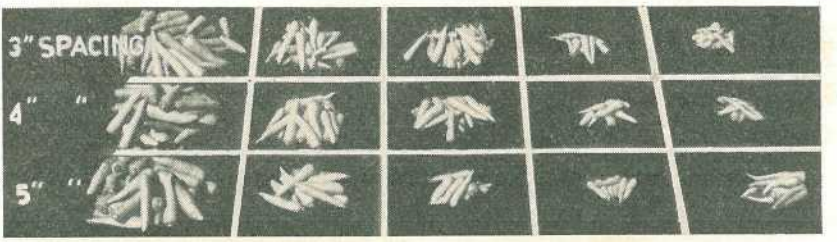


Plate 3.

Effect of Plant Spacing on Proportions of Carrots in Various Size Groups.

Number and Weight of Carrots

As distance between plants was increased, there was a rapid decline in the number of roots per unit area (Table 3), but there was not a correspondingly marked change in total yield. By increasing the distance between plants from 1 in. to 2 in., the number of roots was decreased by about 30 per cent., but the weight of roots harvested remained much the same. Similarly, although a 5 in. spacing involved a reduction of 70 per cent. in the number of roots as compared with a 1 in. spacing, the weight of roots harvested only decreased about 33 per cent.

The data in Table 3 serve to emphasise that at the closer spacings (1 to 3 in.), there was an increase in

TABLE 2.

PERCENTAGE OF CARROTS IN EACH GRADING.

(Based on numbers of marketable roots.)

Spacing.	No. 1 Grade Roots.				No. 2 Grade.
	Large.	Medium.	Small.	Total.	
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
0 in. ..	4	12	33	49	51
1 in. ..	8	15	38	61	39
2 in. ..	26	27	30	83	17
3 in. ..	42	27	22	91	9
4 in. ..	46	25	21	92	8
5 in. ..	57	19	14	90	10
6 in. ..	60	21	10	91	9
7 in. ..	57	16	13	86	14

TABLE 3.

NUMBER AND WEIGHT OF ROOTS.

Spacing.	Total Marketable Yield.	
	Number/plot.	Weight (lb.)/plot.
0 in. ..	274	58
1 in. ..	213	51
2 in. ..	150	52
3 in. ..	108	47
4 in. ..	88	40
5 in. ..	66	34

root size with each increase in spacing. This was not evident at the wider spacings of 4 in. or more.

Effect on Root Quality

Size of root was more affected by spacing than any other factor. Though large roots had the coarsest appearance, they were not noticeably more fibrous in texture nor less palatable than smaller ones. However, market comment was to the effect that though large (9.1 oz.) and medium (5.9 oz.) No. 1 grade carrots were attractive in appearance, small (3.8 oz.) roots in this grade were generally preferred by buyers.

Large No. 1 grade roots showed a greater tendency to splitting than medium and small No. 1 grade roots but, under the favourable growing conditions which existed throughout the period of the experiment, this was not a major fault in the crop. With wide spacing between plants, top growth was mostly of the spreading type and the roots were therefore not particularly suitable for the bunch trade.

The effects of different spacings on root size are illustrated in Plate 3. An undesirable feature which showed up in carrots grown at the wider spacings was the greater development of lateral, fibrous roots. These tended to coarsen the carrot and their removal at harvesting added to the labour of preparing the product for market.

Close spacing, such as occurs in an unthinned crop, was responsible for a small proportion of malformed roots (Plate 4).

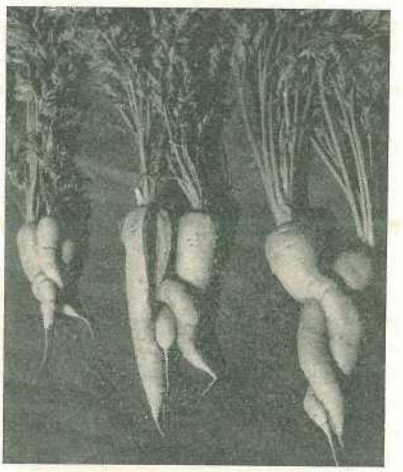


Plate 4.

Twisted Roots: An Effect of Overcrowding in the Row.

Application of Results

It has been shown that, within certain limits, spacing within the row determines the size of the carrot roots at harvest. If the grower decides to market as many *large* carrots as possible, his crop should be thinned to a 3 in. spacing. The adoption of a wider spacing will give a greater proportion of large No. 1 grade roots but yield will be reduced.

