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Event and Comment

Agricultural Development in Queensland.

IN the course of a recent statement the Minister for Agriculture and Stock (Hon. Frank W. Bulcock) said that to-day it could be clearly recognised that agriculture had entered on the third phase of its development. Successively these stages were the pioneering era, the production era, and the production plus selling era.

In the second stage it was only necessary to produce a crop to be able to sell it, and disposal was the only objective. In this period such things as quotas and limitations were unheard of, but equally also was the factor of a fair price for the commodity. In other words, the producer had no guarantee that he would receive the cost of production. This period was a far happier one for the speculator and middleman than for the producer.

Then, because of a variety of circumstances, the new alignment of production began to manifest itself. Not only did the farmer have to produce a crop, but he had to sell it under increasing difficulty. The old system of individual bargaining could not meet the new demands made on it, and economics was wedded to agriculture, and the sun of organised marketing cast its glow upon the horizon. Queensland was the first State in the world to recognise that organised marketing was essential for a well-balanced State economy, and, as a result, the first experimental orderly marketing legislation was introduced. This was "*The Wheat Pool Act of* 1922," sponsored by the late W. N. Gillies, in his capacity of Minister for Agriculture. Although ridiculed and reviled by a

certain section of the public, its very success secured its permanent place on the statute-book. The present Premier, Mr. Forgan Smith, followed Mr. Gillies in the Department of Agriculture, and under his guidance and care the general orderly marketing of agricultural products took definite shape. The principles laid down in the relevant legislation had never been disturbed. These were farmer control of products, farmer responsibility for satisfactory marketing, and the maintenance of a due balance between producer and consumer.

For years Queensland stood alone in respect of orderly marketing. Then came economic nationalism, with its sure and certain repercussion on Australian agriculture, and other States and other countries, in a frantic search for a solution of the very real difficulties besetting the producer, finally focussed attention on the Queensland system, which, introduced some years earlier, had gained wisdom by experience and made a success of the venture. Then followed a period when other States adopted the principles laid down by Queensland in organised marketing, and the seeds of economic security were scattered over a continent. Some fell on stony ground, but some bore fruits much more palatable than the autumn fruits of "go as you please" marketing. Then other countries, chief of which were the United States of America, Canada, and the United Kingdom, introduced legislation fundamentally the same as that existing in Queensland. Where variations in practice were introduced, the basic principle laid down in Queensland was, in all cases, adhered to. The torch lit in Queensland had thus cast its rays far beyond our shores.

The Empire Producers' Conference.

THIS was substantially the position when the Empire Producers' Conference met in Sydney in the last week of March, the Minister continued. Obviously, the major problem confronting the gathering was in relation to United Kingdom markets. Each Dominion desired, naturally, to conserve to the utmost its present and potential markets in that country. On the other hand, it was the obvious duty of the United Kingdom delegates to preserve British agriculture and to ensure that any agreement reached would not prejudice home producers on their own home market. It could, perhaps, have been made clearer to the British representatives that we in Australia would not venture to criticise British agricultural policy, nor had we ever done so, but we had just as consistently required that our agriculture should not rank second to foreign countries. Past happenings had, at times, made us apprehensive that we were not regarded as occupying second place, giving way only to Britain, and if the restatement of the Ottawa principle, agreed to by the conference, was productive of a clearer understanding, then the conference might be regarded as having been eminently successful. The declaration of the conference might prove valuable in view of the revision of the Ottawa Treaty in the near future. Reading between the lines, it was evident that certain delegates feared that, in its early stages, the conference was being steered towards restriction of production. In certain quarters this principle had been regarded as a solution of agricultural difficulties, and if restrictions had finally been abandoned, then surely once again the air had been cleared for closer understanding.

We had now come to a consideration of the actual decisions taken by the conference. These might be briefly stated as providing for the establishment of Federal and Empire Agricultural Councils, organised

on a commodity basis, whose duty would be to achieve orderly marketing. The meaning of orderly marketing must, of course, be comprehensive. It was frankly difficult to define it in exact terms, and even more difficult to achieve it on an international plane. There were so many cross-currents, the force of which could not be estimated at the Sydney gathering. For instance, to what measure would Imperial policy conform to the recommendations of the proposed councils and—coming closer home—what degree of harmony would exist between them and the Australian Council of Agriculture? It must be remembered that the proposed boards would be purely advisory in practice, and that their success would depend on the active support of the British Ministry.

It was there, added Mr. Bulcock, that the canker of suspicion had entered into his mind. He had read that the conference was urged to agree to certain things, lest Governments did certain things not at all pleasant. In short, the conference agreed to certain steps being taken, and he wondered if there were not a distinct danger of the British representatives on the boards endeavouring to present British policy, and so relieve the representative of the Government of the United Kingdom of certain responsibilities. In other words, the function of government could not be taken over by the boards, and we in Australia would be unwise indeed to surrender any of our negotiation rights to boards, whose endeavour may not be in the best interests of Australian agriculture. We had nailed certain principles to the mast in Imperial negotiations. The most important was that we could not agree to a policy of restriction of production. Our national safety and development depended on increased population and a virile land policy. This must mean expansion—not contraction—of production, and established markets were essential.

If this fundamental of our agricultural faith were agreed to generally, then he predicted a very useful work for the Empire Agricultural Councils. The task would be to distribute our goods properly in the most satisfactory way. That regulation of arrivals of beef, lamb, and butter was essential went without saying, and the real task of the Empire Marketing Councils must be to spread production over markets and periods, to the mutual advantage of both producer and consumer. Those were the tasks that had always confronted agriculture during the "economic era." If a new and virile body were to be created to carry some portion of the burden, to smooth out the road, and to serve agriculture and the State, then he felt sure that such a body would receive a very hearty welcome when established, and earnest support and help in its endeavours.

That earnest and loyal support for Australian agricultural policy was essential must be evident to all people who had studied the ever-increasing difficulty of markets. So long as economic nationalism struck a dominant note in world economics, our reliance on the United Kingdom market must continue.

Concluding, the Minister said that everyone knew that there had been times when the understanding between the British farmer and the Australian producer had left much to be desired. The coming of a distinguished body of British farmers to Australia, the opportunities that had been presented for exchanging viewpoints and discussing marketing, must promote understanding and stimulate sympathy with us in our problems. The result should be a strengthening of mutual respect and a knowledgeable approach to the difficult questions that still awaited solution.

A Note on Pollination and Fruit Setting of the Granadilla.

L. G. MILES, Ph.D. and J. W. J. AGNEW, Bureau of Tropical Agriculture, South Johnstone.

IT is widely known among farmers and householders in North Queensland that under natural conditions, fruit setting of the granadilla *Passiflora quadrangularis,* L., is irregular, and totally unsatisfactory. It is generally assumed that some form of hand pollination is necessary to ensure a satisfactory crop of fruit.

H. F. MacMillan, in "Tropical Planting and Gardening," makes the statement: "The flowers are generally pollinated by insects, but these should be aided by artificial pollination in order to ensure a good crop of fruit." No suggestion is made, however, as to whether self- or cross-pollination is advisable, or as to the stage of flowering at which pollination is most effective.

It was therefore decided to lay out a simple pollination experiment at the Bureau of Tropical Agriculture, South Johnstone, during the summer of 1937-38.

Floral Characters and Development.

The granadilla flower (Plate 111) is large (three to four inches in diameter when fully opened), strongly scented, and of very attractive appearance. The flower is subtended by three leafy bracts below a calyx of five large fleshy sepals. The petals are also five in number, fleshy, and similar to the sepals, but purple tinted. Arising from the base of the corolla is a continuous fringe or crown of long, varicoloured filaments. Normally there are five stamens, (though four have frequently been found), comprising short thick filaments and large anthers opening longitudinally down the centre. The ovary is surmounted by three separate styles (occasionally two or four), with large, lobed stigmatic surfaces.

Floral development takes place very rapidly. Unopened buds one day will give rise to fully opened flowers the following day, which will have closed again the same evening. Flowers open during the early morning hours, the styles of the newly opened flowers being semi-erect, and the anthers dehiscing rapidly in warm sunlight. During the day the styles become horizontal, then turn downwards and direct the stigmas towards the base of the flower. Although this movement brings the stigmas within the region of the anthers, natural pollination of all three stigmas was never observed. Occasionally portion of one stigma might come into contact with exposed pollen, but more frequently the stigmas encountered the backs of the anthers or failed to touch them altogether.

Another remarkable feature was the absence at all times of pollinating insects. Bees and other nectar-gathering insects were actively engaged on banana flowers in a near-by plot, but none was ever observed "working" the granadilla flowers in spite of their attractive colouring and scent. A probable explanation of poor fruit setting under local conditions is thus apparent.

During the latter part of the day the styles become limp and flaccid, the stigmatic surfaces turn brown to brownish black, and the flower

droops and closes. The young fruit develops rapidly, and the floral parts gradually wither away, their remains adhering to the stem end for a considerable time.

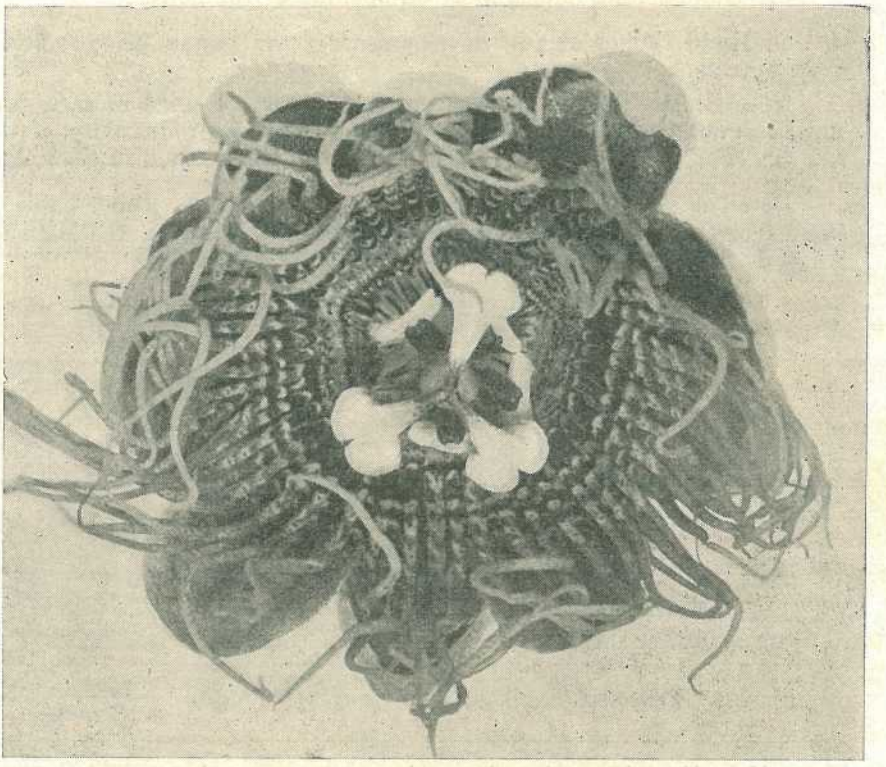


Plate 111.
Granadilla flower at full maturity, showing relative position of stigmas and anthers.

Experimental Procedure and Results.

With the main purpose of determining the most satisfactory method of pollination, sixteen one-year-old vines were selected for experiment, Four different treatments were originally chosen, each replicated in four randomised blocks.

The treatments were as follows :—

A. Hand cross-pollination; removal of the anthers after opening of the flower, and fertilization with pollen from other vines.

B. Untreated; subject to natural self-pollination or to open pollination.

C. It was originally intended with this treatment to ascertain whether or not the anthers matured before the stigmas were receptive; it was therefore planned to tag flowers on opening, and pollinate them at a fixed time later with pollen from freshly opened flowers on the same vine. As, however, the stigmas were observed to wilt and discolour frequently in less than 12 hours, the plan was revised and the two treatments C_1 and C_2, substituted.

C_1. Hand pollination in the bud, just prior to opening, with pollen from opened flowers of the same vine.

C_2. Hand selfing immediately on opening of the flower.

D. Hand selfing at full development of the flower (4 to 6 hours after opening).

Approximately equal numbers of flowers were treated in each vine unit, the number being limited to about 40 by the productivity of the less vigorous vines; percentage set of fruit was determined in each case.

Detailed results per vine are given in Table 1, while Table 2 summarises the mean treatment effects, after subjecting the data to Analysis of Variance.

TABLE 1.

VINE UNIT YIELDS (FRUIT SET PER CENT, FLOWERS TREATED).

——	A	B	C_1	C_2	D	Total.
Block 1	7·9	0·0	0·0	39·1	30·3	77·3
Block 2	16·1	15·6	0·0	35·7	70·0	137·4
Block 3	9·7	0·0	0·0	69·0	44·1	122·8
Block 4	4·5	0·0	7·1	45·5	17·1	74·2
Total .. .	38·2	15·6	7·1	189·3	161·5	411·7

TABLE 2.

MEAN PERCENTAGE FRUIT SET WITH VARIED POLLINATION TREATMENT.

Treatment.	Mean Per Cent. Set.	Significantly Exceeds.
C_2	47·3	A, B, C_1
D	40·4	A, B, C_1
A	9·5	..
B	3·9	..
C_1	1·8	..

The results indicate that pollination in the bud, open pollination and controlled cross-pollination were totally unsatisfactory in inducing fruit setting, while artificial self-pollination immediately after opening or up to 4 to 6 hours later yielded markedly better results. It is disappointing that even these latter treatments resulted in only 40 per cent. to 50 per cent. fruit setting, but under the prevailing conditions of alternating extreme heat and heavy downpours, this percentage may be considered reasonably satisfactory.

Discussion.

The surprising feature of the results is the failure of cross-pollination as compared with self-pollination in promoting fruit development. W. Popenoe, in his "Manual of Tropical and Sub-tropical Fruits," suggests that the granadilla and other Passifloras may be self-sterile, and that "if insects are lacking to do the work, cross-pollination must be effected by hand." The South Johnstone results are certainly at variance with such a claim.

In order to further check the efficacy of self-pollination as compared with cross-pollination, a second trial was made during a flowering period in early January. Alternate flowers were artificially selfed and crossed, using parallel technique throughout, until rain put a stop to the series. Protracted heavy rain adversely affected fruit setting, with the result that only 15.3 per cent. of the selfed flowers and 6.9 per cent. of those crossed set fruit. Even if this difference were statistically significant, the percentages are too low to possess practical significance. The result can merely be said to slightly corroborate that obtained in the main experiment.

The reason for this discrepancy in the results of self- and cross-pollination is not yet apparent. All fruits produced in these trials as a result of either self- or cross-pollination were well provided with seeds, and showed no evidence of defective fertilization. Self-fertility has certainly been demonstrated by the data obtained, but cross-sterility would not be expected among plants so closely allied as those in question. Further studies will, however, be directed towards the elucidation of this problem.

Citing Paul Knuth, Popenoe also refers to protandry in the Passifloras, i.e., the maturity of the pollen bearing organs before the stigmas of that flower become receptive. The South Johnstone observations on the early wilting and discoloration of the stigmas coupled with the comparative success of self-pollination immediately after opening tend, at first sight, to refute this statement.

Considering, however, the rapidity with which anthesis proceeds, it may still be possible that the pollen loses its viability within a few hours after the anthers dehisce, and that the stigmas of many flowers are not fully receptive till subsequent to this time. If such were the case, best results would be obtained when flowers opened some time, but (prior to wilting of the styles), were treated with pollen from freshly opened flowers on the same vine. This possibility will be investigated concurrently with the further study of self- and cross-fertility, the advent of the current wet season having set a period to work of this nature.

Summary.

Under conditions prevailing on the tropical coast of Queensland, fruit setting of the granadilla (*Passiflora quadrangularis*) may be almost a complete failure unless artificial pollination is resorted to.

It has been shown that a satisfactory set of fruit can be obtained as a result of merely self-pollinating open flowers during the morning of opening.

The occurrence of protandry has not yet been demonstrated, and data obtained show that its effect at least is not highly important. Whether still better fruit setting can be induced by using pollen from younger flowers on pistils of older flowers of the same vine, and if so, whether such a method will be practicable, remain to be proven.

Self-pollination may be effected by simply transferring pollen from the open anthers to the stigmatic surfaces with a small camel-hair brush. Alternatively, a small round stick of soft pine sharpened to a pencil point may be used to transfer the pollen. Care should be exercised, however, to avoid injury to the stigmas when smearing the pollen over their receptive surfaces.

Evaluating the Sire.

W. G. BENNETT, B.V.Sc., Lecturer in Zootechny, School of Veterinary Science, University of Queensland.

SINCE the sire represents half the herd, it is obviously just as essential to have some means of measuring his potentialities for production as for ascertaining the influence of the dams. While this article deals primarily with the question of a bull indexing in dairy cattle, there is scope for the application of the progeny test to other types of live stock, for example, litter size in pigs, rate of fattening in pigs or lambs.

Introduction.

Under present economic conditions and keen international competition for the markets of the world it behoves all nations dependent on primary industries for their national income to ensure the highest efficiency in economical production.

Owing to climatic disabilities and distance from the principal markets this applies with particular force to Australia in general and Queensland in particular. Our supremacy in wool is undoubted, but the position is not nearly so satisfactory with regard to beef, mutton, and dairy produce.

Economic production means maximum production at minimum cost, and while at present a suitable yardstick is lacking for measuring this in the case of beef, mutton, or pork, a simple and accurate one is available when it comes to milk and butterfat production. Improvement along these lines has been the aim of breeders for the past hundred or more years, and too much praise cannot be given to our stud masters, past and present, for the wonderful improvement which has occurred in our milking cattle.

In the early days selection was based solely on type, whilst later pedigree was considered all-important. The next big step in improvement, and an accurate measure of the value of females, was the introduction of herd-recording. This lastmentioned showed that type alone was not a satisfactory basis on which to judge the value of a cow, as careful compilation of records indicated that many cows which would never win a prize in a show ring were nevertheless among the leaders in production, while cows awarded championships were by no means always the best producers in a herd. Pedigree alone is also an unreliable guide to the value of an untested animal, although when used rationally it is a valuable aid to the breeder. Its greatest drawback is the fact that frequently all that is available is a list of ancestors, with no indication of their performances, or of only selected ones, while too much emphasis is frequently placed on some outstanding animal far back in the line of descent. Herd-recording has been a most valuable guide to economic production, and it is an absolute essential to efficient dairying. Without it no dairyman can possibly be in a position to say whether his individual cows are an asset or a liability.

Even with this advance, however, a measure of half the herd only is available, since production records apply solely to cows, and the bull is rightly regarded as being the other half. Owing to his anatomical and physiological make-up, we have no direct method of measuring his true worth, for, of course, he does not produce milk. This handicap was

recognised many years ago, and, following the introduction of herd-testing schemes, the selection of the bull was based not only on type and pedigree, but also on the production of his dam. It was quickly realised by students of genetics that this was subject to serious drawbacks, since, unless the animals were directly inbred, the dam would be responsible only for 50 per cent. of the make-up of her offspring, and 25 per cent. of that in the progeny of her son. This led to an endeavour to obtain a more accurate measure of the value of a bull in a herd, giving rise to the evolution of progeny testing and the bull index system.

As an indication of the importance attached to bull indexing in the United States of America, the Year Book of Agriculture (United States Department of Agriculture) states that "Recommendations for the use of proved sires for herd improvement are now general (in America), and the logic of the procedure seems irrefutable."

Correcting Production Records for Age.

Obviously a common age standard for production is essential before any comparison can be made between, for example, a two-year-old and a five-year-old cow. It is common knowledge that a cow's production, under constant conditions, shows a steady increase up to the age of six to eight years at least. In order to arrive at a commensurate basis for production standards in herd recording, the figures for production of large numbers of animals at various ages from two years to six years were taken and the average increase worked out. This gave rise to what are known as "age correction factors," which are reasonably accurate, particularly when applied to initial test records, though individual cases may show wide discrepancies. This accuracy will, of course, depend largely on the maintenance of similar conditions of feeding, management, &c., and further corrections will also be required, depending on the number of days under test, e.g., 273 or 365; and whether the animals are milked twice or three times a day. The Bureau of Dairy Industry of the United States of America, after an exhaustive study of over 4,000 District Herd Improvement Association records, published the following correction factors:—

2 years	.. 1·3	4 years	.. 1·06
2½ years	.. 1·2	4½ years	.. 1·04
3 years	.. 1·15	5 years	.. 1·02
3½ years	.. 1·10		

By the use of such age correction factors two known comparable quantities are now available, viz., the production of the dam and of her daughter, and, in view of the foregoing, it should be possible to calculate the potential production of the bull.

The Bull Index.

It became apparent that a comparison of the productivity of the daughters of a bull, with that of their dams, should indicate the productive ability transmitted to them by their sire. Further, since sire and dam each contribute half the characteristics of their progeny, it is to be expected that the level of inheritance would fall approximately midway between both parents. This was actually proved to be the case as far back as 1913 by a Swedish investigator, Dr. Hansen; and further

investigation in America by numerous workers has proved that even when animals from high and low-yield strains are crossed this still holds.

This led to several investigators producing various systems of what is called "bull indexing," but owing to their complexity, and certain inaccuracies, most of them have failed to gain popular favour. The one which is considered the most satisfactory is that known as the Mount Hope index, which was evolved by Dr. Goodale in 1927, based on certain experiments done by Dr. Gowen. This system has since been presented in a modified form known as the "commercial" or "intermediate" index, which is the one now in general use.

Calculating a Bull Index.

To calculate under this system the index of any bull, the first step is the computation of the "mature" production of milk and butter fat of individual cows mated to him and of each daughter got by these matings. By the use of correction factors the "mature" equivalent is obtained for any age recorded, as indicated previously. When figures for several lactation periods are available each of these is corrected for age, and the average "mature" production figure taken for that animal. A comparison of these corrected records of mothers and daughters establishes what are known as "dam-daughter" pairs. It must be borne in mind that, to give the index its full value, one must include records of all daughters, and not simply those which qualify under a herd-recording scheme, as obviously an entirely erroneous figure would be arrived at if only daughters that qualified were selected.

Authorities differ as to the least number of dam-daughter pairs which are required to give an adequately accurate prediction of a bull's value. As with all statistical data, the greater the number available the less the margin of error, and reliance should not be placed on anything less than eight pairs. At the same time as few as four or five will at least give some indication of a sire's worth in a herd.

The next step is to calculate the average yield of these dams and the average of their daughters. The latter, as mentioned previously, tend to fall midway between sire and dam. From these figures the following are then calculated:—

(*a*) *Indices for Butterfat or Milk.*—

If the daughter's production is higher than that of the dam add to the average yield of the daughters the difference between the average yields of the dams and the daughters.

If the daughter's production is lower than that of the dam subtract from the average yield of the daughters the difference between the average yields of the dams and the daughters. (Alternatively these indices can also be arrived at by doubling the average yield of the daughters and subtracting that of the dams.)

(*b*) *Butterfat Percentage.*—

From the indices obtained multiply the butterfat figure by 100 and divide by the milk figure.

Examples of the Calculation of the Index.

Herd A.—In a certain herd the average yield of all the mates to a certain bull, corrected to mature production, was 319 lb. of butterfat and 8,398 lb. of milk; and of the daughters 455 lb. butterfat and 11,990 lb. milk.

The calculations are now made as follows.

	lb.
Butterfat.—	
Average production of daughters	455
Average production of dams	319
Difference	136
Milk.—	
Average production of daughters ..	11,990
Average production of dams	8,398
Difference	3,592

As the daughters' production is higher than that of the dams, one now adds the above figures for the difference to the average production of the daughters, the resulting figure giving the bull's index as follows:—

	lb.
Bull's Index for Butterfat.—	
Average production of daughters	455
Difference, as shown above	136
Total (Index)	591
Bull's Index for Milk.—	
Average production of daughters ..	11,990
Difference, as shown above	3,592
Total = Index	15,582

Butterfat Percentage for Bull.—

$$\frac{\text{Bull's index for butterfat} \times 100}{\text{Bull's index for milk}} = \frac{591 \times 100}{15{,}582} = 3{\cdot}79 \text{ per cent.}$$

Herd B.—As an example of the value of the index to detect a bull which is actually worthless, but which on type and pedigree might have been expected to be an excellent sire, the following figures are given:—

Dam's average butterfat production 371 lb., milk 9,569, test 3·88.

Daughter's average butterfat production 330 lb., milk 8,740, test 3·78.

This bull's index, worked out as above, is 289 for butterfat and 7,901 for milk, with a test of 3·65, all of which figures are considerably below those for the cows with which he was mated.

Conclusions to be Drawn from Examples Given.

In the case of Herd A practical observations had given some indication of the bull's worth as a sire, but on working out the index concrete

evidence is at once available as to his great value in raising both milk and butterfat production. It may also be added that this bull would never win a prize on show ring type.

In the case of Herd B the figures demonstrate that a sire with a poor index depresses the production of his daughters below that of their dams. Such a bull is an absolute menace to the herd.

It must be remembered, however, that the results can vary between wide limits. The sire may reduce the milk yield but raise the butterfat production and test, or lower butterfat production and test but raise milk yield; at other times there may be little material difference either up or down. If, however, the production level of the herd is high and the daughters of the bull maintain it at that high level, he is still an excellent sire. It is in such a case as this, i.e., an already high-producing herd, that the index is particularly valuable—in fact, almost indispensable—to ensure that there will be no retrogression by the use of a low-index bull.

Under different conditions of management and feeding the production level of cows will vary, and this may affect, to some extent, the sire's index; but a good sire always remains a good sire, and the greater the number of records taken the more reliable will be the index. It becomes apparent that a sire with a moderately good index will show up well in a poor herd but poorly in a high-producing one.

Summary.

There is a pressing need, particularly in this country, for a steady improvement in our livestock production. Type and pedigree, *per se*, as a measure of value, have reached the limit of their usefulness. Production recording in cows is an essential, but something further is required to ensure that sires used will tend to improve rather than retard herd averages. Progress in breeding must depend on the use of sires which have been progeny tested, i.e., proved sires, and the bull index is one useful instrument whereby the potential value of sires can be elucidated. Cases are on record where a bull has received awards in the show ring and on test it has been proved that his daughters' production was very much lower than that of their dams.

If our dairying industry hopes to hold its own steps must be taken to eliminate the poor sire, and the bull indexing system gives the breeder considerable assistance in this direction. It must be borne in mind, however, that bull indexing is not the complete answer to all breeding problems, but must be used in conjunction with selection for type and pedigree, while careful attention must also be given to nutrition and the control of disease.

STARTING WITH PURE BRED STOCK.

Buying pigs or calves too young and when not properly weaned is the wrong way to start with pure-bred stock. No breeder can judge a little pig with any degree of certainty. Pigs or calves which are taken straight off the dam are generally half starved by the time they get to their new home, and are then likely to overeat feed to which they are not accustomed, and that is how trouble starts.

Banana Growing in Queensland.

H. J. FREEMAN, Senior Instructor in Fruit Culture, and Chief Inspector of the Banana Industry Protection Board.

[*Continued from page* 241, *March*, 1938.]

DESUCKERING.

SOME years ago, when only the richest of land was used for banana-growing, and beetle-borer and leaf spot were factors causing very little concern, the practice of desuckering was not considered by growers to be so necessary, but now, when poorer land is being used, desuckering is almost as important as cultivation. The object in desuckering is to produce better-class fruit. In fact, it is pruning the banana, just as citrus and deciduous orchards are pruned with a similar aim in view. Desuckering is done with a desuckering tool as illustrated in Plate 112. Small suckers, commonly known as peepers, are easily removed by

Plate 112.

Desuckering Tool.—Note length of blade, which is hollowed out and sharpened on both edges. This tool destroys the plant, by completely removing the heart, but leaves the rooting system of the stool intact.

forcing this tool perpendicularly through them and giving one complete turn. This action removes the heart of the sucker in the shape of a cone, thus stopping its growth without interfering with the rooting system of the stool in any way. Desuckering with a mattock or a crowbar results in more or less damage to the roots and the weakening of the remaining plants, and should therefore be avoided. Where the

plants to be removed are more than 6 inches above the ground surface it is preferable to cut them off with a knife at ground level and then bore the centres out with the desuckering tool similarly to the operation performed upon the younger plants. A few handfuls of soil placed in and over the inverted cone-shaped cavity of each plant treated, immediately after the operation, will stop an excess waste of sap through the new wound, and to a certain degree will restrict the invasion of beetle-borer, which might be attracted by the freshly-cut plant material.