If market demand is for a *medium* sized No. 1 grade carrot, the greatest yield will be obtained by thinning to 2 in.

For the pre-package and frozen trade, *small* No. 1 grade and No. 2 grade carrots may be the most acceptable. In this case, maximum yield is obtainable by leaving the crop unthinned.

These results were obtained in a friable red-brown clay loam soil, using Topweight as the indicator variety. In other soil types and with a different type of carrot, results may differ somewhat from those reported here.

Orchard and Garden

IT'S not safe to use the weedicide Delapon to control couch grass in pineapple plantations. Even at weak strengths, Delapon will cause pineapple leaves to wither and die from the tips if it gets on them. Fruit and young suckers have been affected several months after the weedicide has been used.

The property of Delapon to injure pineapples has been proved in trials carried out on the North Coast. Delapon can be taken up through the roots of the pineapple plant, and any attempt to control couch with it in the plantation is extremely risky.

Delapon gives good control of couch grass and some growers have already tried it. Injury doesn't always follow its use, probably because growing conditions at the time of spraying influence its effect. However, the risk involved is considered too great for this weedicide to be recommended.

—*R. C. CANNON,*
Senior Horticulturist.

PINEAPPLES are grown from slips, suckers, and tops, each individual plant being identical in type with the parent from which it was taken. Characteristics of the parents, bad or good, persist and multiply in their descendants. Obviously the source of planting material decides the quality of your pineapple crop. Improvement? Or deterioration? Which is it to be?

A little time spent on plant selection will repay you many times. Collar of slips is the main defect in pineapples. You know that only too well; and there are others, such as Long Tom and Bottle Neck and dry fruit. And the odd plants which remain sickly, lack vigour, or sucker poorly; it would be unwise to perpetuate these!

Start your selection programme when a plant crop is maturing summer fruit. Mark with bright paint any plants with any of the faults mentioned. Later, gather planting material only from the superior, unmarked units. Repeat the plan in each summer plant crop. Select and eliminate. Aim for quality and maintain it.

—*D. DOWDLES,*
Assistant Adviser in Horticulture.

Pasture For Walloon Farm

"K.B.", of Walloon, requires a pasture mixture suited to his farm. The area is a flat; it has a light soil, and about half of it could be irrigated.

Answer: When the area is prepared and has a good seed bed, a mixture such as that set out could be planted from about January to March:

H1 rye grass	2 lb./acre
Paspalum	6 lb./acre
Phalaris arundinacea (Reed canary grass)	2 lb./acre
Cocksfoot	2 lb./acre
New Zealand certified white clover	2 lb./acre

An application of two bags of a complete fertilizer mixture at planting time would be very beneficial. In later years this should be changed to one bag of superphosphate to the acre.

Spray will correct iron deficiency in pineapples

By E. L. HASTIE, Adviser in Horticulture.

THE leaves of a healthy pineapple plant are deep-green in colour, with a reddish flush. Variations from this typical colour are therefore a useful indication of nutrient deficiencies or an unbalanced supply of the nutrients needed for normal growth.

The elements needed for plant growth may be divided into two groups, the major elements and the trace elements. The terms "major" and "trace" do not indicate the importance of particular elements but rather the quantity required by the growing plant. The major elements are carbon, hydrogen, oxygen, phosphorus, potassium, nitrogen, sulphur, calcium, and magnesium. The trace elements include iron, manganese, copper, zinc, molybdenum, and boron.

The first three of these elements, namely carbon, hydrogen and oxygen, are obtained from the air and from water in the soil. The remainder of the "major" elements and also the "trace" elements have to be absorbed from the soil through the root system of the plant.

Availability of Iron

Iron occurs in most soils, mainly in the form of oxides which are largely responsible for the characteristic red and brown colours in some types of soil. There is usually more than sufficient iron in the soil to supply the needs of the plant but, at times, much of it is insoluble and cannot be absorbed through the roots. The shortage of soluble iron may be due to a number of causes such as high acidity or interaction of other elements with the iron salts in the soil.

Iron is necessary for the formation of chlorophyll, which is the green colouring matter in the leaves of the plant. If insufficient amounts of this element are taken up by the plant, the young leaves become pale and yellow instead of the normal green colour, and do not function properly. The yellow colour in the leaves is usually termed chlorosis. In extreme cases of iron deficiency, the foliage may be almost completely bleached, while in less severe cases the chlorosis may exhibit a mottled pattern.