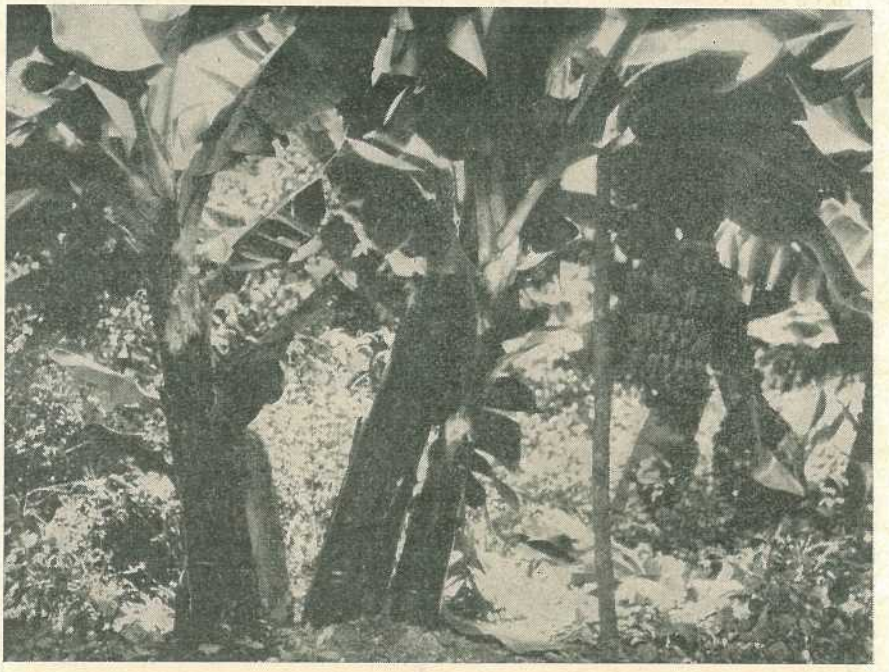


Plate 113.

Desuckered on the two bunches per stool per annum principle. Note original parent butt in the centre, then second, and finally third generation.

Many opinions are held as to the correct time to desucker. Although circumstances govern opinion to some extent, it is undoubtedly true that the sooner the unwanted plants are destroyed after showing through the ground the better. By this it is not meant that desuckering should be made a monthly operation, for the running of a banana plantation successfully embodies too much work to permit of too great a departure from recognised practical methods. It is necessary, however, that the destruction of surplus suckers be attended to as often as possible and at least once in every three months, the first operation commencing when the young plantation is from six to eight months old. This will obviate the necessity of destroying big and vigorous plants, the establishing of which has drawn much nutriment and plant vigour from the stool in the course of its growth.

Further, by removing the young surplus plants frequently, the correct plants for the ratoon crop are easily discernible to the grower who understands the seasonal growing conditions within his own particular district. By studying these conditions and desuckering carefully, it is possible for a grower to regulate crop production and marketing. For instance, weather conditions remaining favourable, a young sucker, having produced in all fifteen or sixteen leaves by the time the parent plant throws its bunch, will throw its own bunch twelve months later. So that to avoid the small November fruit or to harvest fruit of excellent quality during March, April, and May becomes a matter of studying a district's normal growing conditions and desuckering accordingly. The following figures, taken from some records kept on the bunching of a North Coast plantation, go to show the time necessary for a bunch to reach maturity under normal conditions:—

Number of Bunch.	Date Flowered.	Date Cut.	Number of Days to Mature (Approximate).
1	1–15 Dec., 1935	29 Mar., 1936	106
2	16–31 Dec., 1935	29 Mar., 1936	90
3	1–15 Jan., 1936	20 Apr., 1936	97
4	16–31 Jan., 1936	1 June, 1936	123
5	1–15 Feb., 1936	18 June, 1936	125
6	16–29 Feb., 1936	29 Aug., 1936	183
7	1–15 Mar., 1936	29 Aug., 1936	168
8	16–31 Mar., 1936	6 Oct., 1936	190
9	1–15 Apr., 1936	28 Oct., 1936	197
10	16–30 Apr., 1936	14 Oct., 1936	168
11	1–15 May, 1936	20 Nov., 1936	190
12	16–31 May, 1936	17 Nov., 1936	171
13	1–15 June, 1936	4 Dec., 1936	173
14	16–30 June, 1936	4 Dec., 1936	158
15	1–15 July, 1936	14 Dec., 1936	153
16	16–31 Aug., 1936	15 Jan., 1937	138
17	1–15 Sep., 1936	15 Jan., 1937	123
18	16–30 Sep., 1936	29 Jan., 1937	122
19	1–15 Oct., 1936	4 Jan., 1937	81
20	16–31 Oct., 1936	27 Jan., 1937	89
21	1–15 Nov., 1936	3 Mar., 1937	109
22	16–30 Nov., 1936	3 Mar., 1937	94

With regard to the best suckers to retain, only those growing from well down on the butt of the parent plant should be considered. On hillside country these should be selected on the top side of the stool, thereby guaranteeing a deeper and better rooting system. The further away the young plant shows through the ground from the parent plant the better. Cramping within the stool is most undesirable, tending as it does to restrict root growth and forcing the bases of the plants up on to the surface of the soil.

The quality of the land, rainfall, and cultivation are factors that regulate the number of plants to be left. Some growers advocate the one-bunch-one-sucker system. This system necessitates the saving of a deep, vigorous sucker appearing at the correct time on the top side of the parent plant. Other growers prefer to produce two bunches with two followers from each stool each year. The latter system is generally in use throughout most of the banana districts in Queensland. It necessitates allowing two suitable suckers to grow from the original

parent plant more or less simultaneously (see Plate 114). For preference on hillside land these should appear on the top side of the original parent and slightly to the side. Future generations should be formed by allowing suitable single suckers to grow on the top side of each parent. On flat land the suckers left should be spaced round the

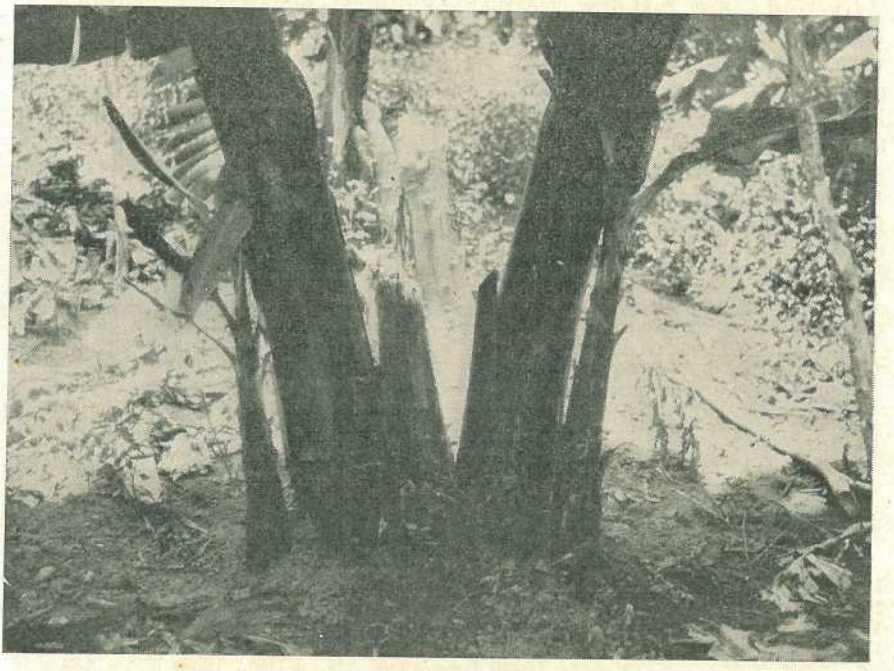


Plate 114.

Desuckered to produce two bunches per stool per annum. Note growth of plants. Remains of original plant show how each generation is allowed to follow.

parents and as far apart as possible. Each generation of plants should be formed from the generation immediately before it, i.e., two generations should not be produced from the one parent. By adhering to this policy faster growth will result, and under natural conditions a greater amount of good quality fruit will be harvested. Apart from the fact that spring and summer are the recognised seasons of the year when plant growth is at its peak, it will be noted that the greatest sucker growth will be recorded immediately after the cutting of the matured bunch from the parent plant. This fact should always be considered when selecting the plants which are to provide the future bunches in the plantation, for the growth of the sucker during the first and second quarters might represent only 25 per cent. of the growth during the next six months.

FERTILIZING.

Just as in recent years it has become more necessary to pay attention to desuckering, so has the fertilizing of bananas become more necessary. When only the best of virgin soils were used general fertilizing was often unnecessary, but on much of the lower-grade country now being utilised it becomes an important factor in successful banana growing. Big dressings of fertilizer give far better results than small dressings, but in considering this matter growers must be guided by the

fact that there exists an economic limit. The application of large quantities of fertilizers when prices for fruit are low or likely to be so is not sound farming; but if the market is good and profitable, then extensive fertilizing undoubtedly pays. Over a number of years growers have used artificial fertilizers more or less experimentally, and many are now using successfully a 4-12-12 formula made up as under:—

Sulphate of ammonia	420 lb.
Bone dust	560 lb.
Superphosphate	700 lb.
Muriate of potash	560 lb.

i.e., 2,240 lb., or *pro rata* for smaller quantities.

On land that needs fertilizing, work should be commenced right at the time of planting. *The actual quantities applied are naturally governed by the quality of the land.* It also should be remembered that the bunch is apparently not influenced by the application of fertilizer after the plant is eight to nine months old. In the poorer soils 1 lb. of fertilizer mixed in the hole with some surface soil just prior to planting gives the young plants an excellent start. This is followed by a second dressing of from 1 lb. to 1½ lb. three to four months later. Normally this application is broadcast round the top side of the plant and chipped in. The third application is made in a way similar to the second, before the beginning of spring, and is slightly heavier than the previous applications, 1½ lb. to 2 lb. being considered a fair dressing, thus making a total application of 4 lb. to 4½ lb. for the first twelve months. Thereafter the plants are fertilized three times a year—during January, April, and August—applying slightly less than 2 lb. per stool per application, which is roughly 1 ton per acre per year.

Departmental experiments are not yet far enough advanced to offer alternative formulas, but it is worthy of mention that the records of recent trials in other parts stress the importance of the application of nitrogen for the production of bigger crops. In Jamaica 2 oz. of nitrate of soda per young plant or sucker per month has shown big increases in the weight of fruit produced per acre. Whether such a method of fertilizing would be successful in Queensland has yet to be determined. In soils lacking in nitrogen good results would probably follow, but the possibility that fruit grown with the aid of nitrogen only would be of poor carrying quality and lacking in flavour naturally suggests caution at the outset.

A good banana soil is one containing an abundance of humus and nitrogen. Both, particularly the nitrogen, are prone to leach out rapidly in districts where the rainfall is frequent and heavy. Although the banana trash and spent stems build up the diminishing humus content to some extent, green cropping with such crops as Poona pea or field peas is of great advantage. To ensure a quick and vigorous growth of these legumes, top-dressing with either sulphate of ammonia or nitrate of soda at the rate of 1½ cwt. per acre is recommended. The seed should be sown in shallow drills running horizontally through the plantation. The best time to sow is during April, and the ensuing growth should be chipped in towards the end of July. A quantity of skinless barley seeds mixed in with these seeds is often advantageous.

[TO BE CONTINUED.]

Queensland Weeds.

ANODA CRISTARA: A RECENT INTRODUCTION OF THE MALLOW FAMILY.

C. T. WHITE, Government Botanist.

Description.—Annual herb, 1 foot or more high; stems clothed with long, scattered hairs; leaves lobed, 1½-2 inches long, and nearly as broad, on a slender leaf-stalk (pedicel) of 1-1½ inches. Flowers pale blue, borne in the leaf axils on slender stalks (pedicels); seed capsule composed of about fifteen carpels radiating from a common centre; the whole about 1 inch across, and subtended and partly enclosed by the five-lobed calyx. Each carpel pointed at the end and enclosing a single dull-brown seed 2 inches long and nearly as broad, flattened on the sides and rounded on the back.

Distribution.—A native of Mexico and Central America. We have no record as to when it was introduced into Australia. It is prevalent in some lucerne fields near Ipswich, and is supposed to have been introduced with imported chaff.

Common Name.—I know of no local name commonly given to this weed. The generic name is short enough for general usage.

Botanical Name.—Anoda, from "a," without, and "nodos," a node, alluding to the flower stalk, which lacks the joint usual in the allied genus, Sida; *cristatus,* Latin, meaning crested, but I am not sure of the application.

Properties.—Not known to possess any harmful properties; cut along with the standing crop it should not be unpalatable to stock, though rather fibrous.

Eradication.—So far as I know this weed is confined to the neighbourhood of Ipswich, where it is abundant in some of the lucerne areas and is said to almost beat lucerne in its growth. It is almost sure to spread generally over the Lockyer and Fassifern districts, and gradually extend to other areas. As it is an annual, every attempt should be made to prevent seed production by hand pulling or hoe cutting before ripe seeds have been formed.

Botanical Reference.—Anoda cristata Schlecht, in Linnæa XI. (1837) 210.

Acknowledgment.—I am indebted to the Director, Royal Botanic Gardens, Kew (England) for the determination of this plant.

DESCRIPTION OF PLATE 115.

Anoda cristata.

A. Twig, bearing flowers and seeds (natural size).
B. Seed-head viewed from front × 2.
C. Seed-head viewed from back × 2.
D. Seed × 2.

Plate 115.

Concerning the Brigalow.

E. HIRSCHFELD, M.D., and R. S. HIRSCHFELD.

The subjoined article has been submitted to the Minister or Agriculture and Stock, Hon. Frank W. Bulcock, who has authorised its publication as a further contribution to a discussion on a subject of considerable importance to Queensland farmers and graziers.—Editor.

NEXT to the prickly-pear, the brigalow has been the greatest obstruction to settlement in Southern Queensland. The prickly-pear is now a menace of the past—the brigalow still continues to hamper the efforts of the settlers.

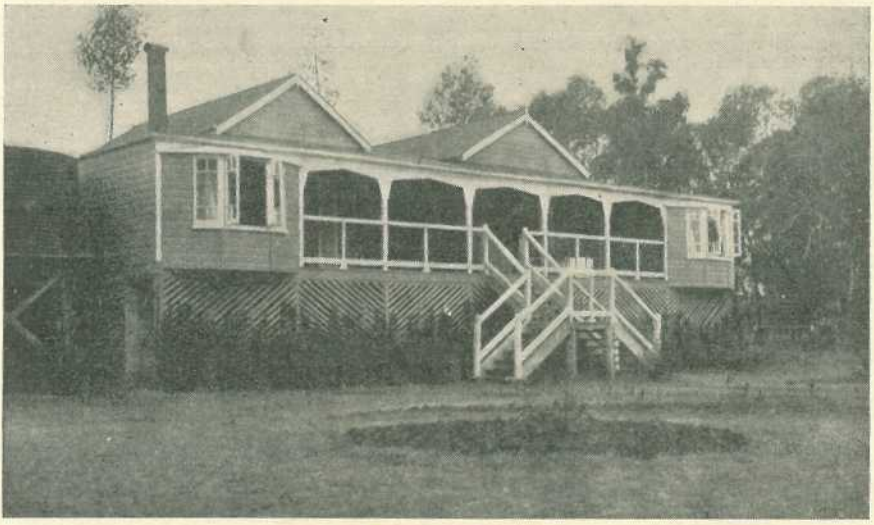


Plate 116.
Bybera Homestead.

Up to about thirty years ago brigalow and belah scrub was left severely alone. When some courageous pioneers realised how valuable this land was after the trees had been cleared off, others followed. Now an increasing wave of settlement is starting in that direction.

There is a big area of brigalow and belah country in Queensland. It probably amounts to between 15,000,000 *and* 20,000,000 *acres. The time will surely come when this vast area will prove as great a possession to our State as the plains of the Darling Downs—great in settling people on the land, great, also, in bringing forth increased wealth in sheep, cattle, and dairy products.*

But the brigalow will have first to be dealt with.

Since 1929 we have ringbarked 13,000 acres on Bybera. A considerable proportion of this area has been brigalow and belah country. Bybera is 25 miles due north from Yelarbon, where the brigalow and belah belt from Northern New South Wales enters Queensland between Inglewood and Goondiwindi.

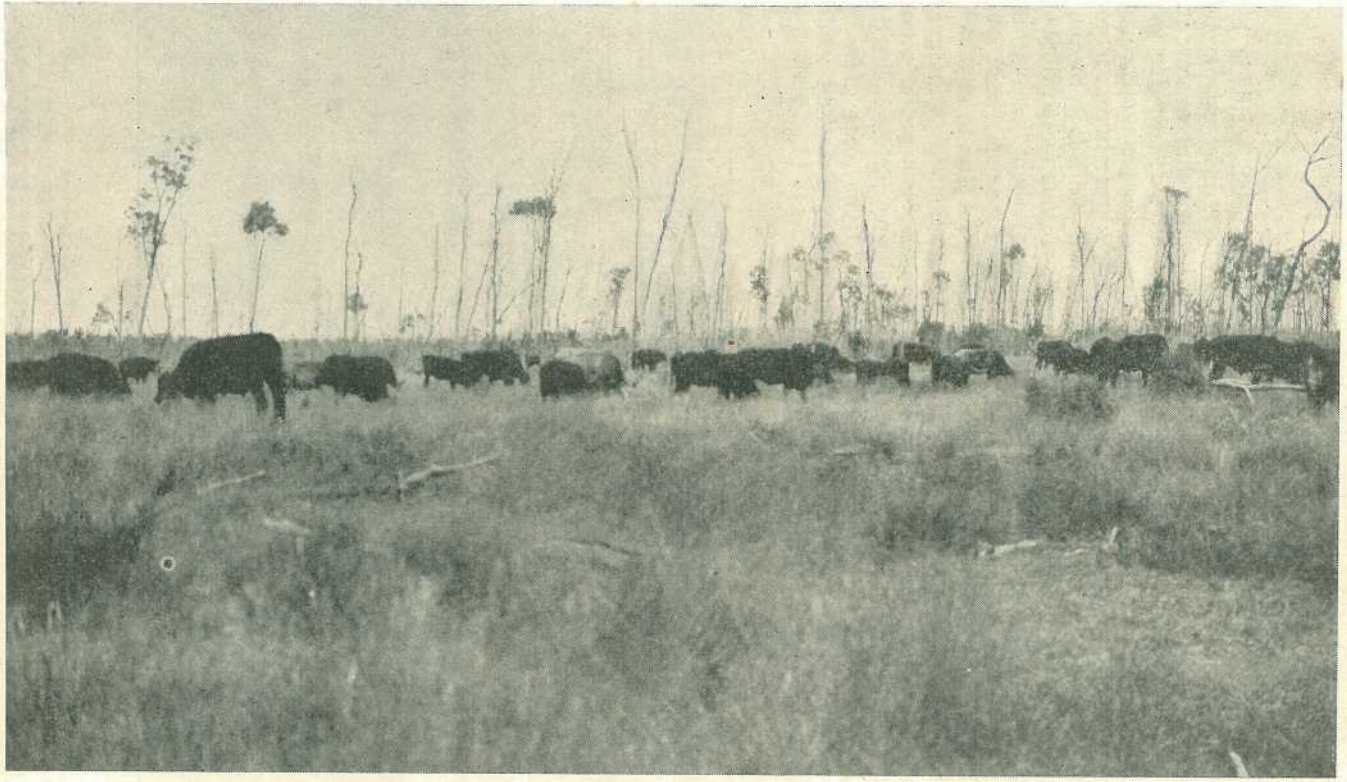


Plate 117.

ABERDEEN ANGUS CATTLE THRIVE ON BYBERA PASTURES.—This country now carrying heavy swards of nutritious grasses, was formerly covered with dense brigalow and belah scrub.

We now place on record our observations and experiments and the recommendations based on our experience.

Ringbarking, Burning, Regrassing.

The recognised way of tackling brigalow and belah scrub is by ringbarking. The belah dies readily, but is followed by numerous seedlings which are fairly easy to deal with. The brigalow is slow in dying. It takes three or four years before the scrub is ready for the burn. As soon as the trees begin to wilt native grasses commence to shoot up from the ground that had previously been quite bare. Foremost amongst these grasses are the brigalow grass, windmill, star, button, blue, wallaby, and other chloris grasses—nearly all of them most valuable and eagerly sought after by the stock. They are at their best within the first two years after the ringbarking; then they become rank, and are spoken of as sour. We are satisfied that this is not due to any lack of virtue in the grasses or the soil. The fact is that the vegetation gets ahead of the stock which, notwithstanding the ample feed, prefer more open country. The fallen timber and the numerous melon holes do not make the scrub a desirable feeding ground. Hence, the grass is getting coarse. This view is confirmed by the analyses we had made by the Department of Agriculture.

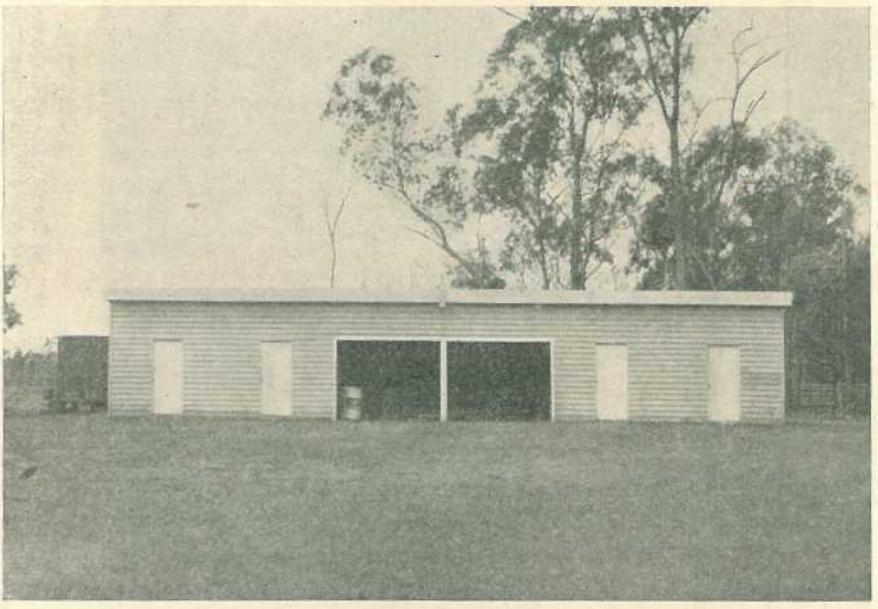


Plate 118.
Storerooms and Workshop on Bybera.

After three or four years the scrub is ready and safe for the burn. If all the conditions are favourable the fire will leave an open plain, and in a few cases the fortunate holder may have no further trouble with his timber. The fiercer the fire the more complete the destruction of the trees, but such a result is the exception rather than the rule.

There are some serious drawbacks to this procedure. The loss of shade trees is soon made good; for wilga springs up rapidly after a fire, grows quickly, and this small, bushy tree gives better shelter against the sun than the tall, branchless brigalow. But the fire that makes a clean sweep of the living things above the ground also destroys the living things within the soil which may be necessary to plant life, like earthworms, insects, bacteria. The surface layers are sterilised—to what depth depends upon the heat and duration of the fire. Where a log has been burning or smouldering for weeks we have seen the scar remain on the ground for many years. *The most lasting injury the country suffers is through the loss of humus, which is all the more serious, since the trees are gone that could replace the mould.*

Plate 119.

Keeping Cool.—A dense growth of grass encircles this rain-filled melonhole.

The land must be artificially regrassed after a hot fire. Not to do so means the loss of pastures for several seasons and giving all sorts of rubbish a chance to get a root hold. Seeds that are carried by air will be the first to germinate. Windmill and star grasses, with their seed-heads on a small stem, sail along in the wind and settle down as soon as the wind drops. He who trusts to chance and good luck has to wait about three years before the native grasses are once more established. The loose layer of ashes is an admirable seed-bed, provided rain falls within a reasonable time after the fire, otherwise the ashes settle down and harden. No other grass can approach the Rhodes for artificial regrassing. It sends out runners which quickly cover the ground and take fresh root at the nodes. The stock—both cattle and sheep—like the Rhodes, and punish it more than the native grasses. Yet a warning is necessary against sowing Rhodes too densely to the exclusion of the native grasses. The country we live in is very cold in winter, and severe, continuous frosts are the rule. The frost kills the Rhodes grass. Hence, at the beginning of the winter, the grazier may find himself suddenly with the bulk of his pastures turned almost useless.

Our native grasses, on the other hand, stand the winter well. There are always a few green shoots in the brigalow grass clumps, no matter how cold the weather may be.

We have experimented with a large number of other grasses and legumes, and planted them in the ashes—Mitchell, Flinders, prairie, Wimmera rye, Toowoomba canary, lucerne, different trefoils, and creeping lucerne, which latter was placed at our disposal by the Waite Institute. We cannot go in this report into a detailed description of the results of our experiments.

Plate 120.
Looking across well-grassed paddocks, covered formerly with brigalow and belah.

The Brigalow.

The brigalow is an acacia closely allied to the wattle. It is often spoken of as the brigalow-wattle. Other members of the same family are the mulga, the yarran, and the myall. Unlike these valuable fodder trees, the brigalow is not attractive to stock. The leaves are shaped like a crescent, up to 6 or 7 inches in length, and leathery—too tough to be digested easily. It is said that sheep, when turned on to very young suckers, will tackle them, but we have had no personal experience of it. The tree in the scrub grows up to 30 and 40 feet and even higher, runs straight up without branches, and is topped by a crown of small branches bearing these leaves. They are firmly fixed to the stem, and remain there after they are dead. It is an uncanny sight to enter a brigalow scrub that has been poisoned and died quickly. The plumes of leaves turned a whitish grey give the trees a ghost-like appearance.

When the trees grow in the open they like to form clumps and grow bushy. After the destruction of the scrub timber these copses furnish valuable shade which the tall scrub tree, with its meagre crown, fails to do. Besides, they are good to look at. It is a sound practice to encourage the formation of these clumps.

The timber is far from useless. It is heavy, hard on the saw, and difficult to work. With a piece of broken glass and a lot of patience we were able to give a good surface to some walking sticks we had

fashioned. The aboriginals who had more leisure, more labour, and a good deal more skill were using brigalow for making boomerangs, nulla nullas, spears, and other fighting implements. Hence the timber is called brigalow spear wood. It is elastic and said to make particularly useful fishing-rods. Of course it would be a serious matter to destroy wholesale a valuable timber, but the small size of the trunk restricts its use except for small jobs, like handles of stockwhips, serviette rings, and other fancy goods.

Plate 121.

On the Edge of the Clearing.—These picturesque apple trees give cool and generous shade on a summer day.

There is, however, no need to waste much sympathy on the destruction of the brigalow. Owing to its tendency to sucker, it grows again with such rapidity that many men who have cleared this sort of country with apparent success will have to continue to fight the timber for the rest of their lives. In the Callide Valley the brigalow has been rung, cleared, burned, and grassed. Now in quite a number of places the brigalow has come back, and the people have little hope

of dealing with it. At Tara men had started dairying on their selections, but the brigalow has got the better of them and driven some of them out.

The Scrub.

The brigalow scrub is made up of a dense mass of trees, both standing and fallen. Associated with the brigalow may be the belah, the wilga, and the tea-tree. Neither the belah nor the wilga suckers, but they bear a great quantity of seeds. They propagate by seedlings, which are easier to deal with than the suckers.

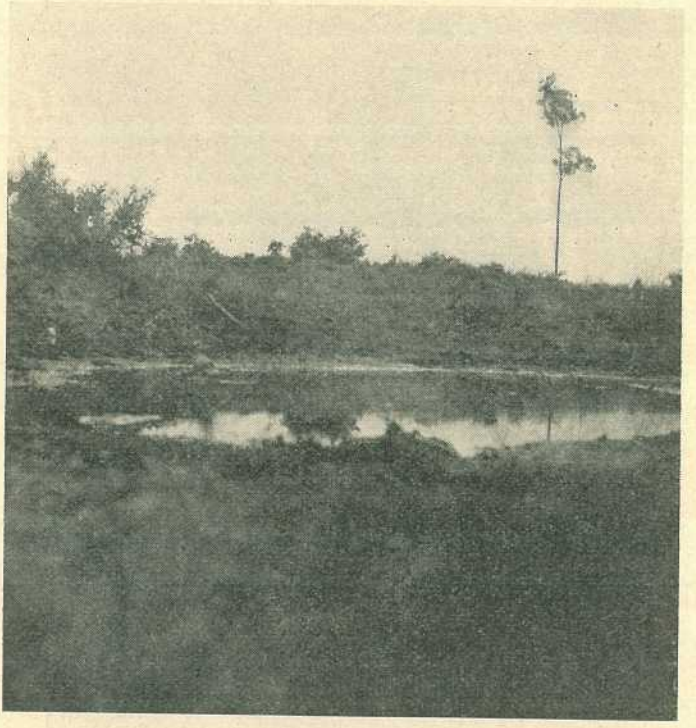


Plate 122.