Iron salts in the plant tissues are relatively immobile and a shortage in the young leaves cannot be made good by reserves elsewhere in the plant. For this reason, iron deficiency symptoms first appear in the younger leaves. This is the reverse of nitrogen deficiency symptoms, which show up in the older leaves before abnormalities can be seen in the growing point. In this case, nitrogen compounds in

Plate 1.

Plant Crop of Pineapples. It should produce a good commercial crop of more than 20 tons an acre. When iron deficiency symptoms are not promptly corrected, yields will be much less.

the mature leaves move to the younger ones and so the growing point remains green.

The fruit of pineapple plants suffering from an iron deficiency are orange-red, rather than yellow, in colour when ripe and usually do not "fill-out" satisfactorily. The tops show the normal leaf symptoms of an iron deficiency, that is, yellowing of the central heart leaves. The outer basal leaves of the top may, or may not, be a normal green colour; this depends on the extent of the deficiency.

In most pineapple areas where iron deficiency symptoms occur, the disorder is due, not to a natural shortage of iron in the soil, but to its immobilisation by manganese. These soils are, in fact, rich in iron and have a pronounced red colour. However, they also contain an excess of manganese salts which interact with the iron salts in the soil to produce insoluble compounds which cannot be taken up by the plant.

Manganese

Manganese, like iron, is present in most soils and the form in which it occurs influences its availability to the plant. A deficiency of manganese is comparatively rare in pineapple-growing areas but an excess has been recorded in certain types of red-brown loams in the Mary Valley near Gympie, at Yeppoon near Rockhampton, Coolabunia in the South Burnett, some areas near Nambour and at Brookfield.

Manganese-induced iron deficiency in pineapples is very pronounced in the Mary Valley, where sizeable deposits of manganiferous ore occur. Some of these deposits have been mined in the past.

The distribution of manganese in the soil, however, varies greatly from farm to farm, even within the one district. It is therefore not surprising that the incidence of iron deficiency induced by excess manganese in the pineapple crop is also highly variable.

Treatment

Symptoms of iron deficiency in the pineapple plant can be quickly corrected by supplying this element in foliage sprays applied directly to the leaves. The active ingredient in such sprays is usually ferrous sulphate or, as it is more commonly known, sulphate of iron. The usual concentration is a 3 per cent. solution which can be prepared by dissolving 1 lb. of iron sulphate in a knapsack spray full of water (usually 3½ gal.). If a power spray outfit with a 100 gal. vat is used, the amount of iron sulphate per vat is 30 lb.

The iron sulphate spray is applied as a fine mist, which gives a much better cover than a coarse spray. Furthermore the mist spray reduces the risk of burning since a smaller volume of the solution is used and there is less possibility of droplets coalescing and running down the leaves into the tender heart of the plant. Where this occurs, severe burning may result.

The amount of spray required per acre of pineapples depends largely on the size of the plants. In a plant crop, however, about 30 gal. an acre should give a satisfactory cover. When applying the spray, the operator moves at a rapid walking pace along the plant row.

The colour and general appearance of the plants is probably the most reliable indication of the need for treatment. On soil types where iron deficiency symptoms have been recorded in previous pineapple crops, the plants should be sprayed whenever there is any indication of yellow colour in the younger leaves or a lack of response to good growing conditions. The actual number of sprayings and the times of application will vary from district to district according to the soil type. In the worst affected areas, however, spray applications are needed at monthly intervals during the summer months when the plants are making rapid growth.

Veterinary Course

An inquiry has been made: "Could you please tell me if it is possible to take a veterinary course by correspondence and if so where to obtain the particulars of the course? If this is not possible, would it be possible to learn something of veterinary work without attending university?

Answer: It is impossible in Queensland or in fact in any of the States of Australia to obtain instruction leading to the degree of B.V.Sc. by means other than full attendance of matriculation studies at an approved university. In this State and any other States in Australia, it is impossible now to commence practice without qualifying B.V.Sc.

The Agricultural High School and College, Lawes, does include items dealing with animal health and treatment of common diseases in its curriculum and in addition does hold various short term schools for farmers and others at which these subjects are touched on. Possibly other information could be obtained from the Principal, and the Adult Education Supervisor.

The Technical College runs a course for meat inspectors and details of this could be obtained through the Education Department.

The Farm Family

Our Children's Happiness

A HAPPY child is the child of parents who, through their understanding, set his small feet firmly on the road to a life successful in its best and widest sense.

To understand children, we must realise that they are NOT all alike; that each is an indivdual in his own right. Differences in make-up call for individual guidance and special opportunities.

However, there are certain basic needs that all children share; needs that must be fulfilled if they are to enjoy their birthright of happy childhood. Here are some of those needs, which call for the finest in parenthood.

Children Need Love

Love to a child is what sunlight is to a flower.

Authorities today agree that children are not "spoiled" by too much love, but by too little. The little one who feels neglected and unloved often becomes the "brat" whom everyone dislikes.

On the other hand, the youngster who is loved, and knows it, develops into a well-adjusted person with a minimum of eccentricities. Show a child love and give him praise.

However, we must beware of some of the mistaken ideas of love. The possessive mother, for instance, who clings to her child and deprives him of the society of others, is harming the one she professes to love.

Neither is it love to shower a child with material possessions you were unable to have in your childhood. And loving a child only when he brings prestige to the family is only personal gratification.

To love children for their own sakes, and freely show them that love, is to help them thrive in spirit and grow into people to be proud of.

Children Need Play

Never think of children's play as unimportant. To them it's serious business; the vital business of expressing themselves, of developing physically and mentally.

Children need to adjust themselves, to sort themselves out through play. They bring out their fantasies and work off their hostilities. They develop physical skill and strength, and exercise their boundless imagination.

For healthy, happy play, these are some of the things children need:—

To romp sometimes with their parents.

At other times (except where play is dangerous or unfair) to play without adult interference.

To have playmates, so they can learn to get along with others.

To be allowed to imitate their parents in the jobs they do about the house.

To be allowed to play with water and sand.

Harmless to health, these give valuable scope to a child's self-expression.

Don't make the mistake of thinking that children can't play properly unless they have expensive toys. Their imaginations can work wonders with the most humble household objects.

Children Need Discipline

We must draw the line between wholesome freedom and allowing children to do as they like. It's most important for youngsters to learn early that there are certain limits in behaviour.

There are two very strong reasons for this. One is to protect the child against the physical dangers that unrestrained activity can lead him into. The other is to prevent him from making himself unacceptable to other people, and so creating a life-long obstacle to his happiness.

It is most essential to a child's happy social adjustment that he learns to respect other people and their possessions. The example of parents is his best teacher in this.

Nothing is so necessary to wise discipline as consistency on the part of the parents. Don't let your mood of the moment colour your attitude to a child. Always try to be just, and if you say you will or will not do a certain thing, keep your word.

Understanding children is a full-time job that calls for a lot of conscious effort. But even when things seem difficult, keep before you the shining goal of your child's future happiness.

To help you to a better understanding of your children, ask for Queensland Health Education Council Radio Talks on the following subjects:—

"Controlling Children," "The Perfect Child," "Children and Eating," "Doting Mother—Jealous Child," "Lonely Children," "Child's Personality," "Children's Fear," "Father and Child." Ask also for Free Booklets on Sex Instruction.

—Contributed by Queensland Health Education Council.

Nature Note

A STATE-WIDE drive to enlist the support of all Queenslanders in conserving native plants and animals is paying off. This is shown by increased inquiries from intending hunters, trappers, naturalists and tourists for advice on protected animals and hunting seasons.

Special care has been taken by Government organisations to familiarise migrants with protected plants and animals in Queensland. Conservation of native plant and animal forms an important part of the migrant education classes and a coloured pamphlet showing some typical native animals and plants is distributed to new Australians by the Department of Education.

The drive, however, has not been directed solely at new Australians. Regular lectures, film evenings, posters and a Royal National Show exhibit are arranged to point out to the whole community that native plants and animals are a national asset. Commonsense conservation aims at protecting the rare, the beautiful and the useful, as well as obtaining a continuity of income and sport from the species having economic and sporting values.

It is planned to continue the drive to make Queenslanders more conscious of the need to conserve the State's plants and animals. Success in conservation hinges largely on the co-operation of the public, and this co-operation can be expected only when the public is kept well informed.

—C. ROFF, Fauna Officer.

Tomato time is any time

Tomatoes, red ripe, and fresh from summer vines . . . tomatoes green for pies, pickles, and other good dishes after the first light frost of autumn . . . tomatoes for winter and early spring "put up" plain or in juice, catsup, chilli sauce, relishes, marmalades . . . The calendar round, tomatoes add their special note of bright colour, tempting flavour, and vitamin value.