A POOL OF REFLECTIONS.—A large melonhole forms a natural reservoir in the brigalow country.

The danger of the tea-tree has not been sufficiently realised. It is a very fertile seed-bearer; it also suckers, mostly from the stem, not like the brigalow from the root. Being rich in oil, it annoys the men working amongst them. It gives rise to itchiness of the skin and headaches. Generally it is a shrub, but once its bigger neighbour has died it commences to flourish and expand into a bushy tree. Wherever a wound has been made in the trunk a sucker will come out and so make the tree more bushy. It is really quite a handsome tree when fully grown and flowering. The timber is quite useless. To get rid of the tea-tree is no small job. A fierce fire will kill it, but unless the fire is very hot it will sucker worse than ever. The only way in which we were able to deal with it was by cutting it down prior to burning off.

The dense withered foliage of the tree, full of oil, forms a track for the fire, eating into the brigalow. Where isolated tea-trees remain we found it best to ringbark them close to the ground and poison them.

The brigalow, the tea-tree, the belah, and the wilga are the masters of the scrub; no grass grows where they flourish. It is estimated that 75 acres of scrub will feed a bullock; we doubt whether a beast could make a living even on that area, even if it wanted to. With its fallen timber, its melonholes, and the death-adders below the rotting *debris*, it is a truly forbidding country, and quite useless until man starts to improve it.

Plate 123.

Burning Off.—A fire sweeping through the ringbarked scrub, making a clean burn. Fallen brigalow and belah logs usually burn out to a clean white ash.

How the Brigalow Conquers the Country.

Since 1929 the brigalow has flowered but once on Bybera. Being such a scanty seeder, it cannot go forth into the world and conquer it by scattering a numerous progeny. Propagating itself by illegitimate means, by asexual reproduction—that's how the brigalow succeeds in beating other plants and trees. It suckers. The box and the tea-tree sucker from the trunk, the brigalow from the roots. To find out how this tree does it we have obviously to search the roots for their secret.

There seemed to be no difficulty in studying the root system of the brigalow. Hundreds of fallen trees cover the surface, exposing the roots and leaving a gaping hole in the ground. The trees always grow on the fringe of the melonholes, never in them. Hence the soil is washed away from the roots, loosening their hold. A heavy rainstorm or wind upends the tree and sends it crashing down across the melonhole.

The first thing that strikes you is that there is hardly any taproot; the roots radiate from the base of the trunk, most of them of considerable size, few of them lengthy. The same is apparent when digging up a tree that has not fallen. The distinguishing feature is *the shallowness*

of the roots; they keep close to the surface. We shall see the importance of this point later. Even where a root dipped into the earth to a depth of 10 to 12 inches, it turned upwards again and came close to the surface. The root prefers the sun to the earth.

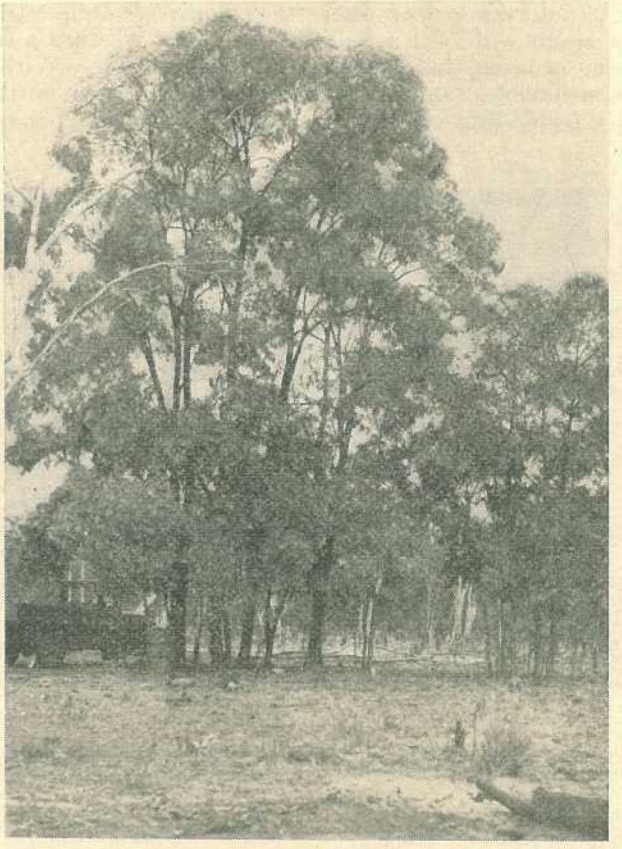


Plate 124.

UNDER THE BRIGALOWS.—Clumps of brigalow like this copse are reserved for shade on Bybera, giving a park-like appearance to the country when cleared and grassed.

Not obtaining any further information from the fully-grown trees, we turned our attention to young trees and suckers. Digging up a young tree about 3 feet in height, we found practically no taproot but a strong shoot half as thick as the trunk was running at a right angle for a distance of 20 to 25 feet. It did not go down into the ground but kept within an inch or two from the surface. At regular intervals other and smaller trees sprang from this runner. Here we had a typical specimen of the brigalow sucker. Like the old tree, no taproot but the root closely hugging the surface and readily exposed to hurt by the stock grazing over it. As the outer layer is injured the vigorous life within the runner is stimulated into fresh growth. It is more likely to happen with young trees than with old ones where life is less vigorous and where the root is bigger and protected by thicker bark. This explains a fact recorded by many experienced settlers that the brigalow spreads with increased settlement.

Fire is the chief cause of the spread of the brigalow. After the tree is ringbarked the trunk and leaves die, while it takes at least three years before all the life has gone out of the roots. Suppose a fire starts in the scrub accidentally or intentionally, within that length of time what will happen is this: the bark of the roots gets burnt first; the sap pent up in the roots protects them to a certain extent, just as a living tree resists the fire. While the tree itself is dead, a mass of suckers starting out in all directions from the still-living roots carry on business as usual. Hence the warning given to every man who starts ringbarking his scrub not to burn too early. But three or four years is a long time to wait; dry spells are sure to happen within that time;

Plate 125.

Brigalow Country in its Natural State.—Virgin scrub soon to fall to axe and firestick, and giving place to a hock-deep cover of rich pastures.

bushfires are hard to avoid, and often do a lot of damage before they are put out. Fire by lightning on Bybera gave us about 20 acres of suckers, and we were grateful for the lucky escape. No one who has not seen it can have a conception how dense the suckers can be. The experience of one settler will illustrate it. A farmer from the Rosewood

scrub, together with his sons, had taken up brigalow and belah country near Miles. They set to with a will and followed what they were accustomed to in the Rosewood scrub. They cleared 50 acres by felling the trees, not ringbarking them. Then they stacked the timber and set fire to it after three months. Of course, a great mass of suckers came up and made the country useless. The father, describing his experience, remarked: "The suckers were that thick a dog could not bark in them."

How are we to deal economically with country that has suckered? The problem is almost similar to that of dealing with the prickly-pear in the pre-cactoblastus days. We have been experimenting since August last as time permitted.

We shall report as soon as results are finalised.

Plate 126.
Young Aberdeen Angus cattle sheltering from the noonday sun in a brigalow reservation on Bybera.

Poisoning of the Brigalow.

To prevent suckering the Prickly-pear Commission has strongly advocated poisoning the brigalow with pentoxide of arsenic after the tree has been ringbarked. We have done so on Bybera over an area of 370 acres with most satisfactory results. We had a 99 per cent. kill; it is now burnt off and regrassed.

The great advantage of poisoning is that tree and roots die quickly. Hence the risks of suckering through an accidental bushfire are materially lessened compared with country where you have to wait three or four years before you can burn. There is no doubt that box should under all circumstances be poisoned. Mr. W. Purcell, of the Prickly-pear Commission, has rendered a notable service to Queensland by urging the pentoxide of arsenic in season and out of season. The disadvantage is the increased cost. The initial cost is greater and may run up to a big sum where a large area is being handled. Every man will have to weigh for himself the increased cost against the advantage he gains. The department has assisted the settler by selling the arsenic at or under cost price and paying railway freight. The man who wishes to do dairying and cultivating and requires to have his holding cleared quickly and safely must use pentoxide in addition to ringing. The same applies to the selector who has only a small belt of brigalow and belah on his holding. In such a case, the increased cost would be small and the advantage agained considerable.

Adding a dye to the solution of the poison—as recommended by the Prickly-pear Commission—is a great improvement. The sap quickly takes the dye, enabling you to see at a glance which trees have been done and which have escaped. We ascribe to the dye the excellent results we ourselves have obtained.

The handling of the poison is, of course, a grave matter, and should not be undertaken without due warning. There are so many ways by which arsenic can gain access to the body. Only men should be employed; men, naturally, are more careful than boys. In addition, the skin of a youth is more sensitive and less protected; hence absorption of arsenic may take place even through the unbroken skin. It is not easy to keep one's skin unbroken when attacking trees with an axe. All men handling arsenic should be clearly warned regarding the risks and dangers connected with it. This applies not only to the poisoning of the trees. Arsenic is used on the farm and on the sheep station for all sorts of purposes. Arsenical poisoning of man is more widespread in the bush than is being realised. Death is rare, but accidents are frequent. Chronic after-effects of arsenical poisoning are often ascribed to other causes. Such has been my experience in my practice.

All that is required to safeguard a man is that he should be warned in plain language. That is the least we owe him.

* * * *

Queensland owns a great estate in its brigalow and belah scrubs. The proper handling of this country will bring many millions of acres into production. It will also provide remunerative employment for a great number of men in clearing it. Owing to its peculiar colloidal subsoil the ground holds moisture for an exceptionally long time. Once the clearing is accomplished the harvest is in sight. We possess no other country in Queensland that can compare, in my opinion, with brigalow and belah country in its drought-resisting capacity.

The Dairy Industry in Britain and Denmark.

L. F. ANDERSEN, Instructor in Dairying.

Subjoined is an interesting pen and camera record of a recent tour by Mr. Andersen with a party of farmers organised by the Jersey Cattle Society of New Zealand. He visited his homeland, Denmark, after an absence of thirty-seven years, and was greatly impressed with the progress of the dairy industry there, as a result of systematic herd testing and recording.

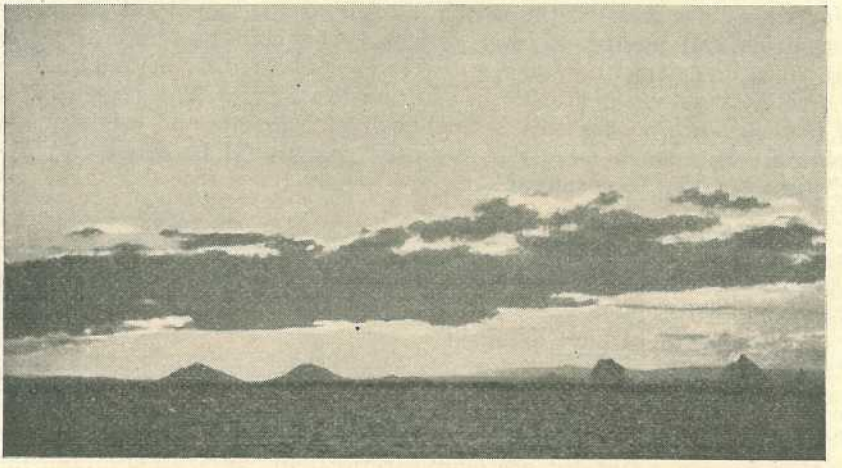


Plate 127.

OUTWARD BOUND ON MORETON BAY.—The voyager's last view of distant Brisbane.

IN ENGLAND.

DURING our tour of England we inspected many herds of many breeds, and the people we visited were always most anxious to show us their stock and farms, as well as places of historical interest. The wonderful hospitality with which we were received wherever we went is a cherished and abiding memory.

The first dairy herd inspected was a Jersey herd of about 250 cows of all ages. All animals had been tested for T.B., and forty cows had been awarded merit certificates with the English Jersey Cattle Society.

On another farm excellent herds of three breeds—Red Polls, Jersey, and Dexters—were seen. The Dexter cows were, like the others, of splendid type, and yields of over 5 gallons are recorded daily, the average fat per cent. being around 3·8.

Another good Jersey herd, T.B.-free, was inspected at Guildford, and from which certified milk is retailed at 6d. a pint.

One of the best Jersey herds inspected in England had produced many winners in milking trials from time to time, including the Mond Shield at the London Dairy Show, 1936. This herd has been tested consistently, and fourteen of the cows produced an average of 12,272 lb. milk, while some cows yielded more than 8 gallons daily.

Plate 128.
Belted Galloways at the 1937 Royal Show, Wolverhampton, England.

Excellent dairy Shorthorns, including many Royal Show prize-winners, were seen on another farm.

A day of special interest to the New Zealanders was spent with Lord Bledisloe, a former Governor-General of New Zealand, and who also had visited Queensland. Lord Bledisloe is a breeder of Red Polls, and the milk is converted into cheese in his own factory. Extensive pig

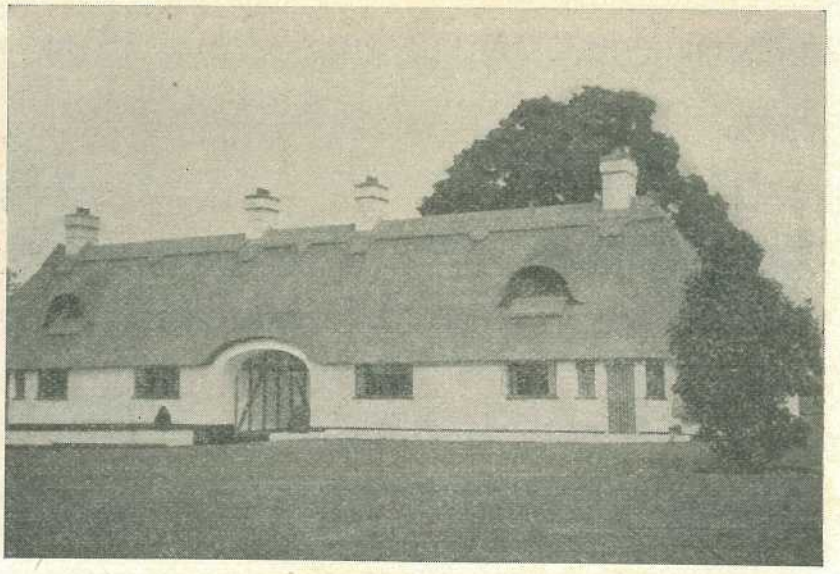


Plate 129.
Entrance to Ovaltine Model Dairy (England).

stables built on the Danish principle house a very large herd of about 600 Large Whites.

Plate 130.
ON AN ENGLISH DAIRY FARM.—Milk delivery by horse and motor vehicles.

The milk trade seems to engage the attention of all dairy farmers within the vicinity of big cities all over England. A milk marketing board is now operating, and every endeavour is being made to put the industry on a proper basis.

In order to encourage a pure milk supply from disease-free herds the British Government is contributing a large sum of money annually

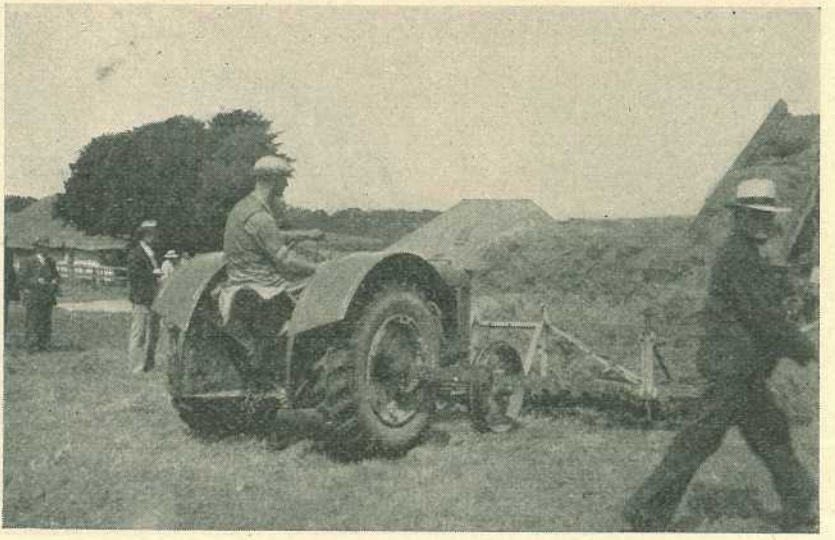


Plate 131.
A Tractor-driven Hay Sweep in Use in England.

for a period of at least five years, and it is estimated that this year's contribution will be approximately £1,700,000. Under this scheme, a producer of accredited milk from a herd free from T.B. will receive a premium of 3¼d. a gallon.

For the production of pure milk with a low bacterial count great stress is laid on cleanliness, and on many farms special stalls are provided where each cow is subjected to a foot bath before entering the milking bails, while all utensils are placed in a steam chamber when not in use.

At the Royal Show.

A stay of several days was made at Birmingham, and from here, at the invitation of the Royal Agricultural Society of England, we visited the Royal Show held at Wolverhampton. After being used to Australian show grounds, with substantial permanent pavilions and accommodation for livestock, one was somewhat disappointed with the apparently makeshift conditions under which the Royal Show is held. When it was realised that the Royal Agricultural Show Society changes its venue every year, disappointment quickly changed to admiration for the remarkably efficient organisation behind it all.

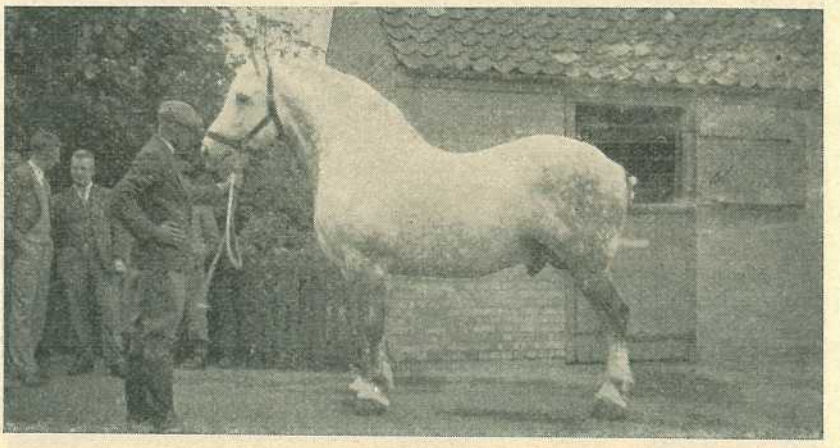


Plate 132.
A Percheron Sire on a farm in England.

The stock exhibited at the Royal were, of course, of very high standard. In the cattle section, Dairy Shorthorns, Lincolnshire Red Shorthorns, and British Friesians were particularly impressive, while Jerseys and Guernseys were also well represented. Many other breeds, some of which are little known in Australia, were exhibited, including Dexters, Belted Galloways, Blue Albions, and Kerrys.

In the milk and butter classes many excellent results were recorded. In the milk yield classes one class only had been arranged for each breed, and points were allowed for the yield of milk, with additional points for milk containing more than 3 per cent. butter fat. Points for lactation were also allotted. The highest yield of milk recorded for 24 hours was 95 lb., produced by a British Friesian cow; this cow, however, failed to reach the required 3 per cent. fat standard. Excellent yields were also recorded in other breeds—such as 81 lb. from the

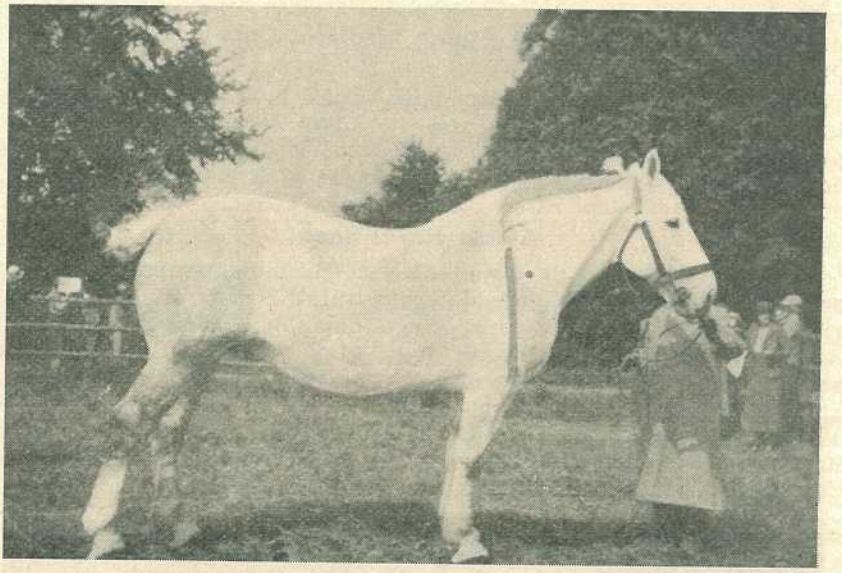


Plate 133.
A Percheron Mare on an English Farm.

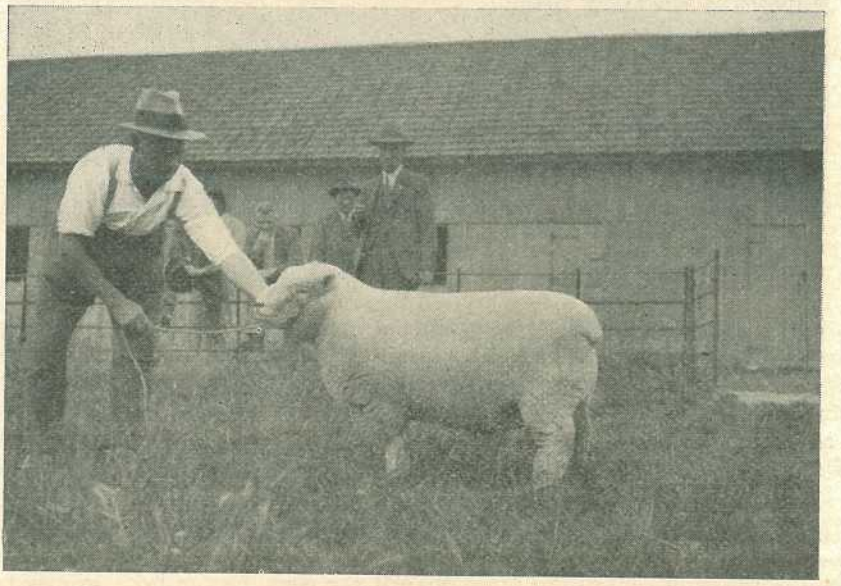


Plate 134.
A Southdown Ram on its Native Heath.

winning Lincolnshire Red Shorthorn; Guernsey, 77¼ lb.; Ayrshire, 75½ lb.; Jersey, 70¾lb.; Dairy Shorthorn, 67¾ lb.; South Devon, 55½ lb.; Dexter, 52 lb.; Kerry, 49 lb.; and Blue Albion, 45¼ lb.

The butter trials were divided into two classes—light breeds, including Guernsey, Jersey, Kerry, and Dexter; and heavy breeds, which included all others. In these classes each cow's milk was separated and the cream made into butter, points being allowed for yield, lactation, service, and quality of butter. Low testers—i.e., cows from which more than 30 lb. milk is required to produce 1 lb. butter—were debarred from the winning awards. The highest producers in these classes were a Jersey cow, among the light breeds, with 3 lb. 8¾ oz. butter, and a Friesian cow, among the heavy breeds, with 3 lb. 2¾ oz. butter.

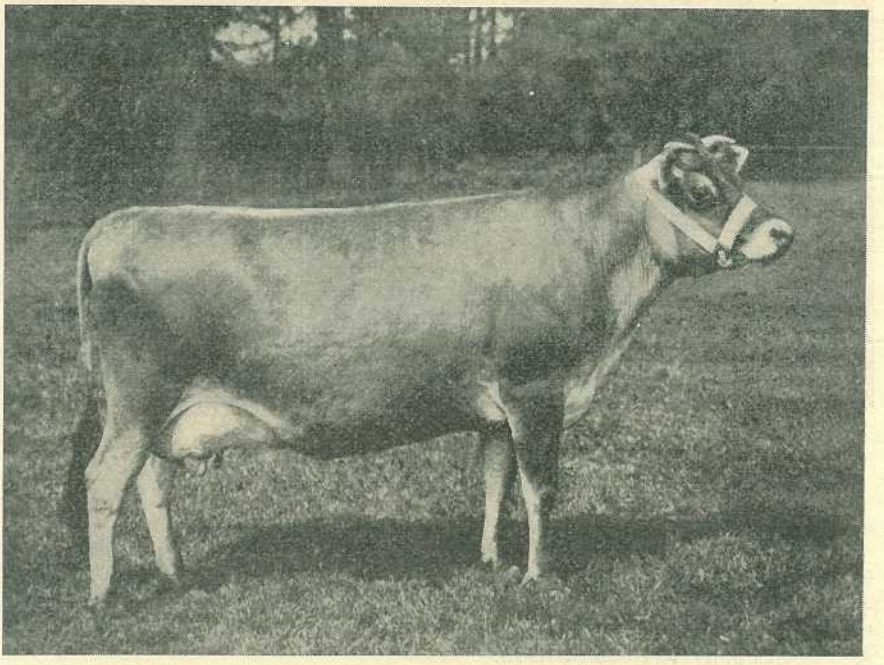


Plate 135.
Jersey Heifer, "Jack Sparrow Queen," owned by Lady Loder, Leonardslee, Horsham, Sussex (England).

This show class served a double purpose, as each cow's milk is separated and the cream used in dairymaids' butter-making contests, with small hand churns, on the ground.

To the average man a plot of 650 acres of celery may sound almost unbelievable, but such an area was inspected on one estate in the Fen country, East Anglia. One East Anglian farmer is the owner of a large tract of this country, about 12,000 acres. On this huge property celery is a very good paying crop, and although expenses are high, the net return is generally between £60 and £100 per acre. In addition to celery, 2,000 acres are down in wheat, 2,000 acres in potatoes, and 1,000 acres in sugar beet. The owner's wages sheet for 1935 amounted to £65,000.

In London a visit was made to Hay's Wharf, where practically all Empire as well as Continental butters are landed. Normally, 2,200 men work on this wharf, but in busy times the employees number 3,000.

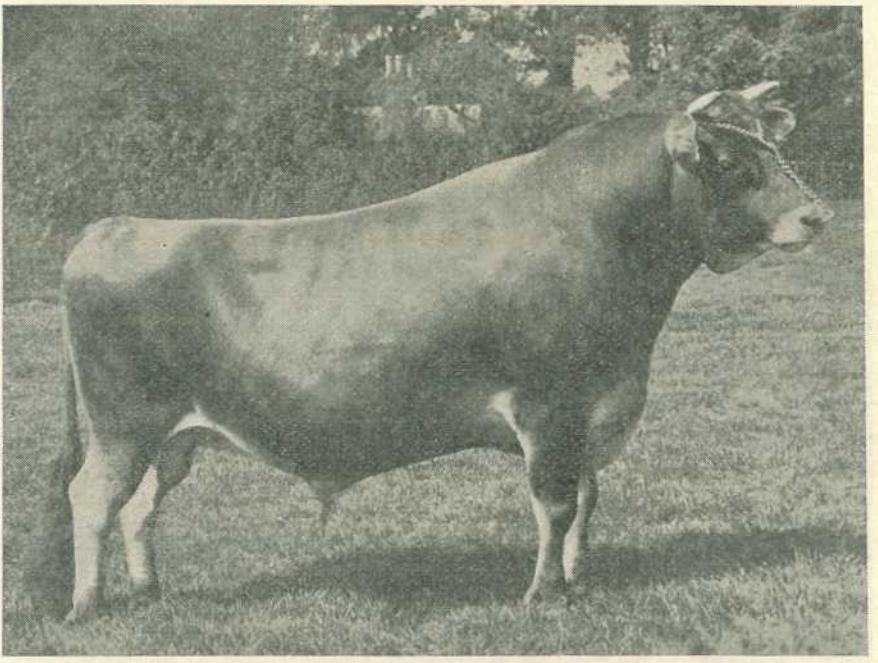


Plate 136.
Jersey Bull, "Kentwins Corona," owned by Lady Loder, Leonardslee, Horsham, Sussex (England).

In Tooley street, cold store butters were inspected from many countries—including Esthonia, Holland, Ireland, New Zealand, and Australia. Some Queensland butters were compared with samples from other countries, and I do not hesitate to say that Queensland butters lost nothing by the comparison.