Cooked Tomatoes—Ripe or Green

Stewed Tomatoes.—Remove stem ends and quarter 6 medium-sized ripe or green tomatoes (peel ripe tomatoes, if preferred). Add 1 tablespoon minced onion for flavour, if desired. Cover and cook until tender—10 to 20 min. for ripe tomatoes, 20 to 35 for green. Add a little water to green tomatoes, if needed.

Season with 1 teaspoon salt; a little pepper; sugar, if desired—½ teaspoon for ripe tomatoes, 1 tablespoon for green—and one tablespoon fat. For variety, add ½ cup soft bread crumbs before serving or top with toasted bread cubes. Six servings.

In the Main Dish

Curry of Meat with Green Tomatoes

1 onion, sliced
3 tablespoons meat drippings or other fat
1 quart sliced green tomatoes
3 cups chopped, cooked meat
1 to 2 teaspoons curry powder
salt.

Cook the onion in the fat. Add green tomatoes, cover, and cook until tender. Add meat and heat thoroughly. If the mixture is too thick, thin it slightly with meat broth, gravy, or water. Season to taste with curry powder and salt. Serve with flaky boiled rice or noodles. Six servings.

Luncheon . . . Supper Dishes

Savoury Rice With Tomatoes

Cook ¼ lb. diced bacon until crisp, remove from fat, and drain. Combine 2 tablespoons of the bacon drippings with 3½ cups tomatoes, ¼ cup each of chipped green pepper and onion. Bring to boiling, add about 3 cups cooked rice, cook 10 to 20 min., or add 1 cup uncooked rice and 2 cups water, and cook gently 40 to 45 min. or until rice is tender. Add more water if mixture becomes dry. Season with salt and pepper. Add bacon. Six servings.

Salad Suggestions

Combine diced tomatoes, cooked beans, chopped celery, chopped pickle or pickle relish; season with minced onion, salt, and pepper. Moisten with salad dressing.

Arrange alternate slices of tomato and cucumber; or tomato, avocado, and grapefruit sections on lettuce or other salad greens. Serve with salad dressing.

Combine diced tomatoes, diced, cooked potatoes, top with several pieces of cooked asparagus. Serve with salad dressing.

Some favourite salad combinations are: sliced tomatoes and cucumber with cottage cheese; diced tomato, celery, radishes, cucumber, scallions or green onions, and lettuce; chopped tomato and shredded cabbage; diced

tomato, raw spinach, onion, and grated carrots. Serve with your favourite salad dressing.

Tomato Juice, Soups, Sauces

Tomato Juice Cocktail

3½ cups fresh or canned tomatoes
1 cup chopped celery
¼ cup chopped green pepper
½ bay leaf
1 tablespoon chopped onion
½ teaspoon salt
1 teaspoon Worcestershire sauce
½ teaspoon horseradish if desired.

Cook together the tomatoes, celery, green pepper, bay leaf, and onion—about 20 min. for fresh tomatoes, 10 for canned. Press through a sieve. Add salt, Worcestershire sauce, and horseradish to sieved tomatoes. Chill. Mix well before serving. Makes 3 cups.

Cream of Tomato Soup

3½ cups fresh or canned tomatoes
¼ cup chopped onion
2 tablespoons fat
3 tablespoons flour
½ teaspoon sugar, if desired
3 cups milk
1 teaspoon salt.

Cook together the tomatoes and onion—about 20 min. for fresh tomatoes, 10 for canned. Press through sieve. Melt the fat; blend in flour and sugar (if used). Gradually add cooled, sieved tomatoes. Cook over low heat, stirring constantly, until thickened. Gradually add tomato mixture to milk, stirring constantly. Heat slowly to serving temperature. Add salt. Serve at once. Six servings.

Tomato Sauce

2½ cups fresh or canned tomatoes
¼ cup chopped onion
½ teaspoon sugar, if desired
¼ bay leaf
2 cloves
Flour
Fat
½ teaspoon salt
Pepper.

Cook together the tomatoes, onion, sugar (if used), bay leaf, and cloves—about 20 min. for fresh tomatoes, 10 for canned. Press through a sieve and measure. For each cup of sieved tomatoes, blend 1 tablespoon flour and 1 tablespoon melted fat; gradually add the cooled, sieved tomatoes. Cook over low heat, stirring constantly, about 5 min. or until thickened. Season with salt and pepper. Serve over meat or vegetable loaf, croquettes, fish, cooked spaghetti, souffle, or omelet.