IN DENMARK.

Haymaking was in full swing when the party arrived in Denmark, but as there is no Australian sun the progress is slow, and the farmer anxiously watches the sky in fear of having his hay spoiled. Cattle are seen tethered in the fields of clover; the Danish cow does not know the meaning of the word "drought," but is simply a machine for producing milk and butter, and is fed accordingly. After a visit to Denmark one can understand why Danish butter always realises top price on the English market.

No home separation is practised in Denmark; the milk is delivered to the factory every morning. Pasteurisation is compulsory, the milk being heated to a temperature of 170 degrees and automatically reduced to about 100 degrees as it passes through the separators. Passing from the separators, the cream is again subjected to a pasteurisation of 192

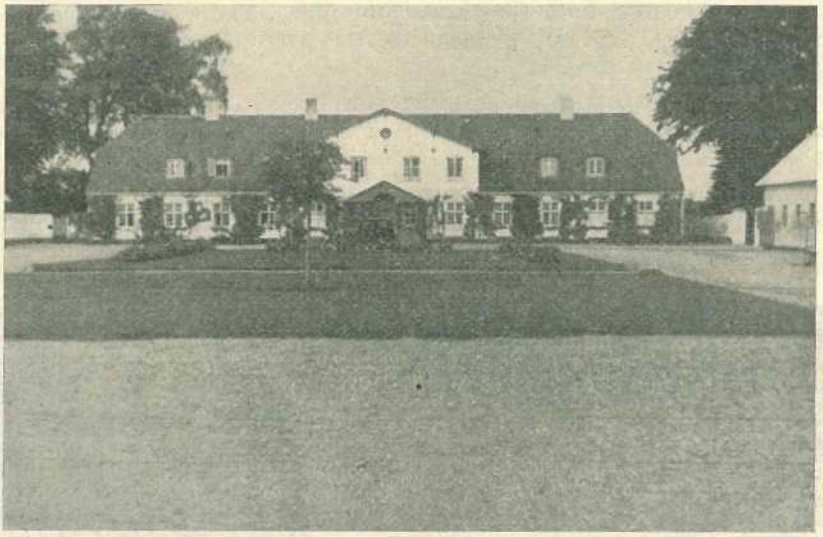


Plate 137.
Typical Danish Farm Home.

degrees, after which it is placed in holding vats, where a certain amount of lactic starter is added to ensure the correct acidity desired for butter-making the following day.

The separated milk is returned to each farmer in proportion to his deliveries if desired; otherwise it may be used for skim milk, cheese, or casein. Before being returned the separated milk is treated with a lactic starter, which sets up an artificial souring, and, thus treated, it is

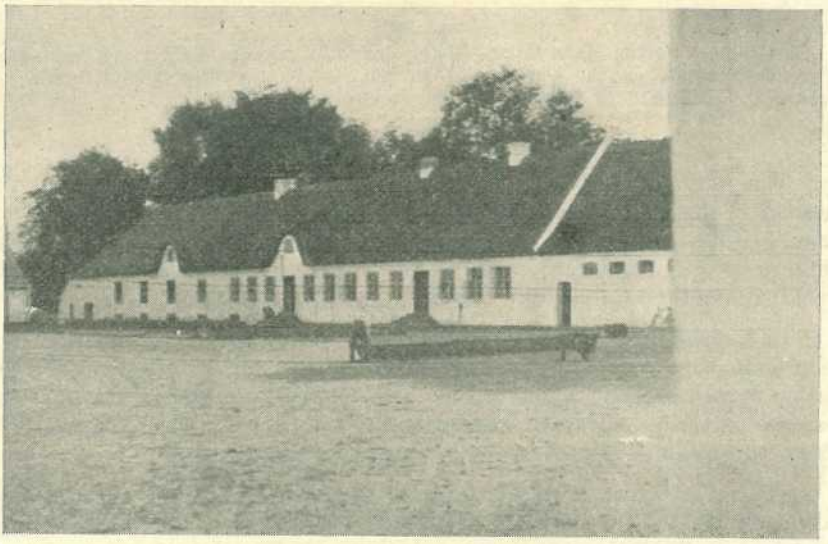


Plate 138.
Typical Danish Cow Stable.

a much safer food both for calves and pigs. There are in Denmark approximately 1,700 butter factories, the average output of which is 3½ tons of butter a week.

Butter is exported under strict Government supervision, and any factory may be required to submit a cask of butter to examination at a few hours' notice.

Any factory producing butter below the required standard is deprived of the use of the national brand until such time as the butter is again adjudged to be of first quality.

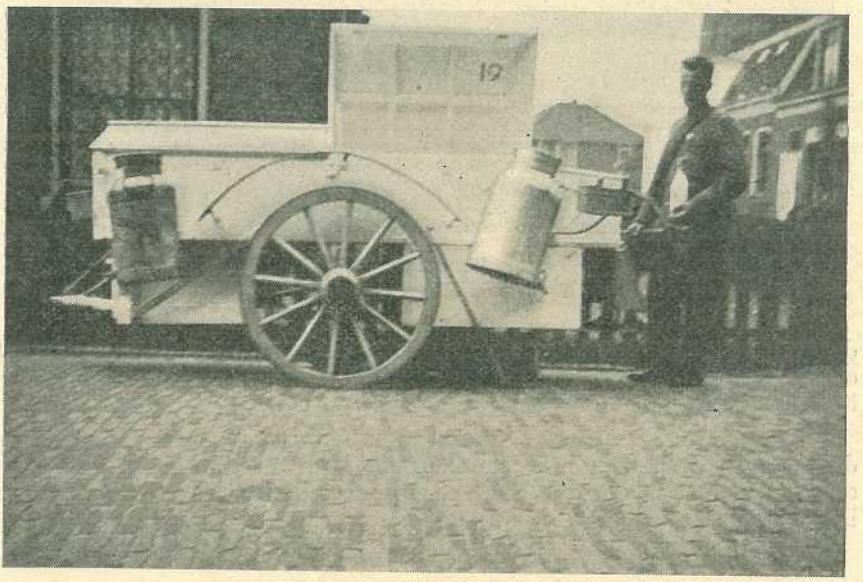


Plate 139.

A ONE-DOG POWER MILK CART.—Using domestic dogs for light street haulage is a common custom on the Continent. In the picture the dog is underneath the "chariot," harnessed to the axle.

Showing of Cattle.

The showing of cattle in Denmark is taken seriously, and the method of judging is different from that in Australia. Judging is not done by one judge, but in many instances the panel of judges may number twenty-four for cattle alone. There are always three judges working together on certain classes.

In a class for high-producing cows at one of the chief shows on the Island of Funen no entry is accepted unless a production of 660 lb. butter can be shown for one year. The winning animal in this class at last year's show had an average of 847 lb. butter for three consecutive years, the highest yield for one year being 948 lb. butter.

There are many regulations to which Australian dairy stock exhibitors would take strong objection; for instance, all bulls must be dehorned, and other requirements are equally mandatory.

Systematic Herd Recording.

It is in herd recording, however, that Danish farmers have shown what can be accomplished. The average yield of butter per cow has never been higher than it was last year, when all tested cows, including heifers, showed an average of 308 lb. butter-fat.

A most careful record is also compiled of food units used per cow, and it is noted that this increased production has been achieved without any extra concentrates, and it follows, therefore, that these excellent results, in the main, are due to careful breeding, testing, and culling.

Red Danish Cows.

Some very high average yields have been recorded; one owner with a small herd of six cows secured an average yield of 657 lb. fat, the highest yield being 855 lb. Another herd of eleven cows yielded 633 lb. fat per cow. Among the larger herds pride of place is held by Nasgaard Agricultural College, where the entire herd of 131 cows produced 534 lb. fat per cow, including all the heifers.

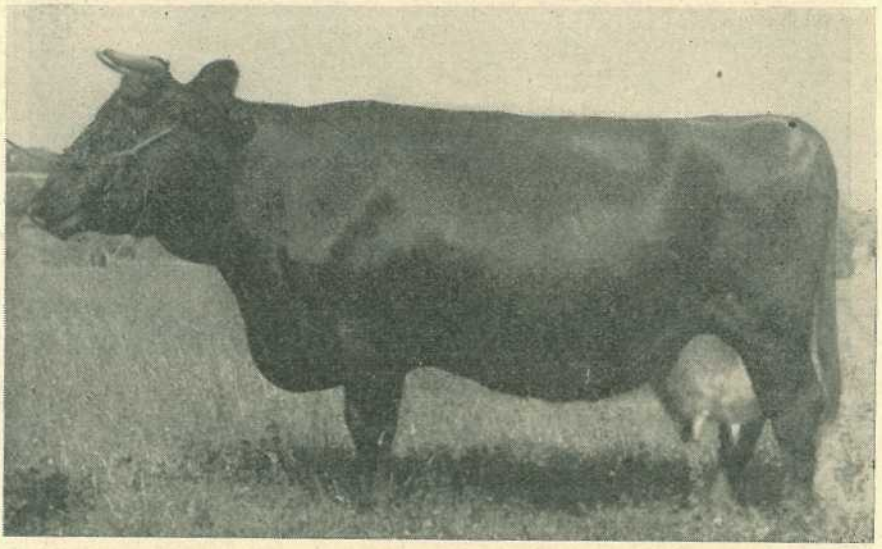


Plate 140.

A Typical Cow of the Red Danish Breed.—Animals like this have built up the reputation of Denmark as a butter-producing country.

All the yields quoted are from the native breed—Red Danish—but several other breeds are represented among the high-producing herds. A Friesian herd of seventy-two cows is credited with an average production of 473 lb. fat, and a Jersey herd of 167 head showed a yield of 380 lb. fat per cow. The Red Danish cow, however, seems to be the most favoured, and no fewer than 432,000 were under test last year. That the Red Danish are the best producers is shown by the fact that of the highest individual yielding cows producing no less than 785 lb. fat per year, sixty-none cows are listed, sixty of which are Red Danish. The highest yield, however, was by a Jutland cow, 1,042 lb., which occupied the same position the previous year with a yield of 1,034 lb. fat.

Community Bull System.

As the number of cows in the average herd is very small, it is not economical for each farmer to own a bull, but by joining a bull association he may have the use of very high-producing sires. Some of these associations are in a position to buy the best bulls, and some may own ten to twelve bulls. It should not be imagined that bulls are cheap in Denmark. The farmer there says a good bull is always cheap and a poor animal always dear.

The co-operative bulls are stationed on the farms of members of the association, and the price of service is mutually arranged.

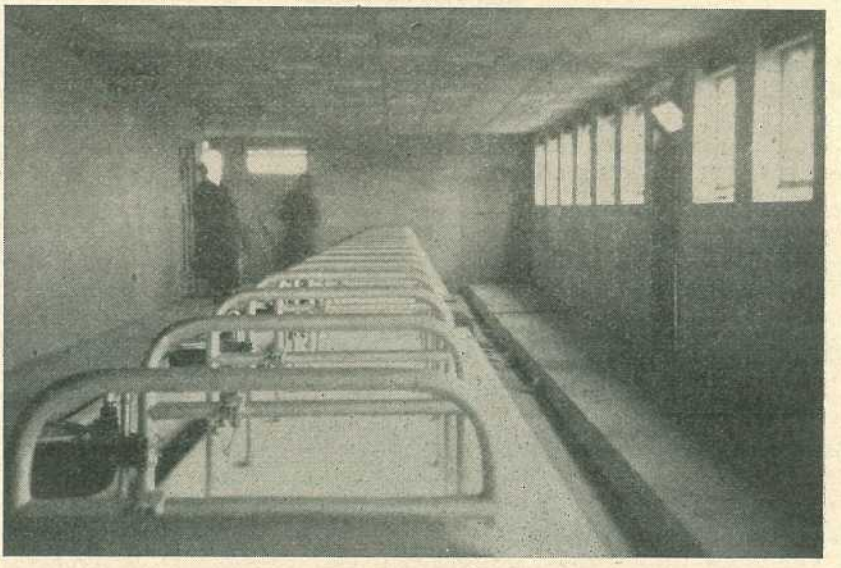


Plate 141.

MODERN MILKING SHED INTERIOR ON A DUTCH DAIRY FARM.—Cow accommodation like this is common on the newly-reclaimed areas in Holland.

Improvement in Yields.

In the early years of herd recording (1898-99) the average percentage of butterfat is given as 3·37 per cent. for 3,000 cows, with a yield of approximately 6,000 lb. milk per cow, whereas last year the average percentage is given as 3·9 per cent. for 432,000 cows, with a mean average yield of 8,260 lb. milk.

Thousands of owners, however, now boast an average herd test of well over 4 per cent. fat, and some have improved the test up towards 5 per cent. In one instance a herd of 130 cows owned by an agricultural college showed an average yield of 12,000 lb., with 4·41 per cent. butterfat, and many individual animals show an average of more than 5 per cent. butterfat.

Bull Indexing.

Equally important as herd recording is the system of indexing of bulls and progeny. The records of as many daughters as possible are examined and compared with the same number of dams. From the annual record of this work extending over the Island of Funen it is

noted that no fewer than 195 bulls are tabulated, and definite figures are quoted as to increase or decrease in yield of milk, the percentage of fat, and production of butter. For instance, the record of the bull Enggaard Rex (H.B. 2447) is given as follows:—

ENGGAARD REX.

—	No. of Cows.	Average Yield Milk.	Per Cent. Fat.	Average Yield Fat.
		Lb.		Lb.
First Calf.				
Daughters	60	9,354	4·37	408
Dams	60	8,091	4·10	351
Increase	..	1,263	·27	77
Second Calf.				
Daughters	70	9,928	4·44	440
Dams	70	9,160	4·17	382
Increase	..	768	·27	58
Third or Later Lactation.				
Daughters	40	11,169	4·41	492
Dams	40	10,197	4·20	428
Increase	..	972	·21	64

It will thus be seen that the production of the daughters showed a definite improvement over that of their dams in all branches.

In comparison, the records of the bull Tjalfe Loby (H.B. 6789) are given as follow:—

TJALFE LOBY.

—	No. of Cows.	Average Yield Milk.	Per Cent. Fat.	Average Yield Fat.
		Lb.		Lb.
First Calf.				
Daughters	22	6,963	4·03	280
Dams	22	8,652	4·08	353
Decrease	..	1,689	·05	73
Second Calf.				
Daughters	22	8,566	4·02	344
Dams	22	9,994	4·19	418
Decrease	..	1,428	·17	74
Third or Later Lactation.				
Daughters	7	8,987	4·10	368
Dams	7	10,027	4·32	433
Decrease	..	1,040	·22	65

Both these records are taken from the same volume. Although the dam and grand-dam of Tjalfe Loby had yields of 409 lb. and 525 lb. butter-fat, respectively, over a number of years, this bull was unable to get any daughters with a yield equal to that of their dams. No doubt

such bulls have but a short life in Denmark, but it is easily seen that much damage may be done in a herd with a sire of this character, and it goes to show with what breeders have to contend, particularly where little or no testing records are available.

T.B. Eradication.

The eradication of tuberculosis in cattle is now well in hand all over Denmark, and this also is having a great influence upon the average production. Whereas in 1895 the percentage of positive reactors to test was usually very high, to-day many districts are in the happy position of being able to show a clean bill. This work is encouraged by all co-operative butter factories, and is being carried out without any assistance from the Government.

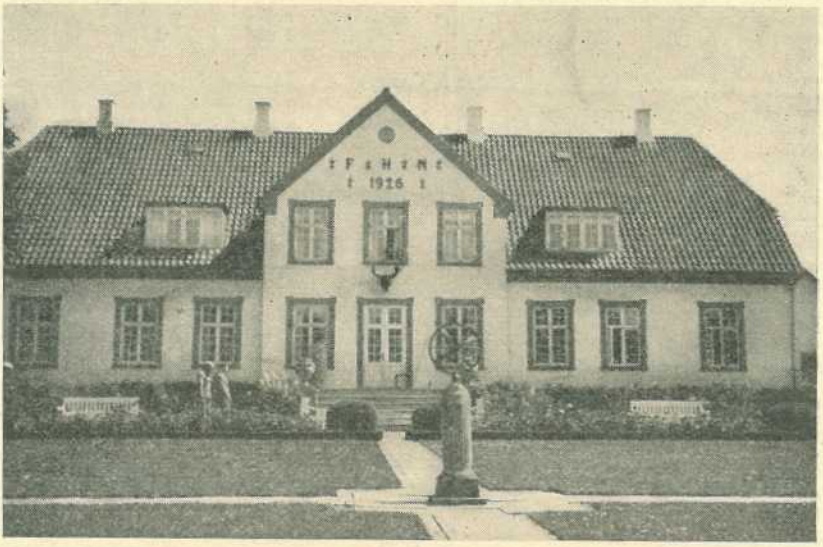


Plate 142.
A Farm Home in Denmark.

At the Naesgaard Agricultural College, on the island of Falster, the oldest college in Denmark, great progress has been made in increasing the production of the herd of 140 cows of Red Danish breed, and during the past nine years the average production per cow has been raised by 88 lb. fat. During 1935 the entire herd, including heifers, produced an average of 534 lb. fat. No females have been brought into the herd for many years, but no money is spared to secure the best sires obtainable. Recently a young bull of the very best breeding was purchased for £300 cash, with a further £300 to be paid on condition that the bull and progeny secure certain prizes in shows.

Reduced Bacon Output.

Owing to restrictions in production of bacon, this industry is not in so flourishing a condition as it was a few years ago. However, the majority of farmers were not complaining much about the regulations, realising that it is probably the best policy to keep up prices. No doubt the restrictions interfered considerably with many large establishments, but as new markets are found these restrictions will gradually be lifted.

IN HOLLAND.

While in Holland the party inspected some of the land which had been reclaimed from the sea.

Before the reclaimed land is leased by the Government it is drained by canals and underground drains; it is then ploughed several times and treated with basic slag to sweeten the soil. A comfortable home and farm buildings are all ready for the farmer before he takes over. Rents are paid on an acreage basis, according to the value of the crops grown. This system is considered very satisfactory from the farmer's point of view.

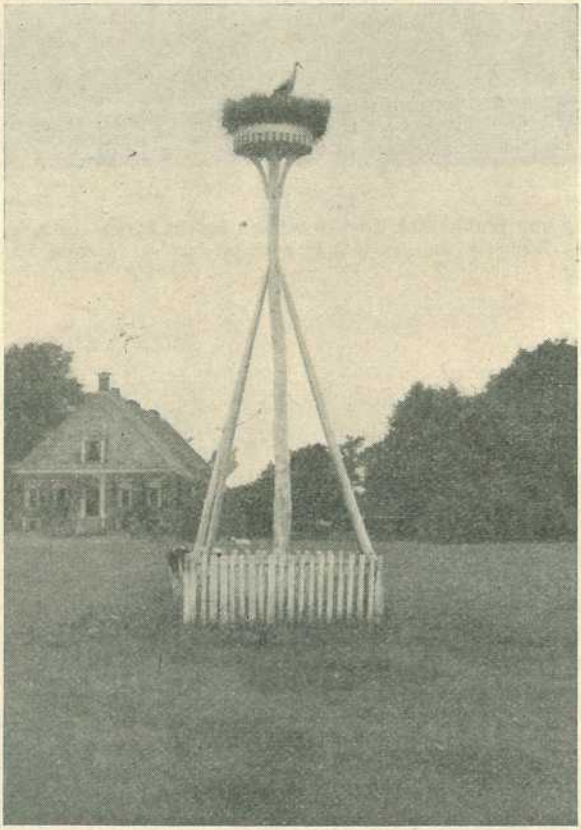


Plate 143.

Stork's Nest on a Dutch Farm.—The stork is a popular bird in the Netherlands, where it is regarded as a harbinger of good fortune.

Excellent crops, such as wheat, barley, and oats, were seen in the reclaimed area, but grasses had not, apparently, done well during the first year or two.

The Zuider Zee, which covers approximately 70 by 25 miles, will in the course of about thirty years be entirely reclaimed, and so a new and fertile province will have been added to Holland.

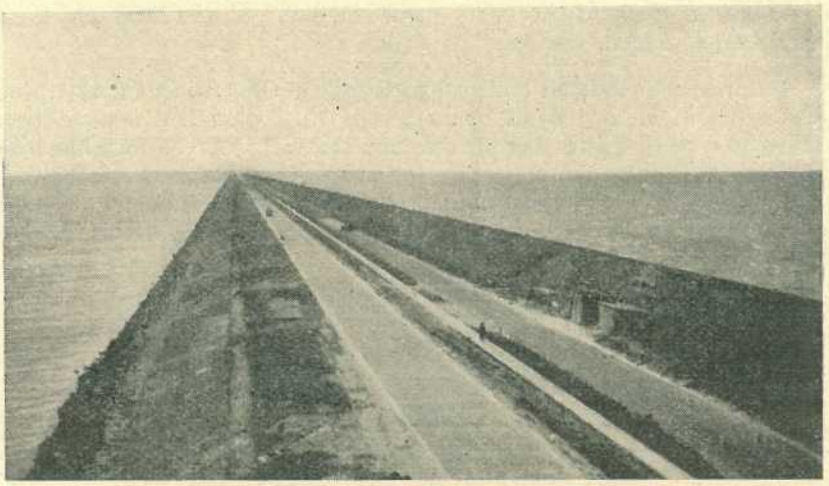


Plate 144.

A DYKE ACROSS THE ZUIDER ZEE TOPPED WITH A MOTOR ROAD.—A large area of what was formerly the sea bed is now productive farming land.

Plate 145.

A TYPICAL FARM HOUSE ON RECLAIMED LAND IN HOLLAND.—This house, built by the Government, is ready for occupation under leasehold tenure. The farmer's living quarters (left) are attached to the barn and stables in which all stock are housed during winter.

IN THE ISLAND OF JERSEY.

As the party included many Jersey breeders, a very busy and interesting week was spent on Jersey Island. Most of the leading studs were inspected, many of which will be familiar to Queensland breeders.

It is to be regretted that herd recording has somewhat slipped back of recent years, but as American fanciers or their agents are continually buying up the best stock at high prices, many breeders contend that testing is unnecessary. Nevertheless, some excellent returns are recorded on the island. In the Goddington Competition, under four years, one breeder was awarded first, second, third, and fourth prizes for cows with the following totals, respectively:—723 lb., 721 lb., 713 lb., and 704 lb.

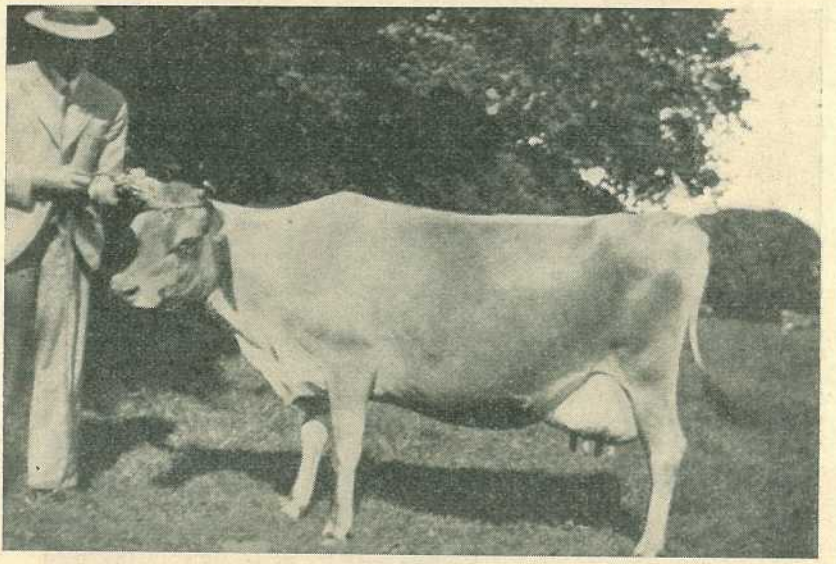


Plate 146.
Type of Jersey Cow on a Farm in the South of England.—This eye-taking matron has a very fine production record.

In an aged class, the winner produced 1,157 lb. of butter; the second cow had recorded 1,048 lb., and the third 797 lb. butter.

The dairy and cattle industry in Jersey has been surpassed in economic importance by the potato industry. During 1935 some 58,000 tons were exported, the net value being, approximately, £845,000. The climate on Jersey is very mild, the crops mature earlier than in England, and, therefore, demand a good price on the English market, approximately £13 to £14 a ton to the grower. At the time of our visit some 1,200 tons of potatoes were being shipped daily.

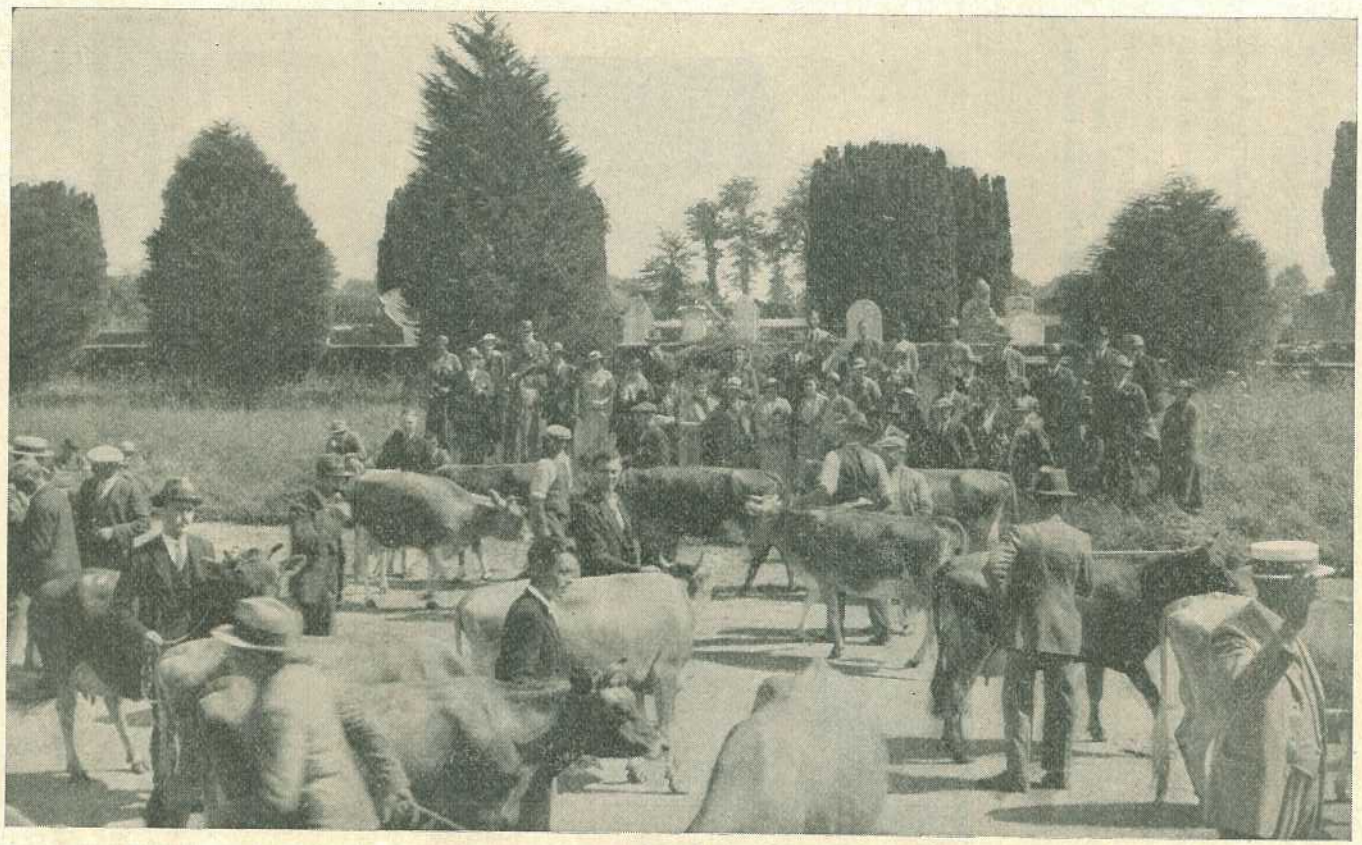


Plate 147.
Jersey cattle paraded for herd book entry, Jersey Island.

Fat Lamb Raising in Queensland.

J. L. HODGE, Instructor in Sheep and Wool.

FAT lamb raising should be a profitable enterprise for farmers with suitable country. From the point of view of returns, if properly practised, there is no quicker money in the whole range of sheep farming.

The districts most suitable for the raising of fat lambs from English type sheep are the Darling Downs and neighbouring country. There is no reason, however, why graziers further afield should not engage in the industry with profit to themselves, providing they cultivate.