For variety, brown lightly in the fat 1 cup sliced mushrooms before blending fat with the flour. Or for a main dish, add cooked meat balls to the sauce and serve over cooked spaghetti.

Tomato Relish

Catsup

2½ quarts (15 to 17 medium-sized) sliced tomatoes
¾ cup chopped onion
3-in. piece stick cinnamon
1 teaspoon whole cloves
1 large garlic clove, chopped
1 cup vinegar
½ cup sugar
1½ teaspoons salt
1 teaspoon paprika
Dash cayenne pepper.

Simmer together tomatoes and onion for 20 to 30 min.; press through a sieve. Put the cinnamon, cloves, and garlic loosely in a clean, thin, white cloth; tie top tightly; add to vinegar and simmer 30 min. Remove spice bag. Boil tomato mixture rapidly until you have but one-half the original amount. Stir frequently to prevent sticking. Add spiced vinegar, sugar, salt, paprika, and cayenne pepper to tomato mixture. Boil rapidly, stirring constantly, about 10 min. or until slightly thickened. Pour into hot, sterile jars, fill jars to top, and seal. Makes about 2 pints.

The Good Chairman Does This...

By J. PARK,
State Organiser, Junior Farmers.

EACH junior farmers' club is required to conduct regular meetings over which the club leader, in his capacity as chairman, presides, and at which the members make plans and decide how best they may carry these out. The meetings can only be successful if they are well run and the discussions are intelligent and regulated to the business in hand. Matters are made easier if the rules of procedure are known and thoroughly understood by the chairman, for it is his duty to guide the meeting in such a way that the greatest amount of business is done in a reasonable time. He must also do what he can to make certain that those who attend leave the meeting satisfied that useful work has been done; that they have had the opportunity to express their views and to vote according to their opinions; and that information to which they were entitled was not withheld.

Preliminaries.—The chairman is responsible for convening meetings, though in this he will follow the wishes of his executive committee and the instructions, if any, of the general meeting, that is, of the club. The actual summoning of the members, by sending out notices, is the duty of the secretary. The chairman must fully understand the business that has to be done at the meeting, and he should go through this with the secretary when the agenda is being drawn up prior to the meeting. Such collaboration is essential to good management. It is also wise, just before the meeting, to go through the agenda again and to discuss with the secretary any matters that have arisen recently. The chairman must, therefore, arrive at the meeting-place in advance of the time of the opening of the meeting, and the other officers should do the same.

The chairman should begin the meeting exactly at the time stated in the notice convening the meeting, unless there is some very good reason for doing otherwise. If the attitude of "give them a few minutes more" is regularly adopted, the latecomers will not improve their manners, and those who are punctual will resent the waste of their time. By being punctual himself, the chairman sets the club an example of courtesy and good sense.

In taking his place in the chair, the chairman declares the meeting open, saying, "Order please, ladies and gentlemen, I declare this meeting open."

The chairman remains seated during the meeting unless he wants to make a speech, present a report, introduce a speaker or make a special announcement.

Items on the Agenda.—The first item on the agenda is the acceptance of any apologies for absence; then follows the reading of the minutes. The minutes must be those of the last meeting of the same body of people as is then assembled. The chairman then asks the meeting if the minutes are correct.

It is usual to ask for a resolution (motion) "That the minutes as read be confirmed."

This resolution can only be moved and seconded by members who were actually present at the meeting concerned. If the meeting approves, the chairman signs and dates the minutes.

If the meeting, after proper discussion, passes a resolution amending or altering the minutes, because they are not a correct record, the secretary makes the necessary alterations, the chairman initials these, the corrected minutes are then accepted by the meeting, and the chairman signs and dates them. The minutes must never be altered except on grounds of inaccuracy.

Business arising from Minutes is the next item on the agenda. It is at this stage that discussion is permitted on matters dealt with in the minutes. It is not unusual for most of these matters to be the subject of reports given by the secretary or other members. It is the responsibility of the chairman to ensure that these reports are prepared.

Reports.—There is much confused thinking about the presentation of reports. Formal reports have to be "received" by the meeting before they can be discussed.

The member responsible for presenting the report moves a resolution, "That this report be received"; this resolution must then be seconded.