Cultivation must be regarded as a prime necessity where fat lambs are the object. This is not to say that a crop of fat lambs may not be raised on natural grasses, but to do so is more or less in the nature of a fluke and the practice is not recommended. An appropriate slogan for this branch of the sheep industry is "The fat lamb follows the plough." The wheat farmer should certainly consider fat lamb raising as a complementary enterprise. Incidentally, its adoption would make a saving in cultivation costs.

Wheat, like the rest of the cereals, is an excellent sheep fodder. Oats probably give a longer feeding period. Lucerne, than which there is no better sheep feed, should have its place on the farm if conditions are suitable for its cultivation. It will do well on any well drained flat, where the rainfall is sufficient and frosts are not too severe. Every consideration should be given to introduced grasses and to pasture improvement, with especial application to winter feeds.

It should be remembered that the lamb must be maintained fat from birth to butcher's block. The ewes in lamb should be kept in good strong store condition. After lambing, no feed is too good for the ewe and lamb.

With regard to breeds, in Queensland it is admittedly difficult to obtain the right type of crossbred ewe. It, therefore, becomes necessary in most cases to breed the future mothers of the lamb raising flock. With this object in view, the farmer would be well advised to secure the boldest and strongest possible type of merino. Station ewes culled for broadness of fibre in the fleece are best suited for the purpose, with due regard for size and constitution. They should be mated with one of the English long woolled rams—such as the Romney Marsh, Border Leicester and Lincoln. The ewe lambs in the resultant drop should be saved as the future dams in the fat lamb raising flock. On these half-bred ewes it is advisable to put a Downs ram. Two breeds highly recommended are the Southdown and the Dorset Horn. Lambs got by the Southdown rams provide the most desirable carcases at the present time. The Dorset Horn, however, gets a very nice early maturing lamb from the ewes mentioned, and he has, besides, the additional value that, like the Merino, he will work at any time of the year. This is an important consideration, as it enables the farmer to have his lambing to suit his cultivation. The wool from ewes of these crosses is not to be despised, all of them being of value. However, it should be remembered in this connection that the fat lamb is of first importance, and the production of wool a secondary consideration.

Here a certain line of breeding has been indicated, but it should be realised that locality has much to do with the choice of a breed. For instance, the pure Corriedale ewe is an excellent all round general utility farmer's sheep. She is docile and a splendid milker and is recommended from every point of view. On the Corriedale ewe a Downs ram should be used. At the time of mating, the breeding ewes should not be too fat or a poor lambing may result. They should, however, be strong and vigorous. The rams should be in good condition.

Lambs bred as indicated and properly fed should be ready for slaughter at four months of age, or even before. Extraordinary weights are not looked for by the shippers, but, in this connection, it must be stated that in the local market heavy weights are paid for at very profitable prices. About 33 lb., if the lamb is properly fat and a true sucker, is the ideal weight for an export carcase. The true export sucker lamb must never be weaned. "Straight from the teat to the block" is the maxim in this trade.

In districts where, because of wet conditions, sheep would not ordinarily be depastured profitably, the Romney Marsh stands alone. Apart from other reasons, this may be accounted for by his ability to withstand fluke and footrot better than any other breed.

Prices for fat lambs in Brisbane have been consistently high over a period of years. It is not too much to expect that a ewe of the right type, and mated as advised, should produce £1 a year.

From every standpoint, the farmer with suitable country and cultivation will be well advised to give some thought to engaging in this very lucrative branch of sheep husbandry.

DRENCHING FOR WORMS IN SHEEP.

F. H. S. ROBERTS, D.Sc., Animal Health Station, Yeerongpilly.

ABOUT this time of the year worms are usually very troublesome in sheep. Before drenching an effort should always be made to ascertain which species of worm is the cause of the trouble, and this can readily be done by a post-mortem examination of a badly-infested animal. The fourth stomach, small and large intestines, should be cut open and examined carefully, and if the animals are coughing attention also should be given to the lungs.

For the worm that occurs in the fourth stomach—the barber's pole worm—bluestone is recommended. Carbon tetrachloride is also very effective against this worm, but there is some risk attached to its use, and it is therefore no longer recommended by the Department of Agriculture and Stock.

Bluestone and nicotine sulphate is used for the removal of the small hair worms, which inhabit the small intestine. Hair worms are the cause of a disease known as "black scours." Infestation is most severe among young sheep in which the losses may be very heavy. Bluestone and nicotine sulphate is the only drench which is of any value against these small worms.

Where a mixed infestation of stomach worms and hair worms occurs —a frequent experience, especially in young sheep—the bluestone-nicotine sulphate drench should be given, as this drench is effective against the stomach worm also. Moreover, it may be used for the removal of tapeworms from lambs, although these worms may also be removed by arsenic and epsom salts.

For the nodule worms in the large intestine there is as yet no efficient method of removing them by means of drenches which are given through the mouth. They may, however, be combated by the use of an enema containing sodium arsenite, which, if administered carefully has a very high degree of efficiency.

Lung worms are treated with certain drugs which are injected into the windpipe, the formula being:—

Oil of turpentine—1 cubic centimetre.
Creosote—0·5 cubic centimetre.
Olive oil—2 cubic centimetres.
Chloroform—0·5 cubic centimetre.

This formula represents a dose for one adult sheep. For lambs the dose is reduced by one-half.

In country subject to worms the sheep should be given treatment at regular three to four-weekly intervals during the spring and summer months, for otherwise little or no benefit from the treatment may be evident. Treatment is to be regarded only as a temporary measure in the fight against worms, for it must be realised that when paddocks are heavily infested with worm larvæ the animal is no sooner freed of worms by treatment than it is attacked again by larvæ which are picked up by the animal when grazing. In about three to four weeks' time the larvæ have grown and have reached such a size and attained such numbers that the health of the animal is again affected.

Further information on mixing and administration of these drenches may be obtained from the Animal Health Station, Yeerongpilly.

CARE OF SICK ANIMALS.

Stock owners are frequently required to diagnose and treat sick animals and, from their constant observation of stock in good health, are quick to notice any abnormal behaviour due to sickness. A knowledge of the normal temperatures, pulse, and respiration rates of various animals is most valuable in arriving at a correct diagnosis of the trouble. The temperature of all young animals is somewhat higher than that of older animals, and various influences—such as periods of œstrum (heat), time of day, external temperature, and so on—may alter the temperature of the mature animal. The temperatures of healthy farm animals are:—Horse 99·5-101 degrees, cow 100-101 degrees, sheep 103 degrees, pig 102·5 degrees.

The temperature of an animal is usually measured in the rectum, and a self-registering thermometer, such as is commonly used in ordinary medical or nursing practice may be used. Care should be taken to see that the column of mercury is shaken down. A small quantity of vaseline smeared on the bulb as a lubricant to assist the passage of the instrument is desirable, and it is inserted with a circular motion between the fingers, forward in a line with the backbone, and allowed to remain for a few minutes before it is withdrawn carefully and the reading taken. If the temperature of an animal is found to be about 2·5 degrees above normal it is said to have a low fever, if it reaches the vicinity of 4 degrees above normal a moderate fever is indicated, and if in the neighbourhood of 6 degrees above normal it has a high fever.

In some diseases, such as tetanus and sunstroke, the temperature may be as much as 10 degrees above normal. Having decided by use of the thermometer whether the sickness is of a febrile (pertaining to fever) or nonfebrile nature treatment and nursing must be considered.

Good nursing is of the utmost importance. The patient should be provided with a soft bed, shade from sun, wind, or rain, and a rug in cold weather. A supply of water and green feed should also be provided if possible.

Medicines are usually administered by the mouth in the form of a drench, and it is necessary to use care and patience when using this method. The head of the animal should not be raised above a horizontal position, and only small quantities of the drench poured into the mouth at a time, allowing time for swallowing. Pinching the throat to induce swallowing should not be practised, and the head should be lowered if the patient commences to cough.

LAMB-MARKING.

For lamb-marking all instruments should be sterilised. Tetanus is always a risk in old yards and sheds. If the work can be done in grassed yards the risk of the entry of tetanus and other germs is reduced considerably. On large holdings it is always advisable, when practicable, to do the work in the breeding paddock, where temporary dust-free yards can be erected.

Marking should be done in early morning or late afternoon, and the sheep should be released as soon after as possible, to avoid any risk from germ-laden dust. The correct age for marking is from two to four weeks. Care should be taken to sever the tail at a joint. An antiseptic dressing should be applied.

BRUISING IN CATTLE.

The meat export industry is seriously prejudiced by the bruising of cattle when travelling to the meatworks, and the annual loss to both the owner and the State is considerable. Bruising is caused by many factors, particularly so when journeys are long, but the two chief causes are ill-treatment and horning because of faulty supervision during trucking and in transit.

Cattle travelled to market on the hoof always give a higher percentage of first-class beef than railed stock, provided, of course, they have the condition and weights essential for export. Much of the bruising attributed to train travelling is caused in the trucking yards. In many instances every endeavour is made to load the trains in a minimum of time. This is a mistake. Care should be taken to avoid crowding in gateways because, where jamming occurs, the outer beasts are bruised on ribs and hips. Precautions are necessary both at the crush entrance and in the crush. If cattle are trucked in "single file" their sides do not come in contact with the rails. Drovers in charge should insist that no unnecessary force is used to drive the cattle, for every injury affects the quality of the carcase.

Competition in the chilled and frozen meat trade to-day is keen, each competing country endeavouring to produce a better carcase. Therefore, if Australia is to retain or increase her output of first-grade beef, the cattle received at the meatworks must be of prime quality and free from injuries of any kind. Growers and dealers may assist the trade by judicious handling of stock. Dehorning is essential. This is a simple operation and should be done when branding. Records prove conclusively that polled cattle give a much higher percentage of first-quality beef than horned cattle.

Dehorned cattle are also much more docile in the paddocks, cover less country when feeding, and retain condition longer.

WINTER-GROWING RHODES GRASS MAY CAUSE STOCK LOSSES.

Although warnings have been issued to the effect that the so-called winter-growing or frost-resistant Rhodes grass is a potential source of danger to grazing stock, some farmers may not yet be aware that this grass should be grazed with caution. Winter-growing Rhodes grass should not be confused with the more common Rhodes grass which makes a very valuable pasture.

The prussic acid content of winter-growing Rhodes grass has been determined in samples collected both in Queensland and in New South Wales, and the quantity found was sufficient to indicate that the grass may sometimes be toxic to animals. Little is known regarding the conditions under which stock losses due to ingestion of the grass may occur, and stockowners are advised to exercise a good deal of care when paddocks of the grass are being grazed.

In districts where high-yielding winter-growing grasses and clovers can be grown, the use of the winter-growing Rhodes grass for grazing purposes is not recommended.

Herd Testing and Profits.

L. A. BURGESS, Dairy Research Laboratory.

THE problem facing all dairy farmers is the production of the maximum amount of butterfat at the lowest possible cost, at the same time maintaining or improving the fertility and carrying capacity of the pasture and health of the stock. The best results are only obtainable by a combination of three factors—the farmer, the pasture, and the herd. On the farmer rests the responsibility for efficient pasture management and on the stock that of producing the maximum amount of fat from the food consumed.

All thoughtful farmers must admit that good cows are essential to success. Many claim that they have good cows, and base their claim on factory returns. This, however, is only evidence that the herd as a whole is good and not that each individual member of the herd is producing enough fat to pay its way. A drop in factory returns is inexplicable to such farmers, and they are in a quandary as to where the remedy lies. The farmer who submits his herd to testing regularly can see by comparing the production records of cows and heifers whether the production is being maintained, whether the right cows are being used for breeding, and whether the herd sire is producing profitable or unprofitable progeny. By so doing, he is able to remedy the fault before it affects his factory returns to any noticeable extent.

The productive capacity of a cow can only be ascertained by testing. The figures obtained indicate her ability as a producer under the existing feeding and management conditions, which are controlled by the weather and the farmer. There is ample evidence available to show that the average herd contains animals which do not produce sufficient fat to pay for the food which they consume, and other animals which produce double or even treble that of the unprofitable cows. These latter cows are the ones which must be exploited to improve the yield of the herd.

Herd testing is essentially educational. The figures merely disclose the facts, and the responsibility is upon the farmer to carry out the necessary remedies. A farmer who neglects to cull unprofitable animals

has only himself to blame for a stationary or decreased production. Failure to act on the part of the farmer cannot possibly be construed as a failure on the part of herd testing.

An actual case of well-applied herd testing is as follows:—

A herd of thirty-four cows averaged 194 lb. of fat, total 6,596. At the end of the season no fewer than twenty-six animals were culled.

In the next season the herd reduced to thirty-one members (eight cows retained from previous season plus five tested pedigree and eighteen heifers from tested cows) averaged 307 lb. of fat, total 9,517.

In the third year the thirty-one cows averaged 340 lb. of fat, total 10,540 lb.

In this case the actual production from the same grazing area rose from 6,596 lb. to 10,540 lb. of fat. The fat per acre was thus nearly doubled, and, with fat at 1s. per lb., the income rose from £330 to £527.

Herd testing will pay handsome dividends, provided that the farmer does his share.

THE IMPORTANCE OF BLENDING OF CREAM.

An examination of cream on the receiving platform of almost any factory will indicate the necessity for careful treatment and storage on the farm. Proper blending of the cream after separation is essential.

The process of cream ripening assists the production of delicate butter flavours.

The development of lactic acid in the cream is desirable, because the lactic acid bacteria, if present in large numbers, prevent the undesirable off flavours and taints from developing.

Small quantities of cream are more difficult to hold in a satisfactory condition than larger quantities, and, consequently, the dairy farmer should keep his supply in as large a bulk as possible.

Objections to blending have been raised by some dairy farmers, who claim that if the cream from each milking is kept separate only portion of the supply will be graded second-grade when sent to the factory. To this objection, however, it might be stated that the aim of dairy farmers to-day is, or should be, to have all and not merely part of their cream of the highest "choice" quality.

To blend correctly the cream from each separation is first cooled for about an hour before adding to the bulk supply, which should always be kept as cool as possible.

If the use of the cooler and aerator has been effective the cream should then be ready for blending—the farmer must satisfy himself, however, in all cases that the cream is sufficiently cooled before attempting to add it to the bulk.

Thorough and frequent stirring with a metal stirrer is necessary for correct blending.

If two or more cans are to be sent to the factory, approximately equal portions of the cooled cream from each separation should be placed in each can. This will ensure that a standard cream is supplied.

—*E. B. Rice.*

CLOVERS ON THE COAST.

A marked increase in milk production in late winter and spring when white clover is plentiful in the pastures is a common experience in coastal dairying districts. Unfortunately, it is not every year that weather conditions are favourable for the development of a good growth of clover in unimproved paspalum pastures.

Generally, the requirements of clovers are a fertile and not too acid soil and a fair supply of soil moisture. Where white clover is naturally abundant in paspalum pastures it may be taken for granted that its requirements are supplied, but it is true that the production of thousands of acres of paspalum pasture could be improved by the encouragement of clover growth.

Soils which are distinctly acid can only be made suitable for clover growth by the use of lime. If the fertility of the soil has been lowered by many years of grazing, it is advisable either to renovate with the plough or paspalum renovator and top-dress with fertilizers. On suitable areas it may be preferable to plough out the pasture and grow a green manure or some other form of crop prior to resowing the area with a mixture of grass and clover seeds. Renovation and green-manuring practices, in addition to increasing soil fertility, also tend to increase the water-retaining properties of the soil.

In all cases where pasture has been renovated, or where new permanent pastures are to be sown, it is advisable to add clover seed to the pasture. The clovers which have proven themselves of outstanding usefulness for incorporation in permanent pastures are white clover and red clover, and both should be included in permanent pasture sowings on the sub-tropical coast. White clover provides good grazing from about August until November, while red clover makes the bulk of its growth from September till March. Compared with white clover red clover is a short-lived plant, and dies out in a pasture within two or three years. It is of great use, however, in providing feed during the first year while the white clover is establishing itself.

When sowing on renovated paspalum or in new pasture mixtures about 1 lb. per acre of each of the clovers should be used. New Zealand strains of white clover are superior to European or local strains of which commercial seed is available; the best seed to use is New Zealand Government-certified white clover seed. New Zealand strains of red clover also are preferable to other commercial types.

—C. W. Winters, B.Sc.Agr.

Charcoal for Pigs.

DIGESTIVE efficiency in farm animals depends largely on their ability to grind their food well. Thorough mastication is therefore linked with ease of digestion. Some animals may eat food rapidly without ill-effects. Thus the domestic fowl swallows quickly, but it has a remarkable mechanism in the gizzard for grinding the food to a fine state for subsequent digestion and absorption.

The pig is not so well equipped as the fowl to handle rapidly-eaten food, yet under most farm conditions fast eating is the rule. The pig can be helped to make better use of its foods in the following ways:—

(i.) By feeding easily digested material;

(ii.) By grinding the less digestible foods;

(iii.) By ensuring the animals sufficient feeding room;

(iv.) By arranging for some open grazing where the animals may eat at their leisure;

(v.) By feeding aids to digestion.

It is the last with which this note is concerned.

Charcoal and coke are extraordinarily cellular in structure and possess a great number of surfaces. At these surfaces rapid digestion of food can take place. By feeding either of them in powdered form, coarse lumps of food become coated with a film possessing an actively digesting surface.

An alternative and cheaper method is to throw coarse charcoal or coke into the pig sty and let the animals grind and eat as they feel inclined.

REGISTRATION OF HATCHERIES.

Following is a list of persons who have applied for registration of their hatcheries under the provisions of "*The Diseases in Poultry Acts, 1923 to 1937.*" The list has been compiled up to and including 21st March, 1938 :—

Name.	Name of Hatchery.	Breeds Kept.
G. Adler, Tinana	Nevertire ..	White Leghorns, Australorps, White Wyandottes, Rhode Island Reds
F. J. Akers, Eight Mile Plains ..	Elmsdale ..	White Leghorns and Australorps
N. Cooper, Zillmere road, Zillmere	Graceville ..	White Leghorns
R. B. Corbett, Woombye ..	Labrena ..	White Leghorns and Australorps
Mrs. G. Crawford, Stratford, *via* Cairns	Rho-Isled ..	Rhode Island Reds
Rev. E. Eckhart, Head street, Laidley	Laidley ..	Australorps, Langshans, and White Leghorns
Elks and Sudlow, Beerwah ..	Woodlands ..	Australorps and White Leghorns
Gisler Bros., Wynnum	Gilser Bros. ..	White Leghorns
F. J. Lambert, Acacia Vale, Townsville	Lambert's ..	Australorps and White Leghorns
A. Malvine, junr., The Gap, Ashgrove	Alva	White Leghorns and Australorps
W. J. Martin, Pullenvale ..	Pennington ..	Australorps, White Leghorns, and Black Leghorns
J. A. Miller, Charters Towers ..	Hillview ..	White Leghorns
F. S. Morrison, Kenmore, *via* Indooroopilly	Dunglass ..	Australorps, Brown Leghorns, and White Leghorns
F. J. Mottram, Ibis avenue, Deagon	Kenwood ..	White Leghorns
J. McCulloch, White's road, Manly	Hinde's Stud Poultry Farm ..	White Leghorns, Brown Leghorns, and Australorps
E. K. Pennefather, Oxley Central		Australorps and White Leghorns
G. Pitt, Box 132, Bundaberg ..	Pitt's Poultry Breeding Farm	White Leghorns, Australorps, Langshans, White Wyandottes Sussex, Rhode Island Reds, and Brown Leghorns
E. E. Smith, Beerwah	Endcliffe ..	Australorps and White Leghorns
T. Smith, Isis Junction	Fairview ..	White Leghorns and Langshans
H. A. Springall, Progress street, Tingalpa	Springfield ..	White Leghorns
W. J. B. Tonkin, Parkhurst, North Rockhampton	Tonkin's ..	White Leghorns and Australorps
T. Westerman, Handford road, Zillmere	Zillmere ..	White Leghorns and Australorps
R. H. Young, Box 18, P.O., Babinda	Reg. Young's ..	White Leghorns, Brown Leghorns, and Australorps

Worms in Poultry.

F. H. S. ROBERTS, D.Sc., Animal Health Station, Yeerongpilly.

MANY young birds will now be commencing their first season of production. During the rearing of these birds diseases such as coccidiosis, pullorum disease, and roup will have taken their toll. These diseases are spectacular in their onset, and the symptoms manifested and the mortalities experienced have compelled the poultry farmer to undertake control measures in order to minimise his losses as much as possible.

In many instances, however, worm infestation has been overlooked. The effects of worm infestation are usually insidious in nature, and being accumulative do not attract attention until the birds are seriously affected. Such effects include failure to make normal growth and even loss of weight, loss of appetite and activity, dull, ruffled plumage, and a paleness of the comb and shanks. The mortality, especially among young birds, may be serious. More important, still, young pullets, while maintaining a ravenous appetite and being apparently in fair health, may not be producing their normal quota of eggs.

Of the various worms which infest poultry one of the most important is the large roundworm, which grows up to 4 or 5 inches in length, and is found in the intestine. Where the farmer pays careful attention to sanitation and cleanliness, this and other worms rarely become dangerous by the regular removal of droppings and the adoption of other measures which promote cleanliness, the source of infestation is removed. Prevention of infestation is most important in the control of parasitic worms. There are, however, certain drugs which may be employed to remove the worms from the birds, and if treatment is employed regularly the infestation should be of no great importance. Treatment of poultry for worms may be undertaken either by mixing certain drugs with the mash (flock treatment), or else by giving the drug to each individual bird (individual treatment).

Flock Treatment.—Flock treatment can be applied with success only when the birds are kept under intensive or semi-intensive conditions. The procedure is to mix nicotine sulphate with the mash at the rate of ·5 cubic centimetre of nicotine sulphate for every 1 lb. of dry mash. The amount of nicotine sulphate required is incorporated with just sufficient water so that when mixed the mash is flaky. About 1 part of nicotine sulphate to 400 parts of water is usually adequate. The mixing should be thorough so that no lumps remain. This treated mash is mixed fresh daily and fed continuously for four days.

Individual Treatment.—The best drug to use for individual treatment is carbon tetrachloride. This may be given in capsules or by means of a syringe and rubber tubing. The birds are starved overnight and treated next morning. They may be fed immediately after treatment. The doses range from ·5 cubic centimetres to 2 cubic centimetres, depending on the size of the bird. If the syringe is used great care must be taken to avoid delivering the drug into the windpipe, which would cause instant death. Before undertaking this treatment farmers should apply to the Animal Health Station, Yeerongpilly, for further details.

MARKING EARLY LAYING PULLETS.

The marking of early laying pullets provides a practical method of selection where the trap nest is not used.

Records obtained by trap nesting in various parts of the world show that—

(1) Early laying pullets are, as a rule, the highest producers;

(2) Birds that lay late into the autumn and are late in moulting are also high producers.

As the early layers and late moulters are high producers, a marking system will assist in distinguishing between profitable and unprofitable fowls.

In one convenient system of marking a coloured leg band is placed on the left shank of all pullets which start to lay before six months of age. A band of another colour is attached to the left shank of pullets starting to lay when six and seven months of age, and a third coloured band is used for fowls which commence to lay in the eighth month. Pullets that do not lay until after the eighth month should be culled from the flock, or kept in a pen by themselves, and forced for egg production.

Pullets which are early layers show the following characteristics:—

(1) A large red comb;

(2) An active disposition and a ravenous appetite;

(3) Roominess between the keel and pelvic bones;

(4) An occasional disappearance of the yellow colouration round the vent in some yellow shanked varieties.

In small flocks individuals showing the abovementioned characteristics may be caught in the nests and then marked.

During the following season all fowls which were marked as late maturing the previous autumn and moult in December, January, and February may be culled. All the early laying birds and those that moult after 1st March may be kept for layers or placed in a special breeding pen and mated to a male known to have come from a high-laying hen that has been trap nested. In this way the egg production of the offspring may be raised.

The method outlined provides a simple method of selection which will, properly used, raise the level of production in a flock.

—P. Rumball.

AUTUMN HATCHING.

The term autumn hatching is usually applied to incubation practised during February, March, and April.

Many poultry raisers may be considering the advisability of autumn hatching during the coming year because of the shortage in the number of chickens raised during the past hatching season. Before adopting this practice, consideration should be given to the financial returns that may be expected from autumn hatched stock.

Most of our commercial breeds reach maturity within six months; consequently chickens hatched during the autumn come into production during August, September, or October. Egg prices at this period of the year are usually around about 1s. per dozen, gross, for first-quality eggs. Pullets, however, do not produce a first-grade egg with respect to size, and there is a tendency for autumn-hatched chickens to lay eggs of a smaller size than if the birds were hatched during the winter and spring of the year. Consequently, the demand for autumn-hatched stock during the glut period will not equal that for stock hatched in the usual season. In addition, during that period of the year when eggs vary in value from 1s. to 1s. 9d. per dozen, autumn-hatched stock will be growing and not producing.

It may be claimed that the autumn-hatched stock will produce eggs in plenty during late summer when egg values are fairly high, the birds moulting late. This cannot be depended upon, for many moult at the usual period.

With the relatively good prices for table poultry—and it is reasonable to assume that good prices will be obtainable for table poultry during the winter of 1938—some justification may exist for the raising of birds that are for table purposes only. This, however, is dependent on the value of fodders. In experiments at the Animal Health Station, it has been ascertained that the following quantities of fodder are required to raise cockerels to the various stages of development:—

Age.	White Leghorns.		Australorps.		Light Sussex.	
	Bird's Weight in Oz.	Food Consumption for Period in Oz.	Bird's Weight in Oz.	Food Consumption for Period in Oz.	Bird's Weight in Oz.	Food Consumption for Period in Oz.
Day-old ..	1·3	..	1·36	..	1·23	..
3 weeks ..	5·31	9·80	5·84	9·9	6·59	10·17
6 weeks ..	12·92	32·8	15·86	34·61	17·03	30·34
8 weeks ..	21·4	54·74	27·5	63·61	27·2	62·74
12 weeks ..	34·7	116·92	49·1	140·39	47·3	144·84
16 weeks ..	47·8	180·02	72·4	226·49	70·4	245·84
18 weeks ..	51·1	215·86	85·0	277·88	83·6	288·94
21 weeks ..	..	..	98 7	358·83	96·8	403·54

The poultry raiser who contemplates hatching poultry for table purposes during autumn should carefully consider the prospects of profitable engagement in this business by calculating the costs from this table, having due regard for the market value of fodder.

THE PURCHASE OF POULTRY.

At this time of the year the upward trend of egg values tempts many beginners, and also persons who keep a few fowls, to increase their income from poultry by purchasing pullets or hens. The idea is fairly sound, but there are numerous pitfalls for the inexperienced buyer.

Assuming that the beginner sets out to buy pullets about four or five months old, it is only natural to expect that the quoted price will have an important bearing on the transaction. For instance, if pullets four to five months old are obtainable from one source at 6s. per pair, and from another at 10s. per pair, the cheaper lot may be bought.

The inexperienced buyer seldom appreciates the necessity for paying the higher price, as the birds are of the same age and breed. It should be borne in mind, however, that there is usually a definite reason for the difference in the price, and that difference can be summed up in one word —quality. The cheaper birds may be culled from flocks, as the result of their being backward or stunted in growth. Such birds cannot be expected to commence egg-laying at the normal time and be profitable. As they are culls as pullets, it is unwise to breed from any of them. They cannot return a profit, irrespective of the purpose for which they are used.

After allowing for feeding costs and a slight increase in egg values, it is unlikely that the more expensive birds will show any profit during their pullet year. It is quite probable, however, that they will repay their purchase price. At the same time, many of these birds should make suitable breeders, and their use for this purpose would be profitable.

Much the same situation applies in the case of hens. Cheap hens are usually unsuitable as breeders, whereas many breeding birds may be selected from the more expensive birds. The purchase of old hens is not good business, apart from their value as future breeders. Again, while the beginner may be able to distinguish a pullet before it begins laying, once production starts it is more difficult to separate hens which have just completed a moult and pullets which have been laying for a few weeks. It is also very difficult to distinguish between a hen that is fifteen months old and one four years old. This means that in buying alleged first-year hens the birds could be any age above that mentioned.

In such circumstances, it is advisable for the prospective buyer to inspect the flock from which it is proposed to make the purchase before parting with his money.

—*J. J. McLachlan.*

Harvesting Cotton.

R. W. PETERS, Cotton Experimentalist.

THE methods adopted in picking cotton have a decided effect on the quality of the lint produced, for excessive cleaning during the process of ginning both damages the fibres and adds to the expense of spinning yarn of high quality. The harvesting of cotton, therefore, should be carefully carried out.

Picking should be commenced as soon as sufficient bolls are open to allow a moderate daily tally being obtained. Cotton should not be picked when it is either wet or green, the latter term describing fibres that have not dried out thoroughly following the opening of the boll.

Wet cotton is difficult to gin, for the fibres tend to stick to the saws, which either cut them or twist them into a ropy state. It is also difficult to clean leaf and trash from either wet or damp cotton. In most seasons in Queensland, no difficulty should be experienced with wet cotton, for the usual climatic conditions are suitable for the harvesting of dry cotton after the dew has dried. Where picking is done while the dew is still on the crop, the wet cotton should be spread out in the sun during the forenoon, after which it can be baled with the rest of the picking for the day.

With the present efficient ginning machinery it is not necessary to have the cotton as nearly "snow white" as formerly in order to obtain the best grades. This is very helpful where the farmer and his family pick the crop, and it is suggested in such cases that it would be better to pick the cotton slightly less cleanly and thereby faster, for not only could greater tallies be obtained in the harvesting period, but larger acreages could be grown and still harvested without employing outside labour.

Early picked cotton may contain a fair amount of big leaf and still yield lint of high grade, for the cleaning machinery removes the big leaf without breaking it to any great extent. It is a mistake, therefore, to try and exclude leaf by very careful picking, or, worse still, to break up large leaf by rolling the cotton between the hands. Small pieces of leaf are difficult to remove during ginning, and seed cotton containing fine pieces of leaf—or "pepper" leaf as it is termed—is graded lower

than cotton with only big leaf. Hence grades usually drop off after heavy frosts—the dead leaves and bracts are so brittle that they break into small pieces when picked with the cotton. While modern cleaning machinery eliminates most of this leaf, the remainder is sufficient to necessitate lower grading than if the leaf was large and not brittle.

Grass and weed seeds, especially spear grass seed, are particularly difficult to remove from cotton lint, and every effort should be made to clean the fields at the last cultivation so that no seed will be produced. On old cultivations, even where good farming practices have been followed, there is always danger of tall-growing weeds setting seed late in the season, and it pays to chop them out before the harvesting commences, especially if pickers are employed.

Cotton ready for picking should not be exposed too long to the weather. When the bolls first open, the lint has a rich colour or "bloom," and this "bloom" is essential for the higher grades of the regular universal standards. Cotton which is left unpicked for several weeks loses its "bloom" through bleaching caused by wetting by dews and the subsequent drying by the sun. The colour changes to a chalky dead white and the lustre of the fibres is destroyed. The effect of rain on cotton is particularly severe—the colour changes to a dull greyish or light bluish tinge during rains which last several days. Cotton should not be picked for several days after rain, for the bleaching action of the dews and sun greatly improves the colour, while the wind and heat of the sun fluff out the fibres from the matted condition caused by the rain.

Winds have a detrimental effect on a well-opened crop, for the locks tend to hang out of the bolls in a long, stringy condition. The cotton not only dries out excessively, but the fibre quality suffers, and the cotton is difficult to gin properly owing to a considerable proportion of the locks being in a twisted rope-like condition. Cotton left exposed to windy weather also usually gathers up bits of broken bracts and leaves. In addition to these disadvantages, some of the cotton is shed during heavy storms.

Where the harvesting is done by the grower and his family, it will usually pay to make several pickings in a good crop. Where labour is employed to harvest the crop, sufficient bolls should be open to allow the picker to make a reasonable tally, otherwise the cost of picking will be high. In these circumstances, one good picking followed by a clean-up is sufficient in fields of light to medium yield. With good crops, two or more pickings and a clean-up may be necessary. The grower should be guided by the conditions as they exist. Sometimes it is more profitable to allow a heavy picking to open and thus get it picked cheaper than if a lighter picking were made.

FARM MACHINERY CREATES JOBS.

It has been amply demonstrated over and over again that labour-saving devices set us free from hard labour, and long hours. The argument that labour-saving machinery throws men out of work has been generally disproved. With farming, there is direct proof that modern machinery creates jobs instead of destroying them. Modern farm machinery will pay for itself in more and faster and better work. Its construction gives work to the miner, mechanic, and distributor who, after all, constitute a large proportion of the farmers' home market.

Packing and Consigning Cotton.

R. W. PETERS, Cotton Experimentalist.

BECAUSE of the distance of the cotton fields from the ginneries in Queensland, the crop is forwarded by train either in bags or wool packs containing around 80 to 100 lb. and 500 lb. of seed cotton respectively. The growers of small acreages generally use second-hand corn or chaff bags, while those with more than 5 or 6 acres usually purchase once-used wool packs for their crop. It is cheaper to use the wool packs, for they are returned to the grower on payment of a small fee, which covers the cost of freight and heating to kill the pink boll worm or any cotton pests in them.

Before filling, the container should be cleaned carefully to remove everything that might affect the grade of the cotton. Wool packs which have had cotton in them should be especially cleaned in order to protect the purity of seed. Undoubtedly, much contamination of pure seed varieties can be brought about by seed cotton sticking in the corners of bales or becoming attached to strands of the sewing along the edges.

When packing a container, every care should be taken to have only the one grade and staple of cotton in it. A bale of lint is sold on the basis that it contains cotton of uniform grade and staple length. If there is any variation in the contents, it is purchased on the basis of the lowest grade and shortest staple contained. Growers should always try to obtain uniformity of contents in the bale of lint.

Many large growers allow the pickers to empty the contents of the picking sacks directly into the wool packs, and because of the variable efficiency of the pickers, layers of different grades may be found in the one pack. The cotton in each picking bag should be roughly classed by the grower and an endeavour made to segregate the different grades into separate wool packs. The grading at the ginneries can then be done more quickly, as it will be unnecessary for the grader to stop and estimate the true value of a wool pack containing different grades of seed cotton. In addition, more uniform cotton is fed to the gins, thus enabling the production of bales of lint containing only one grade in each. Usually two or three grades are ample, for, with the exception of droughty spots or places of rank growth, the quality of the crop over a field, if picked in a short time, is more or less the same. By using separate bales for good cotton, leafy cotton, and cotton which is insect-stained or from drought-affected plants, a grower will not only obtain the full value of his crop, but will facilitate operations at the ginnery.

Every grower has a registered number, and he should include this with his initials and railway station in a brand for identifying each container sent to the ginnery. The brand should be placed in a conspicuous place on the side of the container in black that will not rub or wash off. Each season some wool packs are received at the ginnery which have no identification marks, or with brands so indistinct as to be illegible; and it is only through checking up the advice notes which a grower despatches to the Cotton Board when consigning his cotton that the ownership can be established. This slows up the work at the ginnery and should not occur, for it is a simple matter to brand the cotton correctly.

It is necessary to know the variety of seed cotton in each container received at the ginnery, in order to determine the estimated percentage of lint contained in it. This information is required because the grower is paid on the basis of the amount of lint he forwards and the grade and staple thereof. Where a grower has only one variety no label is necessary, as this fact is recorded at the ginnery, but in the case of more than one variety tags for each should be used. When more than one variety is grown on a farm great care must be exercised to prevent the mixture or loss of identity of the varieties, and each container should be carefully labelled with the proper tag for the variety it contains. The label should be sewn on in the usual cross diamond method, which protects it from being torn off.

SEED MAIZE SELECTION.

As like tends to beget like, the necessity of selecting seed from ears of desired type and known parentage is obvious. Some farmers, however, do not realise the importance of this, and are satisfied to sow seed of any breeding, provided the grain is sound and germinates readily. Uniform tasselling and maturity cannot be expected from such seed. When times of tasselling do not coincide, there is poor fertilization of late-maturing plants and reduced yields follow.

The general improvement of a crop and the rapid elimination of undesirable characters can only be brought about by a regular process of seed selection. Isolation of the growing crop is necessary to ensure that cross-fertilization with maize in neighbouring fields does not occur. This is all the more important because wind and insects frequently carry pollen over long distances. Where isolation is not possible, sowings may be arranged so that tasselling times do not coincide.

It has been proved beyond doubt that locally-grown seed is more suitable for planting than comparable supplies of the same variety secured from outside sources. Farmers should, therefore, endeavour to improve their own seed by rigorous selection from year to year—provided, of course, the variety grown is continuing to give satisfaction—rather than buy seed annually, which cannot always be guaranteed as to its type and purity.

Seed selection may be carried out by the grower in both the field and barn.

Field selection is the better way, and it can be done conveniently when the corn is being pulled. More essential characters can be taken into consideration during field selection than are possible in the barn, where characters in the cob are alone considered. In the most rigid field selection the characteristics of only one parent can be determined, but even so seed selected from plants showing the following characteristics should give the best possible crop in the coming season:—

(1) The crop should have matured naturally, be thoroughly dry, and free from disease.

(2) Ears, when compared with the stalk, should be comparatively large and selected from those plants remaining upright.

(3) One good single ear to a plant is better than two mediocre ones, but where possible select from a plant with two good ears.

(4) Position of the ear on the stalk is important, for if too high from the ground harvesting is difficult and the risk of lodging is greater. If too low there is a danger of loss through weed overgrowth and also slow drying out in showery weather.

(5) Most varieties sucker to a greater or lesser extent, but the smaller the sucker development the better the plant.

(6) The ears should be firmly attached to the stalk and droop when ripe. The point of the cob should be well covered by the husk as a protection against insects and weather.

(7) The cob itself should be of moderate size, both in length and thickness, cylindrical (not tapered) in shape, having a well-filled butt and tip, yielding when threshed a high percentage of grain. Such cobs are much heavier than the average.

(8) The grain itself should be typical of the variety, uniform in depth and shape, and tight on the cob in regular straight rows.

Of all the characteristics in the grain, the farmer can least afford to overlook mixed colour, for maize showing this defect sells at a disadvantage if the crop is sold in the open market.

SOWING OF WINTER PASTURES.

Many farmers are now preparing land for sowing winter pastures to provide grazing during winter and spring. The sowing of winter pastures should be done during late March or in April. Later sowings will be successful only if exceptionally good seasonal conditions are experienced subsequent to sowing. Annual winter pastures, which are being sown for the sole purpose of providing feed during the present year, must go in early if a long grazing season is to be obtained.

If through dry weather, or some other circumstances, the preparation of land intended for winter pastures has not been done thoroughly, and a fine seed-bed is not available, the sowing of permanent winter pastures is not recommended. Instead, an annual pasture should be laid down, and after the land has been ploughed in the summer the area should be well worked for autumn sowing with a permanent pasture mixture in 1939.

Winter pastures should be sown only on land of at least fairly good fertility. If success is to be achieved with valuable grasses—such as *Phalaris tuberosa,* perennial ryegrass, Italian ryegrass, and prairie grass—it is essential that the soil should be of good quality. Land not quite up to first-class standard may support Wimmera ryegrass and cocksfoot pastures, but infertile and roughly prepared land cannot be expected to maintain a good winter pasture. Cultivation areas which have been "cropped out" should not be put straight down to winter pasture, as is often done, but should have their lost fertility restored to some extent by green manuring.

The winter-growing pasture plants available for use include perennial species—such as *Phalaris tuberosa,* perennial ryegrass, cocksfoot, red clover, white clover, and lucerne, and annual species, including

Italian ryegrass, Wimmera ryegrass, prairie ryegrass, and Berseem clover. Not all of these plants are, of course, suited to all districts, but recommendations regarding suitable mixtures for most localities in the southern dairying and agricultural districts are available on application to the Department of Agriculture and Stock.

—C. W. Winders, B.Sc.Agr.

CATERPILLARS ON LAWNS AND GRASSLANDS.

In most districts in and about the Brisbane City area, grass-feeding caterpillars are at present infesting both lawns and pastures. Brown patches, sometimes quite extensive in area, are very noticeable, and on examination caterpillars of various sizes up to 1½ inches in length may be found sheltering among the grass stalks or low down in the turf. The caterpillars are the progeny of greyish-brown moths, often seen around the lamps at night. The caterpillars feed on the leaf-blade and, while the grass is not permanently injured, the appearance of a lawn is spoilt for the time being and the grazing value of pastures may be seriously reduced. More than one insect is involved, but the information given here has sufficiently general application. Various types of parasitic wasps are taking toll of the caterpillars, but it is advisable to supplement their work by applying suitable control measures.

A convenient bait may be made up in the following manner:— Thoroughly mix 1 oz. Paris green or arsenate of lead into 1½ lb. dry bran. Dissolve 4 oz. molasses, treacle, or honey in 1 pint water. Then pour the sweet fluid over the poisoned bran and mix the whole to a uniformly moist loose mash. The mixing would be conveniently done in an old bucket or circular wash-tub.

The freshly mixed bait should be distributed preferably in the late afternoon, as the caterpillars shelter mainly by day and feed over the surface of the ground by night. The bait should be scattered very thinly by hand by vigorous broadcast throws. Correctly mixed loose bait will scatter and fall to the ground as individual flakes. The quantities given provide sufficient bait for the treatment of about 150 square yards.

Precautions should be taken to ensure that children and pets do not have access to the poison or to the mixed bait or mixing tins, and poultry should not be allowed on the baited ground. Any vessels used should subsequently be thoroughly washed out. The thorough use of a nail brush in washing the hands immediately after the bait has been handled will be the final precaution required.

If extensive areas need to be treated, the following larger quantities might be mixed:— 1 lb. Paris green, 25 lb. bran, 4 lb. molasses, 2 gallons water. These materials would make up sufficient bait for the treatment of about ½ acre. However, any dairyman who intends carrying out baiting work on a grazing area should obtain further information from the Entomological Section, Department of Agriculture and Stock.

—J. A. Weddell.

PREPARATION OF WHEAT LAND.

Widely distributed rains since December have enabled farmers to go on with the preparation of wheat lands. Fields ploughed during December will now be in good physical condition, provided weed growth has been controlled by judicious cultivation.

Where sheep have access to the fallowed areas weeds will not be troublesome, but elsewhere every effort should be directed towards the eradication of all such growths. If it has been possible to control weed growth, all workings following the initial ploughing can be done entirely with rigid tine cultivators, or spring-tooth implements, and with harrows. Cultivation to the desired depth in order to break the crust and form a good surface mulch should be done soon after all substantial rains. As a firm seed-bed is required, it is important to progressively reduce the depth of working towards seeding time, particularly where sheep are not available to assist in consolidation.

Well-prepared land containing ample reserves of moisture is often fit for sowing at a seasonable period, according to the variety selected, independently of favourable rains. On the other hand, hurriedly prepared land may have to await later rains to effect germination—a great disadvantage, for early or seasonably sown crops invariably give the best average returns.

The wheat yield for the 1937 season exceeded the average annual return for the previous decade, despite somewhat adverse seasonal conditions, a fact which can be attributed largely to the increased attention being given to the thorough preparation of the land. The growers who consistently practise summer fallowing have been amply rewarded for their efforts during recent years when winter and spring rains have been under average, a fact which cannot have escaped the attention of neighbouring farmers.

Where wild oats and other weeds are assuming pest proportions, it is suggested that the land be sown to a good fodder oat, which can be grazed as required, ploughing in the residue in sufficient time to prevent the maturity of wild oat seed.

Weed infestation during the following year can thus be greatly reduced, besides providing valuable feed, and a rotation crop of benefit to the land.

—R. E. Soutter.

ESTABLISHING LUCERNE.

Lucerne is grown for hay purposes chiefly in warm districts on deep calcareous soils provided with abundant moisture. In such situations heavy crops are produced over a number of years. Within recent years the cultivation of lucerne has been extended into fairly dry districts, but most success may be expected on soils rich in lime and with ample moisture available to the plants.

Land intended for lucerne is best cropped with a cereal—such as wheat, oats, barley, or rye—or panicums and millets—prior to its preparation for lucerne. Stubbles should be cultivated to induce volunteer growths of weeds and other seeds; these should be turned in subsequently by ploughing. For a first cultivation, two deep ploughings

should be given at right angles to each other. Moisture should be conserved by frequent cultivation. In dry districts, where a good rainfall cannot always be depended upon at seeding time, fallowing is particularly necessary for the purpose of conserving moisture. The land may therefore be ploughed in late autumn or early winter the year before it is intended to sow. The depth of the ploughing is governed by the character of the soil. Alluvial soils should be ploughed to a depth of about 7 inches, but on other classes of soil of lighter or more porous nature a depth of 4 to 5 inches is sufficient. The ploughed land should then be allowed to lie in the rough state for a month or so and be broken down with harrows after summer rains. During summer the land should be frequently worked with harrows or cultivators, so as to allow neither growth of weeds nor the formation of a hard crust on top. If the seed-bed cannot be worked down sufficiently fine with the harrows, a one-way disc cultivator or roller will do all that is necessary. If the land is rolled, it should be harrowed immediately after the rolling. Where the soil surface shows a tendency to dry out just prior to sowing, a light ploughing may be given and followed by the harrows. Sowing on top of the harrowed surface, followed either by a light rolling or by brush-harrowing, is a good practice—but if rolling is adopted, a set of light harrows should be used immediately afterwards. Rolling assists in bringing the soil particles in closer contact with the seed and works in the same manner as compressing a partly dried-out sponge.

Lucerne is best sown in April or May, the young plants then being sufficiently well established before the onset of cold weather to enable them to survive. Provided the seed is drilled in, a sowing rate of 12 to 14 lb. per acre is ample, and often too much, in the best lucerne-growing districts. If hand broadcasting is practised, slightly more seed should be used. The rate of seeding should be lighter in dry districts, and for grazing purposes a seeding of as low as 2 lb. per acre is permissible. Seed sown on the surface should be covered by means of a light harrowing.

Though fertilizers are not used to any considerable extent in the main lucerne-growing areas, many growers have obtained payable results by applying up to 1½ cwt. of superphosphate per acre, either drilled in with the seed or used as a top-dressing. Nitrogenous fertilizers appear unnecessary.

Fully a month or six weeks will pass before the young root system becomes established and the lucerne is fit for its preliminary cutting by the mower. An early mowing before the young lucerne flowers acts as a pruning and stimulates the root growth. After the preliminary cutting, a light harrowing may be made if absolutely necessary because of foreign growths.

Often promising stands of lucerne, following good germination, are destroyed through cutworm attacks. Damage at this time is irreparable, for the blank spaces are filled with weeds which considerably lessen the value of the crop. The Paris green-bran cutworm bait broadcast at the rate of 30 lb. per acre gives effective control, provided it is distributed as soon as the depredations of the pest become apparent. The necessary materials should therefore be held in stock on the farm for emergency. Cutworms attack only very young lucerne, and intelligently applied bating is then quite safe. Bait distribution in established crops is undesirable on account of the possible risk of stock poisoning.

Wetting, Spreading, and Sticking Properties of Insecticidal Spray Fluids.

THE successful application of insecticidal sprays depends on their ability to destroy the insect, without harmful effects on the treated plant, at a cost that can be borne by the product to be marketed.

Success in spraying is, therefore, in large measure dependent on the ability of the operator to obtain a maximum degree of efficiency with a minimum expenditure of spray fluid. This desirable objective will be achieved only when the sprayed surface of the plant or insect is thoroughly, intimately, and evenly covered with a thin film of the spray fluid. In addition the toxic element of the spray should remain on the sprayed surface for a sufficient period of time to achieve the objective for which it was applied.

Some spray fluids do not in themselves possess satisfactory wetting and spreading properties, no matter what plant they are applied to, while such plants as the cabbage and such insects as mealy bugs present decided difficulties in spray application.

Where it has been found impracticable to obtain the desired degree of efficiency in the application of the spray fluid it has become the practice to add supplementary substances known as spreaders and stickers.

The power of a supplementary substance to wet a surface may depend on its ability to produce chemical changes therein, e.g., a solvent effect may be produced on the waxy coating of the cabbage leaf or mealy bug. Its wetting power, however, may be dependent on a physical interaction between the spray fluid and the sprayed surface. Whatever be the case, one objective of the supplementary substance is to ensure thorough wetting, i.e., intimate contact between the spray fluid and the sprayed surface.

A further essential in the supplementary substance is its ability to ensure that the sprayed surface is completely covered with a film of spray fluid. The achievement of such an objective means that the spray fluid will not become aggregated in droplets, a development which would leave much of the surface unprotected or many of the insects untreated.

Wetting and spreading are not just one and the same thing, but a single supplementary substance may frequently produce both effects in a spray fluid that is deficient in wetting and spreading properties, and it is generally referred to as a spreader. Soap, saponin, gelatine, and calcium caseinate have been used as spreaders, but before adding a spreader to a spray the operator should satisfy himself that the addition can be made without reducing the toxicity of the spray or rendering the spray fluid more liable to injure the sprayed plants, e.g., soap could not be used as a spreader for arsenate of lead.

Recently a number of proprietary spreaders have been placed on the market by reputable firms backed by the claim that they are "compatible with practically every spraying fluid."

Stickers, as their name suggests, are supplementary substances, the addition of which to the spray fluid increases the ability of the toxic substance to adhere to the sprayed surface. Actually, the spreader added to a spray fluid functions also as a sticker.

REWORKING DRONE CITRUS TREES.

In orchards where undesirable types of citrus trees have been cut back for reworking, the final thinning of shoots not required for budding into may be done. Where necessary, the trunks and limbs should be re-whitewashed to continue protection from sunburn. In districts where the growth of new shoots is sufficiently advanced (they should have attained a diameter of some ⅜ inch at the base), and providing that the sap is flowing freely, they may be budded.

When the shoots are ready to receive the bud, a perpendicular cut is made in the bark at or near the base. The cut should be from 1 to 1½ inches in length, and in depth through to the cambium layer. Another cut is then made horizontally across the top of the perpendicular one, so that the two together form a T.

Budwood should be taken only from selected trees which are healthy and vigorous and noted for consistent production of heavy crops of quality fruit. Budwood should be well rounded, mature wood about the thickness of an ordinary lead pencil or slightly less, and not more than one year old. Before the buds are cut from the budstick, the leaves are trimmed off so that a piece of the leaf stalk or petiole is left in each case. By this means the bud can be more easily handled after cutting.

The bud may be cut off the stick either from above or below, but the general practice is to cut from below the bud upwards, commencing about half an inch below and ending about half an inch above. The cut must be made with a sharp, thin-bladed knife, and be just deep enough to remove a very thin layer of wood. In the absence of thorns, the wood may be carefully removed from behind the bud, care being taken not to damage the bud.

The bud is then inserted down and under the bark of the stock by raising the latter with the budding knife. In order to bring the bud and stock in close contact, they are bound tightly together with a raffia tie. In from two to three weeks the bud, if it remains green, will have taken—that is to say, united with the stock. The tie may then be cut and the head shortened back to force the sap into the bud. The stub may be utilised to support the shoot from the bud during its early growth, but when the shoot has made good growth and is strong enough to support itself the stub should be removed altogether.

—*R. L. Prest.*

LETTUCE GROWING.

Lettuce is one of the most popular vegetables, and with regular sowing and care in cultivation it may be grown the whole year round. In Queensland, the best times for planting are the late summer, autumn, and winter.

Lettuce is a vegetable that must be grown quickly to ensure crisp leaves. If a check is received during growth the leaves acquire a slightly bitter taste, which tends to decrease the market value of the plants. This defect is more prevalent during the late spring, early summer, and autumn plantings.

The soil should be well cultivated, and it is desirable that, where possible, large quantities of well-rotted farmyard manure be incorporated with the soil. Should fresh manure be used some time should elapse before planting.

Lettuce may be grown in a seed-bed and transplanted into rows, allowing 12 inches between the plants. The seed may also be sown directly into the row and the plants later thinned out to the required distance.

Sow the seed thinly and cover lightly with fine soil, and then firm the ground gently.

During the growing period the soil around the plants must be kept cultivated, but care must be taken not to allow any soil to get on or into the hearts of the plants. Constant watering is essential, and the soil should never be allowed to dry out. Should the plants appear to be growing slowly an application of liquid manure would be beneficial, or, failing this, a top-dressing of nitrate of soda or sulphate of ammonia at the rate of 1 to 2 cwt. per acre. These fertilizers should be spread lightly over the ground, but under no circumstances on the plants.

Lettuce should be marketed as soon as possible after cutting, as they deteriorate in quality very quickly.

The cabbage type of lettuce is the popular one in Queensland, and should be cut for market as soon as possible after hearting. For home use they may be used earlier.

Popular varieties for planting are—

New York or Neapolitan.—A very large variety, best suited for planting in the cooler months.

Iceberg.—A large, good-hearting variety, with crinkled leaves and pink tips, suitable for planting in warm weather.

A pamphlet on packing of lettuce for market is obtainable free on application to the Department of Agriculture and Stock.

—*C. N. Morgan.*

Varieties of Apples and Pears.

H. St. J. PRATT, Senior Instructor in Fruit Culture.

IF intending planters of fruit trees in the Granite Belt have not already placed their orders for the coming season with reliable nurserymen they should do so without further delay. Early ordering ensures early delivery of the young trees.

As regards varieties to plant, the Granny Smith is likely to be the best commercial apple for many years to come. If reasonably well treated it will give a good crop every year.

Some growers are inclined to think that the market will be overloaded with Granny Smith apples when young trees already planted come into bearing. This is not likely to happen.

The Stanthorpe Granny Smith is equal to if not superior to any grown in the Commonwealth. The keeping qualities are good, and far more should be cool-stored than at present. Stanthorpe apple-growers should try to supply the requirements of their own State with Queensland-grown apples as long as possible by using the available cold-storage facilities.

If the Granny Smith crop in the Stanthorpe district were doubled, or even trebled, there should be no difficulty in marketing the fruit at existing or even enhanced prices.

In addition to the Granny Smith, which should be the main variety, Delicious, Lalla (Red Delicious), Winesap, and Red Statesman are good types.

Red Statesman and, in addition, Dougherty are eminently suitable for the late "private order" trade. Growers who specialise in this trade should cater for their customers over as long a period as is possible. Stocks are frequently exhausted long before they should or need be, and then supplies have to be drawn from elsewhere.

The Gravenstein is a good early dessert apple well worth growing. On account of its susceptibility to gnarl or twist it is advisable to grow a scaffold tree of another strong-growing variety, such as Delicious, and then rework with Gravenstein scions from selected trees free from the trouble.

Growers should be wary of planting new varieties of apples. Generally it is a good plan to plant only standard varieties and let someone else do the experimenting. Though new varieties may have good characteristics, they are seldom better than those already grown, and being unknown to the trade or the householder the fruit is viewed with suspicion and is difficult to market.

As regards pears, the best commercial varieties are Williams Bon Cretien, Packham's Triumph, and Beurre de Box—all are good growers and croppers.

The Winter Cole is a late-maturing variety which is popular in the other States. Stanthorpe growers should, however, limit their plantings of this variety on account of possible fruit-fly attacks at the end of the season.

TRANSPLANTING TOMATOES.

When tomatoes are transplanted during summer, considerable loss is often caused by the young plants "burning off" at ground level. This is particularly noticeable where the soil is fine or sandy.

A dull day should be chosen for transplanting, but if the area is large and transplanting cannot be postponed it should be done late in the day. Roll the stem of each plant in paper just before planting. This is best done by having a sufficient supply of papers cut to a suitable size—for the average size plant, about 4 inches by 1½ inches. The papers may be threaded on a string and suspended from the belt of the field worker for convenience in use. On taking a plant from the carrying-box or basket, the paper is snapped off the string and rolled round the stem of the plant—like rolling a cigarette—leaving only the top leaves and the root exposed. The plant may then be placed in the ground in the usual way. It will be found that after a little practice very little extra time will be required for this method of planting. Other advantages of this method are that the young plant does not readily droop, and soon becomes established. Where cutworms are troublesome, it also will give a good measure of control during the early stages of growth.

—*A. M. Richardson.*

PLANTING THE ORCHARD TREE.

In planting out orchard trees to ensure their being placed exactly in the position indicated by the marking pegs, a planting board will be found very useful, and is easily made. A board about 4 or 5 feet in length, 4 or 5 inches in width, and 1 inch thick, will serve the purpose readily. A "V" notch is cut in one side in the centre, and a similar notch at each end, and the board is ready for use.

The centre V is placed against the peg denoting the position of the tree, and pegs are driven in at the notches at both ends of the board. The board and tree peg are then removed, leaving the two pegs at the ends of the board in position. The hole to receive the tree is then dug. When ready to plant, the board is brought into use again, being fixed as before at the ordinary soil level between the two remaining pegs. The tree is placed in the hole at the centre V in the board, taking the position formerly occupied by the tree peg, and the soil filled in.

The planting board serves another purpose, in that it ensures planting the tree at the proper depth. The correct depth at which to plant the tree is the depth at which it was grown in the nursery; the mark can usually be distinguished on the tree. The union of the stock and scion is always a weak spot in a tree and liable to attack from fungus diseases; it should therefore be kept above the level of the soil. When using the planting board, the union, if kept level or slightly above the top of the board, will ensure the tree not being planted too deeply.