It should be made clear that in receiving a report the meeting does not necessarily approve of all that it may contain. When the report has been received it can be discussed clause by clause if necessary. It may or may not be amended (altered), but when discussion is at an end it is put to the meeting for "adoption" either in its original form or as amended. If the resolution calling for the adoption of the report is seconded and voting is favourable, the body of members then meeting becomes responsible for the report. If it is not adopted it may remain as merely "received," or it may be "referred back" to those who drew it up to try again.

Resolutions.—When a suggestion that something should be done is laid before a meeting, the suggestion is called a "motion." If the meeting decides to follow the suggestion the motion is passed and becomes a "resolution." A motion must be worded as an *affirmative* and not as a *negative*. This means that the motion must say that something *should* be done, rather than that something should not be done. Every motion begins with the word "That——." No motion that has been passed or rejected may be discussed again at the same meeting.

Every motion must be proposed and seconded before it is debated. If there is no seconder, the motion cannot come before the meeting for discussion.

No really important or difficult matter ought to be settled by a meeting unless the members have had a chance to think about it beforehand. The chairman is acting within his rights if he refuses to allow an important motion, not on the agenda, but brought up under "any other business," to be voted on. He may, however, allow it to be discussed. If the chairman is in doubt about permitting discussion on such a motion, he should seek the view of the majority of members as to the desirability of treating the motion "as a matter of urgency."

Debate.—The chairman must insist that every speaker "address the chair." This means that all must speak to him (or her) and not across the room to other members. If members wish to ask questions, they must be directed "through the chair."

Naturally only one person may speak at a time, and if two members who wish to speak rise to their feet at the same time the chairman has to decide who will speak first. The other person must be allowed to speak next.

In an orderly meeting, no one stands up if the chairman is addressing the meeting, except to raise a "point of order." Also, if the chairman stands up, the speaker must sit down.

It is the chairman's job to keep speakers to the point. Everyone's time is wasted if a speaker talks about matters which do not concern the item under discussion, or if he repeats himself.

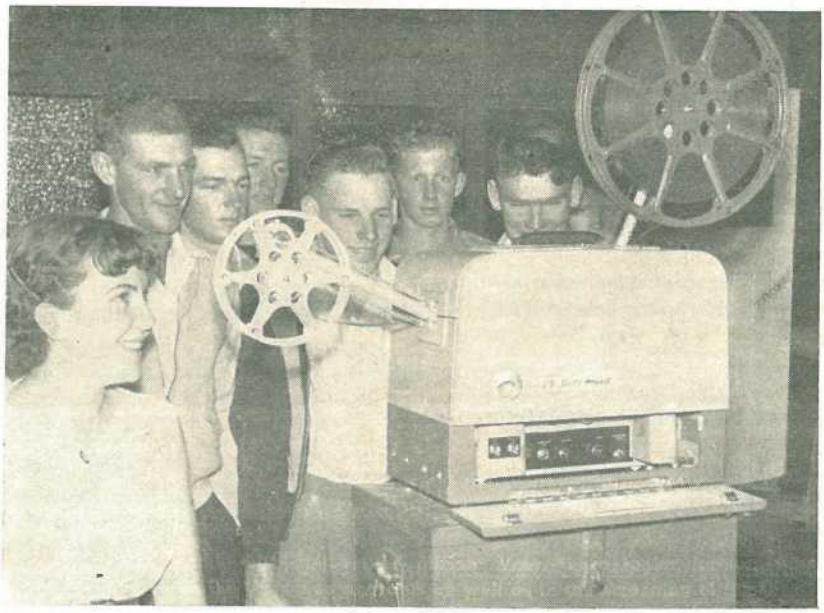
The chairman needs tact and good humour to keep the meeting orderly and harmonious and to get the business done briskly.

Hints For Club Members

Many clubs have considered building their own club rooms. Members of the recently-formed club at Mt. Ossa, near Mackay, have almost completed theirs. If you are interested in seeing their plans and specifications, and finding out how they raised the necessary finance, write to the club secretary, "Silent Grove," Mt. Ossa, via Mackay.

It pays to review your club's programme every three months. If it is not catering for the needs and the interests of members, make some radical changes in it. But remember this, you will benefit from your junior farmers' club only in so far as you take an *active* part in its affairs. Decide upon an interesting and beneficial programme, then *work* to make it succeed.

Educational and Entertaining



WHEN the mobile film unit visited Miriam Vale, these junior farmers found interest in the projection apparatus as well as in the screening of films.