In digging the holes for the trees, the surface soil should be taken out and kept on one side, and the subsoil at the bottom of the holes should be finely broken up. Provided the orchard has been properly prepared, there is no need to dig deep holes; so long as they are large

enough to space the roots without cramping they will serve the purpose. A little top soil may be returned to form a small mound at the bottom of the hole. The roots, which should be carefully washed and trimmed, should be spaced as evenly as possible, and with a downward and outward slope of from 40 to 45 degrees. The spaces are filled with fine soil, and pressed firmly, water being applied and allowed to soak in before the hole is completely refilled with soil. Where there is a danger of the trees being scalded by the sun, they should be protected by cylinders of paper tied around the trunks.

The season for planting is determined by location and local circumstances. Where frosts are likely to occur, July or early August planting is preferable to autumn, but where there is no danger of frost injury autumn planting is satisfactory, as it enables the trees to obtain a root-hold before the winter, thereby materially assisting an early spring growth.

—R. L. Prest.

LABELLING THE EXPORT APPLE CASE.

With the export of fruit overseas now in full swing, close attention should be given to details in the general "get up" of fruit-labelling.

It is often found when inspecting fruit at the ship's side that labels have not been carefully pasted to the ends. If these are lost or torn, there is no means of identifying the owner or the trade description of the contents of the case.

Care in applying the labels is therefore necessary. A good paste is made as follows:—

Take 1 lb. flour, ½ oz. alum, and 1 pint water. Mix with a little cold water, then add boiling water until the paste thickens. If the resulting paste is too thin, it should be boiled slowly and a little more flour added with vigorous stirring until the consistency is right.

When applying the labels, they should first be soaked for a short time in clean water. The paste is then applied by using a broad brush first to the case end and then to the label. The pasted surfaces are applied to each other, the label and the case being pressed into close contact by rubbing the surface of the label with a damp rag.

The following points should be observed:—

Place the label squarely on the end of the case.

Use rubber stamps for filling in particulars of varieties, &c. Pencil or writing of any description is not permitted.

Apply the rubber stamp squarely in the spaces on the label.

It must not be forgotten that Queensland's overseas consignments compete with the world's best fruit on the United Kingdom and European markets. Quality fruit should not be handicapped by a faulty finish to the case.

—Jas. H. Gregory.

The Fruit Market.

JAS. H. GREGORY, Fruit Packing Instructor.

THE month of March has shown a more profitable tendency on the market by giving increased values for lines of regular fruits. The month closed with the best gift of all—rain. This should definitely consolidate the coming citrus, custard apple, banana, and other crops which had already begun to wilt. Most fruits have shown definite rises in value on all markets, papaws, tomatoes, bananas, and pineapples maintaining firm rates. Apples have not improved to any great extent on the low prices at the start of the season. A rise of from 1s. to 2s. has been noted for good lines. Stanthorpe pears have given trouble frequently. One still finds it hard to understand why growers persist in sending poor packs of fruit to market. Early new season's citrus is now appearing, some excellent grapefruit from Gayndah being noticed. Some of the imported Palestine grapefruit is still in the shops. What a tribute to its keeping quality and packing! The fruit is as good inside as it looks outside—excellent in flavour, thin skin, and full of juice, retailed at 6d. and 8d. a fruit. A comparison of this fruit with that from Gayndah confirmed the opinion that correctly named locally grown Marsh grapefruit was of first quality and capable of competing with both the Palestine and American product on equal terms. If fruit of this quality could be sold to the public more often and at a reasonable price, a much larger market would soon be established.

The following were the ruling market prices during the last week of March, 1938:—

TROPICAL FRUITS.

Bananas.

Brisbane.—Cavendish—Nines, 12s. to 16s.; eights, 8s. to 16s. 6d.; sevens, 9s. to 15s.; sixes, 6s. to 14s.

Sydney.—Cavendish—Nines and eights, 15s. to 18s.; sevens, 13s. to 17s.; sixes, 10s. to 13s.

Melbourne.—Cavendish—Nines and eights, 15s. to 16s.; sevens, 13s. to 14s.; sixes, 10s. to 12s.

Lady's Finger—1¾d. to 5d. per dozen.

Pineapples.

Brisbane.—Smoothleaf—3s. 6d. to 6s. 6d. per case, 1s. to 6s. per dozen. Ripley—7s. to 10s. per case, 1s. to 5s. 6d. per dozen.

Sydney.—7s. to 10s.

Melbourne.—7s. to 9s.

Specials higher.

More care in handling is necessary on the part of growers to reduce the incidence of water blister.

Papaws.

Brisbane.—15s. to 18s. per tropical case.

Sydney.—16s. to 20s. per tropical case.

Custard Apples.

Brisbane.—Some early consignments have been marketed, realising to 8s. per case. Growers are urged to only market matured fruit.

Mangoes

The mango season is now finished. Growers of special types have marketed their fruit at very payable prices.

Avocados.

Small lines of this fruit have been marketed. Retailers have not been altogether satisfied with the quality, the fruit being too green. A demand for this fruit can only be developed by the public if matured fruit only is sent to market.

Passion Fruit.—5s. to 8s.; Specials, 10s. to 12s.

Rosellas.—2s. to 2s. 6d. sugar bag.

CITRUS FRUITS.

Oranges.

Brisbane.—Local Navels, 12s. to 15s. per bushel case.

Many lines of oranges have been rejected on the market for immaturity.

Sydney.—Navels, 1s. to 7s. per case.

Mandarins.

Grapefruit.

Brisbane.—Gayndah, 12s. to 15s. per bushel.

Sydney.—6s. to 10s. per bushel.

Melbourne.—15s. to 16s. per bushel.

Lemons.

Brisbane.—Gayndah, 8s. to 15s. per bushel.

Sydney.—15s. to 19s.

DECIDUOUS FRUITS.

Apples.

Brisbane.—Jonathan—4s. to 7s. Granny Smith—5s. to 7s. Delicious—4s. to 7s. Hail-marked lines lower.

Sydney.—Delicious—9s. to 12s. Granny Smith and Jonathan to 7s.

Pears.

Brisbane.—Williams, 8s. to 11s.; Howells, 6s. to 8s.; B. de Caps, 7s. to 9s.

Quinces.—4s. to 5s. bushel case.

Local stone fruits have now finished. Growers would be well advised to thoroughly cleanse the sheds and packing plant to eliminate possible brown rot infection of the future.

OTHER FRUITS.

Figs.—1s. 6d. to 2s. 6d. tray, 5s. to 6s. dozen boxes.

Grapes.

Brisbane.—Walthams—3s. to 5s. Flame Tokay and Purple Cornichon—4s. to 6s. Muscats—2s. 6d. to 4s.

Tomatoes.

Brisbane.—Ripe, 4s. to 9s.; Green, 3s. to 8s.; Coloured, 5s. to 10s.; Special higher.

Sydney.—Locals to 10s. per case.

MISCELLANEOUS VEGETABLES, &c.

Rockmelons.—Stanthorpe, 5s. to 7s. per bushel.

Cucumbers.—3s. to 5s. per bushel case.

Pumpkins.—4s. to 4s. 6d. per bag.

Marrows.—3s. to 7s. per dozen.

Lettuce.—9d. to 1s. 6d. per dozen.

Cabbages.—6s. to 12s. chaff bag.

Beans.—6s. to 8s. sugar bag.

Peas.—8s. to 10s. per sugar bag.

Chocos.—1s. to 1s. 6d. per dozen.

SOUTHERN FRUITS.

Grand Duke.—4s. to 7s. half bushel.

President.—4s. to 7s. 6d. half bushel.

SUCKERING IN THE BANANA PLANTATION.

A flush growth of young suckers has appeared in most banana areas since the splendid January rains have made growing conditions excellent for bananas generally.

Before they form their own root system, these suckers rely solely on the parent plant for their subsistence, and where a number are present they retard the parent plant's growth and the development of its bunch of fruit.

Most growers have a definite time for suckering in their working plan, but others fit in at any time, if at all, with the result that four, six, eight, and up to a dozen suckers, ranging in size from "peepers" to fully-grown plants, are seen, *all* of which have robbed the parent plant of some of its vigour.

Even in the most fertile soils the number of suckers left to bear the grower's next bunch should seldom be more than two, and sometimes three. It is desirable, therefore—particularly if a fertilizing programme is carried out—to destroy *all* the suckers which are not required as soon as they peep above the ground. At this stage they are easy to disconnect with little damage to the plant, and the fertilizer applied goes *only* to those suckers which will eventually produce the next cutting of bananas.

—*J. R. Horsley.*

PRODUCTION RECORDING.

List of cows and heifers officially tested by Officers of the Department of Agriculture and Stock which have qualified for entry into the advanced register of the herd books of the Australian Illawarra Shorthorn Society, the Jersey Cattle Society, and the Friesian Cattle Society, production charts for which were compiled during the month of February, 1938 (273 days unless otherwise stated).

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORNS.				
MATURE COW (OVER 5 YEARS), STANDARD 350 LB.				
Eveline of Alfa Vale	W. H. Thompson, Manumbar road, Nanango	14,334·15	694·216	Reward of Fairfield
Rhodesview Kitty 7th	W. Gierke and Sons, Helidon	12,212·42	515·154	Blacklands Prospector
SENIOR, 4 YEARS (STANDARD 330 LB.)				
Cedar Grove Elma 32nd	W. H. Sanderson, Mulgeldie	10,294·4	337·31	Duke of Cedar Grove
JUNIOR, 3 YEARS (STANDARD 270 LB.)				
Glenhead Lady Jean	W. H. Sanderson, Mulgeldie	8,156·4	302·792	Greenfields Lord Clare
JUNIOR, 2 YEARS (STANDARD 230 LB.)				
Rhodesview Fanny 28th	W. Gierke and Sons, Helidon	10,777·75	416·819	Blacklands Prospector
Jamberoo Rosie III.	N. Bidstrup, Warra	6,866·29	258·716	Banker of Brooklyn
JERSEY.				
JUNIOR, 3 YEARS (STANDARD 270 LB.)				
Kathleigh Comic	F. W. Kath, Malakoff, Dalby	6,710·41	383·079	Retford King's Thorn
SENIOR, 2 YEARS (STANDARD 250 LB.)				
Bremerside Gem	W. Bishop, Kenmore	5,992·15	307·163	Carnation Victory
FRIESIAN.				
MATURE COW (STANDARD 350 LB.)				
Towerlton Anona	F. C. Noller, Kumbia	10,645·55	386·915	Domino Belted King

Answers to Correspondents

BOTANY.

Replies selected from the outgoing mail of the Government Botanist, Mr. C. T. White, F.L.S.

Grasses from Injune Named.

N.L.R. (Injune)—

1. *Trichinium macrocephalum*, a native plant of the Amaranth family (*Amarantaceae*). It is fairly common on the Darling Downs and throughout much of the West. We have a number of species in Queensland and most of them are regarded as good fodders. "Fluffy top" is a name frequently given to them.
2. *Aristida armata*, one of the wire grasses or three prong spear grasses. The three prong spear grasses, on the whole, are of very little value as fodder, except when very young. They are sometimes eaten by stock, particularly steers, in the absence of other feed.
3. *Cyperus bifax*, a sedge not a true grass. The differences between sedges, grasses, rushes, etc., are given in "Botany for Queensland Farmers," published recently by the Department of Agriculture and Stock.
4. *Aristida latifolia*, one of the wire grasses, or three prong spear grasses. See notes under number 2.
5. Blue grass, *Dichanthium sericeum*, one of the best and most palatable of the native grasses. It is not usually regarded, however, as very drought-resistant.
6. *Sporobolus pallidus*, one of several grasses with a strong seed-head and very small spikelets, known in Queensland as "fairy grass." It comes up very quickly after summer rains and provides a bite while it lasts, but soon dies away.
7. Small burr grass, *Tragus racemosus*, a very common grass throughout Western Queensland. It provides a bottom bite for sheep, but the burrs are troublesome in wool.
8. Roley-poley grass, *Digitaria divaricatissima*. It is generally regarded as a good fodder.
9. Paddock love grass, *Eragrostis sp. off. leptostachya*. The love grasses, although not particularly valuable in themselves supply quite an important part of the mixed native pasture.
10. Windmill grass, *Chloris ventricosa*, a valuable fodder, particularly for sheep. It is a very common constituent of the cleared brigalow country.
11. Early spring grass, *Eriochloa sp.*, a very valuable fodder, but not particularly drought-resistant.
12. Kangaroo grass, *Themeda australis*, one of the most widely spread of all native grasses. It varies somewhat in regard to its fodder value in different localities. On the whole, its reputation is high but it soon disperses when heavily grazed.
13. Button grass, *dactyloctenium radulans*, a valuable fodder particularly for sheep. Like Flinders grass, it is eaten readily by stock in the dried state and is said to be nutritious.
14. Flinders grass, *Iseilema membranacea*, one of the most valuable grasses we possess, although it has rather a mixed reputation. Stock will eat it either green or dried. In the dried state, it is generally regarded as more nutritious than most grasses, probably because much of the seed is retained and scattered more or less over the whole plant.

"North Queensland Millet."

D. (Clermont)—

The specimen is *Echinochloa Turneriana*, sometimes known as the North Queensland millet. It is a native grass spread fairly widely in the North West and Central West. It is an excellent fodder and is allied very closely to such well-known cultivation plants as Japanese millet and white panicum. It generally grows in rather damp situations, or where the ground has been disturbed. It is not a constituent of the ordinary pasture.

Candle Nut.

F.N.K. (El Arish, N.Q.)—

The specimen is the candle nut, *Aleurites moluccana*, a native of North Queensland, but also spread widely throughout the islands of the West Pacific and Malayan Archipelago. The seeds are full of an oil. They are frequently eaten by people with no ill effects following, but at other times cause violet purging and sometimes vomiting. We think that there is no doubt that these nuts caused the scouring in the horses.

Starr Burr.

"Inquirer" (Esk)—

The specimen forwarded is *Acanthospermum hispidum*, star burr, a native of tropical America, now a naturalised weed in many tropical countries. It is an extremely bad weed in many parts of North Queensland and in some districts, particularly in parts of the Gulf country, is looked upon as the worst weed pest. The plant has established itself in some localities in Southern Queensland, but has not spread to the same extent as it has in the north. It seems, however, to be largely on the increase.

Grasses from Cooyar Named.

G.R. (Cooyar)—

1. A love grass, *Eragrostis elongata*. The love grasses are generally looked upon as only of secondary value. They are, however, quite important constituents of a mixed native pasture.
2. Crown top, *Eulalia fulva*. This grass varies in quality according to the districts in which it grows. Most of those on the Darling Downs and the more southern parts of the State are generally regarded as excellent fodder. In the more northern districts, it seems to grow very coarse and is rather unpalatable.
3. Weeping love grass, *Eragrostis parviflora*, a very common grass in many parts particularly in low-lying country.
4. Early spring grass, *Eriochloa sp.* The name "early spring" is not very appropriate as the Eriochloa grasses are no earlier than many others. They are very palatable and are valuable components of the mixed pasture.
5. Forest blue grass, *Bothriochloa intermedia*, one of the commonest grasses in many parts of Queensland. It is generally regarded as quite a good fodder.
6. Crowfoot grass, *Eleusine indica*. This grass is very widely spread over the warm temperate regions of the world. In Queensland it grows mostly as a weed of cultivation or where the ground has been disturbed. It is not usually a constituent of the ordinary pasture. It is generally regarded as quite good fodder, but like young sorghum contains a prussic acid yielding glucoside. Very little trouble with it, however, is experienced in Queensland.
7. Blue grass, *Dichanthium sericeum*. One of the most palatable and nutritious of native grasses, but not particularly drought resistant.
8. Kangaroo grass, *Themeda australis*, one of the most widely distributed of native grasses. It varies considerably in its fodder value, but on the whole is generally regarded as excellent forage. It does not stand up well to heavy grazing.
9. Windmill grass, *Chloris ventricosa*. The native chloris grasses are valuable fodders, particularly for sheep. The present species is a very common one on cleared brigalow country, but is found in a variety of situations.

Milky Cotton Bush.

J.G.S. (Winton)—

The specimen is not a lantana, but *Asclepias curassavica*, the milky cotton bush or red head, also sometimes known as wallflower cotton bush and wild oleander. It is a native of tropical America, but is now naturalised as a weed in most tropical and sub-tropical countries. It is very common as a weed in coastal Queensland, particularly along creek banks. Usually it is left untouched by stock, but occasionally trouble has been experienced from it. Feeding tests recently conducted at Yeerongpilly proved the plant to be poisonous to animals.

Prickly Poppy.

V.Q. (Tolga)—

The specimen forwarded with your letter of the 2nd instant is *Argemone mexicana*, the prickly poppy, also known as the silver thistle, Californian thistle, &c. It is a native of tropical America, but is now widely spread throughout most tropical and sub-tropical countries. It is very common in parts of Queensland, particularly on river flats on the Darling Downs and the south-east generally. It is a very noxious weed once it gets a hold. It has been accused of poisoning stock, but our only trouble has been where the plants have been cut, allowed to wilt, and the subsequent softened plants eaten by poddy calves. In addition to its prickly nature, the plant contains an extremely bitter yellow sap which makes it quite unpalatable to animals.

A Species of Zamia.

C.E.E. (Warwick)—

The specimen is *Macrozamia Paulo-Gulielmi*, a species of zamia or burrawang with a rather peculiar distribution in Queensland. It is very common in the sandy tracts in parts of the Wide Bay district, particularly about Tinana Creek. It misses a good deal of country and then becomes quite common again in parts of the western Darling Downs, particularly in the Inglewood district. Feeding tests, so far as we know, have not been carried out with this particular species, but it is allied very closely to *Macrozamia spiralis*, a species on which feeding tests have been carried out in New South Wales. All parts of this plant, we believe, are poisonous, and the seeds especially so. Feeding tests with *Macrozamia* seeds at the Veterinary Research Station, Glenfield, New South Wales, showed that 4-8 oz. was a lethal dose of seeds for a sheep, and approximately 2 lb. for a yearling beast. For the lesions produced, the report states that the toxin is a specific protoplasmic poison having a selective action on endothelial cells.

The Quondong.

"Inquirer" (Southport)—

We cannot offer any satisfactory reason for the quondong trees not bearing fruit. Many native trees are very erratic in the amount of fruit they bear. For instance, in the case of the *Macadamia* nut some trees will bear heavy crops of fruit, while others alongside are quite shy bearers. In the case of the quondong, it is not a question of male and female trees as the flowers are hermaphrodite. The quondong tree is parasitic on other trees, the roots deriving their water supply and plant foods in general from other trees in the neighbourhood. We hardly think, however, the nature of the host tree would have any effect on the fruiting qualities of the quondong.

Rain Forests.

L.B. (Project Club, State School, Lowmead)—

The rain forests, as their name indicates, occur within the heavier rainfall regions of Queensland. Rain forests of an increasingly drier type—the trees smaller and the undergrowth less and of a generally drier type—occur in areas with the rainfall down to 35 inches per annum.

A rain forest is a purely coastal type and occurs rarely more than 100 miles inland. One example of a rain forest being situated at a greater distance from the coast is that of the Bunya Mountains.

The wetter rain forests have developed in:—

The extreme south-eastern portion of the State, including the Macpherson Range and Tambourine Mountain. The near coastal districts between Landsborough and Cooran. The small area round Yeppoon. The area between Mackay and Proserpine. The fairly large area to the north, south, and west of Cairns. The northern part of Cape York Peninsula.

The drier forms of rain forests referred to occur in such places as the Fassifern district, Lockyer Range, and around Rockhampton, &c.

Rain forests are sometimes regarded as being confined to basaltic soils, but this is not so.

Trees and Grass for Caloundra.

R.H. (Caloundra)—

Trees proved to do very well in seaside localities in southern Queensland are:—Pongamia tree (*Pongamia pinnata*); cupania (*Cupania anacardioides*); sand cypress (*Callitris columellaris*); hoop pine (*Araucaria Cunninghamii*); figs (*Ficus* spp.), (*Ficus platypoda*—small-leaved Moreton Bay); and cotton tree (*Hibiscus tiliaceus*).

We are rather doubtful if plants of all of them can be obtained through the ordinary commercial channels, but most of them may, perhaps, be obtained from the Brisbane City Council's nurseries, either at the Botanic Gardens or at Hamilton.

As to a suitable grass, we think the best all round grass for your purpose would be the Queensland blue couch (*Digitaria didactyla*). This is always put down by roots, and as it occurs naturally, this is not so tedious and slow as it would at first seem. Bulletin No. 3 issued by the Queensland Branch of Green-keeping Research deals very extensively with the laying down of fairways and putting greens of blue couch.

Northern Plants Named.

C.R.M. (Townsville)—

1. *Andrachne Decaisnei.* This plant is strongly cyanophoric and we think has been the cause at odd times of deaths in sheep, particularly freshly untrucked sheep, on the Hughenden common and other places.
2. Josephinia Burr, *Josephinia Eugeniae,* a very common plant throughout the whole of the central west and north west.
3. *Amarantus paniculatus,* a plant of the Amaranth family (*Amarantaceae*). Plants of this family are generally regarded as quite good fodders for stock.

Plants from Nanango Named.

School Project Club, (Kunioon, via Nanango)—

1. Rhodes grass, *Chloris gayana,* a native of South Africa and one of the most valuable grasses introduced into Queensland.
2. Common couch, *Cynodon dactylon,* a very valuable fodder, nutritious, and relished by all classes of stock. It does not, however, make a very heavy leaf growth.
3. *Paspalidium flavidum,* one of the native Paspalidium grasses. These are generally looked upon as good fodders.
4. Stink grass, *Eragrostis cilianensis.* The local name arises from the fact that this grass possesses a number of glands at the edge of the leaf which give off a not altogether unpleaant odour. It is not generally regarded as a particularly good grass for stock.
5. Weeping love grass, *Eragrostis parviflora,* a very common grass throughout Queensland. It mostly grows in rather low-lying situations or badly-drained country, but is not confined to such places. It is not usually regarded as of much value for stock.
6. Summer grass, *Digitaria marginata.* This grass mostly grows as a weed of cultivation. When it grows in the ordinary pasture it favours rather sandy land. It is generally regarded as a valuable grass for stock.

A Valuable Native Grass.

A.M. (Toowoomba)—

The grass with seedheads is *Brachiaria miliiformis,* a native grass and generally regarded as a valuable fodder. It is also an excellent hay species. This grass is peculiar in that, although a native, it is usually found in places where the ground has been disturbed rather than in the ordinary pasture. It is found quite frequently in old cultivation areas. When found in the ordinary mixed pasture it usually favours sandy land. We cannot determine the other grass in the absence of seedheads.

Swamp Millet.

M.R.M. (Mundubbera)—

The specimen is *Echinochloa Walteri,* sometimes known as swamp millet, an excellent fodder and very closely allied to such well-known cultivated plants as Japanese millet and white panicum. All these at one time were included in the genus *Panicum,* but this large family has now been cut up into several smaller ones, of which *Echinochloa* is one. So far as we have noticed, this grass does not occur away from rather wet situations.

General Notes

Staff Changes and Appointments.

Constable W. F. Aplin, Urandangie, has been appointed also an Inspector under the Slaughtering Act.

Mr. T. E. Dwyer, Police Magistrate, Ayr, has been appointed also chairman of the Inkerman, Invicta, Kalamia, and Pioneer Local Sugar Cane Prices Boards, and an agent of the Central Board for the purpose of making enquiries under Section 5 (2A) of the Regulation of Sugar Cane Prices Acts in respect of sales and leases of assigned lands.

Mr. T. W. Allen, of Allendale, Greenmount, has been appointed an honorary protector under the Fauna Protection Act.

Constable T. Tree, Forsayth, has been appointed also an inspector under the Slaughtering Act.

The following transfers of inspectors of stock, slaughtering, and dairies in the Department of Agriculture and Stock have been approved:—

Mr. D. C. Clifford from Mount Isa to Julia Creek.

Mr. J. W. Moy, from Toowoomba to Mount Isa; and

Mr. N. C. E. Barr, from Brisbane to Toowoomba.

Mr. A. C. Wagner, Kent's Pocket, Boonah, has been appointed an honorary protector under the Fauna Protection Act.

The resignation of Mr. R. J. B. Barton as acting inspector of stock at Habnarey Crossing has been accepted, and Mr. H. H. Griffiths of Yerranbah Station, New Angledool, has been appointed to the vacancy.

Messrs. C. P. Edwards (manager, Abingdon Downs, Georgetown) and J. F. Shaw (Forest Home Station, Georgetown) have been appointed honorary inspectors of stock.

Mr. A. H. Canty, Inspector of Stock, Ingham, Senior Sergeant H. J. McPaul, Sergeant (2nd Class) H. W. Horn, and Constable J. P. Brown (Roma) have been appointed inspectors under the Brands Acts.

Honorary protectors appointed under the Fauna Protection Act include Messrs. G. Hay (Muirlea), J. S. Handley, E. A. R. Lord, J. R. Costello, and M. T. O'Connor (Murphy's Creek), E. E. Franklin (Eagle Heights, Tambourine), and L. V. Wilkinson (Toowong).

Advertising Value.

People have come to depend upon consistently advertised merchandise. They have confidence in the manufacturer who places himself on record month after month as to the merit of his products. They know he will maintain that product at the standard he has set, not only for their protection, but for his own. Should he drop below, the buying public would soon discover it, and his business would be faced by ruin. No manufacturer who is spending large sums to produce, advertise, and sell an article is going to take that risk. Quality, utility, and value are the things uppermost in the mind of the advertiser to-day. Improving his product, making it more useful, giving greater value—these are his aims. When he succeeds, he tells you about it—in the advertisement.

The Plague Grasshoppers Extermination Act.

Regulations have been issued under "*The Plague Grasshoppers Extermination Act of* 1937" which, briefly, deal with the constitution of plague grasshopper destruction committees and outline the powers and duties of members or employees of such committees.

Wild Life Preservation.

An Order in Council has been issued under "*The Fauna Protection Act of* 1937" declaring the area comprised in the reserve for water supply at Herberton to be a sanctuary for native birds and animals.

By Order in Council under the Fauna Protection Act, the city of Cairns has been declared a sanctuary for the protection of fauna.

"Bunchy Top" Quarantine Boundaries.

A Proclamation has been issued under the Diseases in Plants Acts declaring the parish of Mooloolah and portions of the parishes of Bribie and Maroochy to be a quarantine area for the purposes of the Acts on account of the existence of "bunchy top" of bananas. This, in effect, is an extension of the boundaries of the existing quarantine area.

Diseases in Poultry.

An Order in Council has been issued under the Diseases in Poultry Acts declaring certain diseases of poultry—namely, fowl cholera, fowl pest (all varieties), gapes, and stickfast flea—to be notifiable diseases under the Acts.

A Regulation has also received Executive Council approval, and this provides that all male day-old chickens shall be marked with a violet indelible stain by persons licensed under the Diseases in Poultry Acts.

Veterinary Surgeons' Board.

Executive Council approval has been given to the appointment of members of the Veterinary Surgeons Board of Queensland established under the provisions of "*The Veterinary Surgeons Act of* 1936," as follows:—

Professor H. R. Seddon, D.V.Sc., Dean of the Faculty of Veterinary Science, University of Queensland;

Colonel A. H. Cory, V.D., M.R.C.V.S., Chief Inspector of Stock, Department of Agriculture and Stock; Messrs. J. Washington Irving, M.R.C.V.S., Veterinary Surgeon; E. F. E. Sunners, Chairman of the Queensland Meat Industry Board; and Dr. J. Legg, D.V.Sc., M.R.C.V.S., Senior Veterinary Surgeon, Animal Health Station, Yeerongpilly.

Apple Leafhopper Declared a Pest.

A Proclamation has been issued under "*The Diseases in Plants Acts,* 1929 *to* 1937," declaring the Apple Leafhopper (*Typhlocyba froggatti*) to be a pest under such Acts. A Regulation also has been approved providing that the owner or occupier of an orchard in which the Apple Leafhopper is present, must spray his apple trees with an approved spray containing nicotine sulphate of a brand registered under "*The Pest Destroyers Act of* 1923." The first spraying shall be given in the spring as soon as the insect appears on the trees, and a second spraying at an interval not exceeding twenty-one days after the first application. Particular attention must be given to the under sides of the leaves.

Chick-sexing.

Under an amendment to the Diseases in Poultry Acts, it is incumbent upon all persons who engage in the practice of sexing chickens to be licensed by the Minister for Agriculture and Stock. There is no fee for this license, but it is necessary for the person who sets out to determine the sex of chickens to show, by examination, efficiency in the practice.

The amendment further provides that chickens which are determined to be male chickens shall be branded with an approved stain. This branding is to be done by the person licensed to determine the sex.

In future, therefore, purchasers of chickens will know definitely that chickens carrying a distinctive stain, and in which the plumage is not true in colour to the nature of the breed, have been determined as male chickens by a competent person. Consequently, there should be little possibility of unsuspecting individuals buying in ignorance male day-old chickens.

Rural Topics

Pig Raising in North Queensland.

The current report of the North Queensland Co-operative Bacon Association, Ltd., and the Northern Pig Board indicates that good progress has been made in the North. During February of this year no fewer than 800 pigs were received at the Mareeba factory. Most of the pigs were treated by the factory, but some were used to supply the local pork trade.

The supply during March also showed a decided improvement, which is attributed to the steady price being paid for pigs.

It is pointed out in the report that the overseas market for pork products is very firm and that this has a steadying effect on the Australian market.

The present price (March, 1938) for prime grade baconers at the Mareeba factory is 5½d. per lb. dressed weight.

The price of back-fatters at Mareeba factory has been increased from 2¼d. to 2½d. per lb. dressed weight, but the management stress that the back fatters should not be too fat as the northern market will not buy small goods made from very fat pork.

Best Time to Poison Green Timber.

The autumn is the best time to poison green timber with arsenic pentoxide or sodium arsenite. If the job is done when the sap flow in the tree is ceasing, suckering will be reduced to a minimum.

Para Grass May Become a Pest.

While it is a very valuable pasture grass in coastal areas, Para grass (or *Panicum muticum*) is not entirely free of undesirable features. Under certain conditions—such as when growing on very damp land and in drains, &c.—it possesses a tendency to become ineradicable. In the Tweed River (New South Wales) district, where the grass has been grown for many years, serious trouble has been caused by its choking-up of drainage and irrigation channels. So bad has the position become in that district that a suggestion was made recently that some legal restrictions be imposed on the culture of the grass. Farmers and graziers who have areas of Para grass on their properties are advised to keep the grass clear of all streams and channels in which a free flow of water is desired. Further, the grass should not be permitted to encroach on cultivation lands, particularly where the cultivated area is well supplied with soil moisture.—*C. W. Winders.*

Good Work.

A mother wrote recently to the Queensland Committee of the Australian Dairy Produce Board expressing thanks for the assistance and encouragement given her son in his school pasture improvement project club work. This assistance, she said, had enabled her boy to obtain a scholarship for entrance to the Gatton Agricultural College, where he has now entered on his chosen course of study.

Putting Science Into Practice.

Professor A. F. Barker, the well-known wool research worker of Leeds University, who was a recent visitor to Sydney, made a point in the course of an interview that will be appreciated by most farmers and graziers who want to apply the findings of science to the soil and to livestock breeding. "After twenty years of research endeavour," he said, "it is evident that the difficulty lies not in conducting researches, nor obtaining research results, but in carrying this research forward into actual practice in the industry itself." How best to disseminate the knowledge, how to get the results quickly out to the men on the land—that is the problem. The trouble is to get the results of research into ordinary, everyday language. Agricultural and veterinary science workers are, after all, not working for their fellow science workers, but for all engaged in the land industries. "What is wanted are interpreters to explain the results of scientific work in language that we can all understand."

A Good Slogan.

Here is a slogan for the farmer containing a good argument for co-operative marketing:—Remember the banana. As long as it sticks to the bunch it is safe. When it leaves the bunch it may get skinned.

Organising a Clearing Sale.

From time to time, in every district, farm clearing sales are held. Every clearing sale of farm stock and other property should be properly advertised. It is necessary that the greatest number of buyers possible should be assembled for bidding if the sale is to be successful.

Where special breeds of pure-bred livestock are to be sold, it is wise to advertise in the breeders' journals, or have a special catalogue prepared, showing the breeding of every animal to be offered. The catalogues should be distributed well in advance of the sale to all people who are likely to be interested in the purchase of pure-bred stock.

Most sales would be greatly improved, and the returns from the auction increased, if time before the sale were spent in getting everything in the best possible shape for the sale. The farm itself could be improved by seeing that the main entrance gates are in order—first impressions are of the utmost importance to a possible purchaser—and that all the farm work is brought up to date. What is better to look at than a well-ordered and tidy farm? The stock to be offered should be in top condition. Condition on livestock and working horses put pound notes on to the cheque that the seller ultimately receives from the auctioneer. Stock in average condition only bring average—and, very often, below average—prices. Stock dealers who attend sales make their profit from fattening and quick selling of the animals they buy. It would be better for the farmer to get that profit for himself by seeing that his stock is in the best possible condition for the sale. Every allowance must be made, of course, for seasonal circumstances and so forth, but it would be better to postpone a clearing sale than to sell stock much under their value. Well-groomed stock and tidy yards all help the sale, and any extra work or expense beforehand is well repaid by the higher prices received.

If a farmer is selling off everything, the importance of right display of implements and other equipment to be offered comes into the business. All articles should be properly listed and labelled. A good auctioneer will do the rest. What the farmer has to do is make the clearing or dispersal sale a business proposition, use business-like methods, and any extra costs incurred are usually covered many times by the increased returns.

Parsley.

Parsley will grow almost anywhere and on any kind of soil which is not of too stiff a nature, although a partially-shaded position and a rich, moist soil suit it best. Being a biennial, it must be sown each year in order to provide a continuous supply. It should be sown twice a year—in March and April for use in winter and spring, and again in August and September for use in summer. Seeds may be sown in shallow drills in the open ground, and the seedings thinned out to about 6 inches apart. It frequently happens that parsley is sown too thickly and early thinning is neglected, with the result that the plants run to seed prematurely. Instead of sowing a continuous row, drop a few seeds along the drill at 6-inch intervals, and when the seedlings have developed several leaves remove all but the strongest plant in each group.

Farmers Like to be Shown, Instead of Told.

The aim of the Sunday morning countryman's session—broadcast between 9.10 and 9.30 a.m. every Sunday morning from the National (4QG or 4QR, Brisbane) and Regional radio stations (Queensland)—is to give the farmer information and not *tell* him to do things in his own business. Information and not advice is what the farmer wants—and there is a whole lot of difference between the two. Anybody can give advice about anything, but not everyone can give sound information. No one realises more than the farmer the necessity of working in double harness with the science worker or the agricultural or dairying instructor who is able to show him how to make or save money, for, after all, that is what this question of giving information boils down to.

Tribute of Commerce to Agriculture.

From the United States comes a story of an interesting custom that is spreading over there. Here is an instance:—Last December the Nashville Chamber of Commerce gave special recognition to the farmer within its territory who had rendered the most distinguished service to agriculture in the course of the year. The gathering together of 200 farmers, business and professional men to do honour to a man who had done a great work for primary industry was a notable event. It certainly belied the old misquoted dictum that "a phophet hath no honour in his own country."

Record Rides.

One of the commonest of top-rail topics is that of long-distance riding records. Here is what the well-known Australian writer, Edward S. Sorenson, had to say in a recent *Australasian*, of the endurance of men who have pronged the pigskin and the gallant cuddies that carried them:—

In these mechanised times long journeys on horseback are not much heard of, but in the old days when the horse was king of the roads, long fast rides and great feats of endurance by man and horse were common. In those happy times everybody rode, from children going to school—and in some places the school was a dozen miles away—to the settler's wife going visiting or shopping. Even the splitter and the fencer rode to and from their work in the bush.

It was hard to find a home outside the big towns that did not include saddles among the general furnishings. In most homes there were four—a man's and a woman's saddle, and two small or old ones for the youngsters. If a girl did not possess a horse and saddle of her own, it was the duty of her cavalier to provide them. A favoured Christmas or birthday present was a horse or a saddle, and I have seen many a saddle and lady's bridle among the wedding presents. One popular bride, who married a free selector, got three saddles and seven bridles.

A feature of all country racecourses was the cavalcade of men and women, boys and girls, thundering across from point to point to keep in close view of the racing. They rode long distances to picnics, dances, and other festivities, returning probably in the foggy hours of early morning. They rode to entertainments in town, starting back about midnight for homes that were anything up to twenty miles out.

But what was twenty miles when men rode 300 miles to see the race, and here and there a young fellow rode fifty miles on Sunday morning to see his girl, and fifty miles back on Sunday!

Three-figure Rides Common.

Many of the long-distance rides that gained wide notice were done on stock horses taken straight off the grass. A hundred miles a day was quite an ordinary feat for stockmen and stock horses. Nor were the men on the cattle runs and the scattered selections the only hard riders.

A one-time commissioner of police in Adelaide, Alexander Tolmer, rode from the Coora police camp to the city, a distance of 120 miles, in one day on a horse he called Bucksfoot. Another good performance was that of a policeman who rode out from the Darling to inquire about two swagmen who had died of thirst on a far western track, and bury them. He left a homestead on the river at 10 o'clock on a summer morning, and was back at 9 o'clock the following evening. The distance covered was 136 miles, with no food or water on the way.

A lad, who was afterwards widely known as "Cockatoo Jack," was once sent from Rosebrook to Cooma (New South Wales) for the doctor—a mission that has accounted for many a great ride in the bush. In this instance the doctor was out, and as the case couldn't wait, the boy rode on to Queanbeyan, seventy-nine miles from Rosebrook. Getting a doctor there, he at once started back with him. Before they had gone many miles the medico's town hack knocked up. He then mounted Jack's grass-fed stock horse, which carried him through to Rosebrook, and completed the full journey of 158 miles in twenty-seven hours.

A man who was known as Big Bowden, of Penola (South Australia), used to ride eighty miles one day and back home the next, and as he and his gear weighed 21 stone it was no light performance for one horse. When the Montebello was wrecked at Kangaroo Island in 1906, a selector's son carried the news to Kingscote, seventy-nine miles away, inside nine hours, on a 13-hands pony. The same pony carried an 11-stone man ninety-seven miles between sunrise and sunset.

A Queensland squatter, A. E. Hanslow, in January, 1898, rode a four-year-old mare from Mount Morris to Boothalla and back in fourteen hours, the distance being 124 miles. Another Queenslander—a drover named Charlie Turner—having to inspect cattle at various places on specified dates, rode from Leigh's Creek (South Australia) to Winton, Queensland, a distance of 800 miles, in fourteen days, with three changes of horses.

In 1885, Frank Howson, a wool-scouring contractor, rode an eight-year-old grey mare from Booligal (New South Wales) to Kilfera station in one day and back the next, a distance of 221 miles. On the two following days he rode her another 100 miles. This mare, which had previously belonged to a shearer, was fond of beer, and she was given a nip on the road whenever the rider had one.

ENDURANCE RECORDS.

The longest continuous journey on horseback that I know of was made by an old prospector named Dave Collins, who rode from Clare (South Australia) through the Northern Territory and into Western Australia, covering 7,816 miles, much of it over hard, trackless country. I don't know how long the journey took him, but he was eighty years old at the time—1917.

In 1907 a good performance was put up by a twelve-year-old boy named Archie Danvers, of Wellington (New South Wales), when trailing a couple of horses that were making back to their native run, somewhere near Tumut. He left Wellington on a Monday, and overtook the horses on the following Friday. He was mounted on a pony, and in the five days rode 300 miles, passing through Molong, Cowra, Young, Cootamundra, and other places. Part of the time was spent in tracking and making inquiries.

A better ride, considering the tragic circumstances, was that of the fourteen-year-old Sylvester Fraser, the only survivor of the massacre at Hornet Bank, on the Dawson River, in 1857. His brother, Billy Fraser, was in Ipswich with the station teams, and to acquaint him of the tragedy the boy rode from Hornet Bank to the town, a distance of 320 miles, in three days, with two changes of horses. He had been struck on the head with a nulla, and recovered after rolling under the bed, and the first twelve miles to Eurombar was ridden bareback. The return journey was accomplished in the same time, with three changes of horses—totalling 640 miles in six days!

Endurance rides are a common thing in the central parts of Australia, where men and horses have to travel tremendous distances in the performance of their various duties; but only now and again is some feat of those hardy horsemen heard of outside the far lands that hold them.

One of the outstanding journeys was that of Mat O'Connor, who had been over forty years in the Territory, and at various times had been mailman, prospector, teamster, stockman, drover, hunter, and station manager—occupations that kept him always moving. He was a good horseman, hard as nails; and his various pursuits took him over the greater part of the Territory; but at the beginning of 1919 they came to a sudden end.

While working among stock in the lush grass season, when flies were bad, his eyes were infected with cattle blight, and he became totally blind. For six weeks he lay in camp, for the wet made travelling impossible. Then he set out for the railhead on the Katherine, a distance of 350 miles, which was covered in eleven days. A mate led his horse the whole way, while Mat led the packhorse that carried their camp ware and tucker. Most of the country was bad to travel. From the railhead he journeyed to Darwin, thence to Sydney.

The time and distance of his ride to the Katherine are easily dimmed by the feats of scores of bushmen, but they were not riding at the tail-end of a northern wet season, blind, and nearly sixty years of age. In the circumstances, the long dark ride had no parallel in the bush—and it was his last; for Mat O'Connor became an inmate of the old men's home at Parramatta, where he could only dream in his long night of the wide runs he loved.

THE LOST BET.

At one time many a long ride was undertaken for a wager. One that is niched among the immortals was Skillicorn's ride from Bathurst to Sydney, a distance of about 125 miles, which he backed himself to do in less than twenty hours, for £150. That was in September, 1860, when the mountains made stiff climbing. The other party to the wager was a Bathurst publican named Job Manning.

Skillicorn did the trip in nineteen hours fifty minutes, which was considered a good performance on the bad roads of that time. But a man had been posted at a wayside house; he asked Skillicorn to have a drink, then said he would walk along a bit with him. Skillicorn walked about 100 yards before mounting again, and thereby lost the wager, it having been stipulated that he had to ride all the way.

Orchard Notes

MAY.

THE COASTAL DISTRICTS.

SUCCESS in fruitgrowing depends not only on the proper working and management of the orchard, but also on the way in which fruit is handled and marketed. With citrus fruits particularly, none pay better for extra care in packing and presentation.

Some growers do not realise how easily the skin of citrus fruits is injured, especially that of fruit grown under moist and humid conditions.

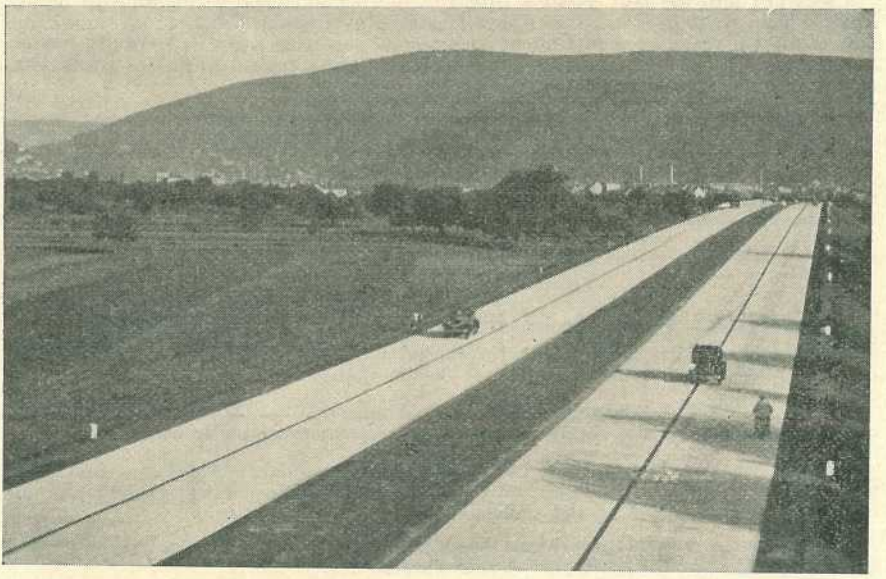
In order to prevent injuring the skin when gathering, all fruit should be cut and not pulled. Any fruit that falls or is injured in any way should be rejected, as it is not fit to send to a distant market. If, however, the injury is only slight, it can be sent to a local market for quick sale.

For oversea and interstate markets only choice fruit should be selected. It should be graded for size, colour, and quality, and properly packed, only one grade of fruit being packed in a case.

All orchards, vineyards, and plantations not thoroughly clean should receive immediate attention.

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

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



[*Photo: L. Andersen, Dept. Agric. and Stock.*

Plate 148.

Concrete Highways like these high and low speed roads are becoming common in Europe.

Farm Notes

MAY.

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

Early fodder crops—such as barley (skinless or Cape) and certain varieties of wheat—may be sown during April.

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

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

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

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

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

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

Sorghums which have matured and are not immediately required as green fodder should, wherever possible, be conserved as ensilage to provide for a reserve, to tide over the period when grasses and herbage are dry.

ANNUAL SCHOOL OF INSTRUCTION IN PIG RAISING.

Arrangements are being made for the school of instruction to pig-raisers and dairy farmers, which is held annually at Gatton College.

It is anticipated this year the school will assemble on 14th June and disperse on 30th June, but further details in this regard will be available in our next issue.

These schools of instruction have become very popular and farmers who have attended them speak very highly of the value of the information received and of the pleasant time spent at the College.

This year a special programme has been planned for junior members of the bacon factories and meat export works staffs.

Full particulars may be obtained by writing to the Principal, Queensland Agricultural High School and College, Lawes, or the Under Secretary, Department of Agricultural and Stock, Brisbane.

Our Babies.

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

THE CHILD WHO WILL NOT EAT.

There are several reasons why a child will not eat.

The Sick Child.

The child may be sickening for something. Loss of appetite and vomiting may be the first signs of sickness. The power of digestion is reduced during illness, and the refusal of food is Nature's signal that no food is required. The sick child should not be coaxed to eat. Give him as much water flavoured with orange or lemon as he will take.

The Child who Eats between Meals.

Another child will not eat at meal time when he is expected to eat, because he has been eating between meals. It is very disappointing to a mother who has prepared a good, wholesome meal to find it turned down by the child who has been to the pantry and helped himself, or who has visited his neighbour's mango tree in company with his friends. Such behaviour may be overlooked when it happens occasionally, but when eating between meals becomes a habit, and particularly when the food eaten is of the wrong sort, such as sweets, cakes, white bread and jam, the child's health will suffer. For such an emergency have on hand the right kind of food. In some cases it may be advisable to re-arrange the meal hours. A child cannot be expected to go hungry for long. Provide food at meal times appropriate to the season of the year. Less fuel or heat-producing food such as sugar, starch, and fat is required in the hot weather than in the cold.

The Problem Child.

The most difficult child to handle is the child who refuses food prepared by an over-anxious and over-attentive mother. Refusing to eat provides him with an opportunity of defying a mother who is perpetually telling him what to do and what not to do, a mother who in the opinion of the child is always interfering with his liberty. Further, by refusing his food he becomes the centre of attention; in order to encourage him to eat the mother goes to no end of trouble. The child's food becomes the chief topic of conversation in the family until he begins to heave at the very thought of food. If the child happens to be an only child the situation becomes aggravated. In desperation the mother takes him to a doctor. She knows that he is irritable, quarrelsome, and flies into tantrums, and she is afraid lest he goes into a decline. "Will the doctor order him a tonic?" The mother finds it impossible not to be concerned about his refusing food. Poor appetite is so intimately bound up in her mind with ill-health, and particularly with some form of wasting disease. Such a mother means very well, and has gone to a great deal of trouble sometimes in trying to discover the right thing to do. Her over-anxiety has been the big stumbling-block. Her difficulty may be due to the fact that she has never understood herself and therefore is unable to understand or handle her child, but not always so. The handling of this type of child becomes a problem sometimes even in the hands of expert psychologists. The mother of this child requires to be dealt with in the most sympathetic and understanding manner. She is not helped by the doctor trying to make light of her trouble, which is very real and has got her down. If the doctor has gained the confidence of the mother sufficiently to enable him to reassure her and point out that the child's behaviour is in large measure due to her over-anxiety and fear, he may be able to improve things a great deal. In many cases it is not so easy to dispel the over-anxiety and fear of the mother. It appears impossible to her to make it seem a matter of indifference whether her child takes his food or not. Her anxiety has become a habit, and in the mind of the child the association of ideas of mother, anxiety, interference with liberty and food has become firmly rooted. He becomes bored with receiving so much attention if he has any strength of character, and he longs for freedom and independence. If the mother cannot be educated to change her attitude, it may be necessary to send the child away and place him in charge of a person who understands his management and is temperamentally suited to supervise his behaviour. It is much easier for another person than for the mother to begin a new regime. This will give the mother a chance of recovering from the state of nervous tension which may have developed as the result of her efforts. The difficulty may be solved by sending the child to a nursery school or to a kindergarten where he will mix with children about his own age. His sense of boredom becomes relieved in community life, where he discovers new interests; his constructive tendencies find an outlet for their development, and the food problem is already beginning to be solved. The idea of food ceases to retain its importance in the mind of the child and becomes merely one of the many interests of his life.

Let those mothers who have difficult children try out these methods for themselves, even if only for a short time. Many mothers and children have been helped by them.

How Much to Eat.

(Contributed by the Queensland Nutrition Council.)

"LIVE to eat!" or "Eat to live!"—which shall it be? As is the case with so many vexed questions, neither extreme is correct. Would you call normal the man who gulps down a few mouthfuls of food placed before him by an insistent wife, with no thought for its delicacy or method of serving? Do you, on the other hand, really envy the man who turns every meal into a feast, rising with disappointment and some difficulty when the last available particle has disappeared, to seek in repose an opportunity for overworked nature to catch up in the eternal competition? Most assuredly you do not envy either of these extreme individuals. "Moderation in all things and all things in moderation" must be one's motto in eating, as in all the necessities and pleasures of life.

The Appetite.

Scientists will tell you that hunger is accompanied by contractions of the muscular stomach wall, and that those contractions are associated with the secretion of adrenalin from one of the ductless glands. This in turn may be due to a falling level of sugar in the blood. The whole mechanism is very complicated, and appetite is not exactly the same as hunger. Every normal person should experience appetite, but only the starved person real hunger.

We all know what appetite is and the normal variations to be expected, though they are difficult to define. Appetite may become abnormal in three ways—(i.) lessened, (ii.) increased, (iii.) perverted. It should be the aim of every person to keep the appetite within normal limits by neither denying nor satiating it. If, in spite of this reasonable behaviour, it persists in being abnormal, there must be a cause, and the cause must be found. The person to do that is your doctor.

The chief causes of lessened appetite are—

Worry.—A very common cause, especially in women, but also in men.

Irregular Eating.—As indulged in by the housewife who "picks" between meals, the school-child spending his pennies on sweets, and the busy man who "just cannot be bothered!"

General Loss of Condition from overwork, lack of exercise, loss of sleep, &c.

Ill-balanced Diet.—A diet which continues to contain a deficiency of some necessary item (especially vitamin B) very often leads to a loss of appetite.

Gastric Abuse.—The continued use of food or drink irritating to the stomach, e.g., chronic over-indulgence in alcohol, will impair the appetite.

Gastric Disease of various kinds affect appetite. If you have any reason to suspect these, your doctor should have the earliest opportunity of finding this out.

General Disease, even a cold, will impair the appetite. In such cases it is not wise to force it too enthusiastically.

The way to correct diminished appetite is not to force unwelcome food in blank defiance of the body's desires, but to set about finding out why the appetite is poor. *One should examine one's eating habits*

candidly and firmly. Only too often the habits are entirely at fault. The importance of doing this early is not merely the restoration of a pleasant bodily function but the prevention of actual digestive disease. Loss of appetite, "indigestion," distaste for food are often friendly warnings that the digestive apparatus is being ill-treated. If they are ignored, actual disease frequently develops. If you have any doubt at all on the matter, particularly if you can honestly find no fault with your eating habits, you should take your worries to your medical man, particularly if you are getting on in life.

Increased Appetite.

A definitely increased appetite occurs in some diseases such as exophthalmic goitre and diabetes. Apart from this, however, a number of people feel that they ought to eat much more than they really need. This is particularly so with sedentary workers at or past middle age. As that indefinite though real period known as "the prime of life" is passed, creature comforts come to appeal more and more; the spartan recklessness of youth dies away, and pleasurable indulgence appears to be more man's desire. Of those comforts eating is one of the foremost. Coupled with this development is often a growing disinclination for active exercise. True, golf, bowls, and other pastimes are designed to supply this exercise, but they are poor substitutes for the spontaneous activity of youth. Thus it is that those who have never been worried by the lack of appetite become a prey to the insidious fault of over-eating in middle-age. For such as these moderation is more than a motto; it is a necessity.

When we advocate moderation or restriction of food for middle-aged people of sedentary habits we do not condone neglect of eating or close our eyes to the undesirability of a poor appetite any more than in earlier life. The moderation which is practised should be an all-round restraint and not the faddist's exclusion of a particular food. Modern science knows no reason why "red" meats should be prohibited while "white" meats should be permitted. Modern science knows no reason why proteins and carbohydrates should be regarded as incompatible and excluded from the privilege of combining in a meal. Modern science *does* realise, however, that most people, and especially those of the earlier generations, eat far too little of such foods as fruit, milk, and vegetables. For that reason we suggest that the restriction of the "over-forty" diet should commence with the other articles of diet, especially those containing a preponderance of the highly-refined foods.

Effects of Over-eating.

Over-indulgence in almost any form (including over-indulgence in work) is one of the predisposing causes of high blood pressure. Over-eating is an important factor in the causation of diabetes, gout, and other kindred disorders. Even if these definite diseases are not developed (because other things than over-eating must be acting), a state of impaired health and decreased efficiency must result. The tendency to drop off to sleep after lunch is sometimes due to this. A certain laxity of mind is normal after a meal, but drowsiness is abnormal. Increasing girth in middle-age is partly due to over-eating, although other factors enter in here, such as the balance of the ductless glands and loss of muscular tone. Digestive disorders are certainly encouraged by eating too much, especially too much of the highly-refined foods.

Slimming.

To reduce weight is a modern fad. For people overweight by reason of obvious over-eating a reduction of food and a consequent reduction of weight is reasonable enough. Apart from this, however, especially in younger people, slimming is a bad and often dangerous practice. People are not all cast in the same mould—thank goodness! There are people who for one reason or another remain slim and are perfectly healthy. For those people to fatten up a change in their make-up or definite over-eating would be necessary. Similarly, there are naturally stout people, and for these to "slim" necessitates a process of starvation. Many are the disasters to be attributed to this bad practice, not the least of which is predisposition to tuberculosis. There is one rule which these people who wish to reduce might bear in mind—the minimum amount of weight for a given diet is gained if the diet is perfectly balanced. A maintenance diet perfectly balanced is the minimum amount of food that can be taken with safety.

Dietary Rules.

1. If your appetite is normal, treasure it and do not abuse it by neglect or by gorging. Avoid conditions which might interfere with your digestion.

2. If your appetite is poor, examine your eating habits carefully and put them right. If the appetite is still poor, consult a medical man.

3. If you are at all worried about your appetite, consult your doctor.

4. If you are past middle age, and engaged in sedentary work, ask yourself frankly if you are eating too much. If so, reduce the quantity a little and see if you feel any better for it.

5. Do not be misled by single-idea enthusiasts. There is no royal road to health; there is only a guiding principle—moderation!

6. It is safer to be over-weight under thirty-five and under-weight over thirty-five.

A SANCTUARY OF BEAUTY.

Perhaps no work of man receives more love and devotion than is bestowed on a garden. Possibly, even, few works of man or woman so fully and intimately express the character of that worker as does a garden.

Among gardeners a few work for harmony and effect, which develops only in the course of years. The imagination envisages what is to be. Experience and a close observation of nature teaches what is possible. Every advantage of slope, of rock or stream is used to achieve the end aimed at. Continuously there is adaptation; often there is readjustment. Restraint always bridles enthusiasm; impulse is taught to keep pace with the rhythm and step of nature. The gardener learns to be servant and companion to that spirit, conscious of Nature's incomparable art in all its versatility, in all its grandeur, its delicacy, its inventiveness and adaptability.

—Dr. J. Luckhoff, in "South African Gardening."

COCKROACH CONTROL.

Cockroaches are nocturnal, hiding during the day in dark corners and crevices, where they congregate in large numbers. In the house, they usually hide near the sink and drainboard, behind the kitchen cabinet, and in similar places. If disturbed when foraging at night, they run rapidly for shelter, and a knowledge of where they conceal themselves is usually the key to their control.

In Queensland, houses are constantly being reinfested by adults crawling and flying in from outside, and no control measures can keep a building continuously free from the pest if reinfestation is possible. Therefore it is first necessary to clean up all outbuildings and burn accumulated rubbish of any kind. All cockroaches found hiding in packages of food and merchandise being brought into the house should be destroyed. They may be killed mechanically or by spraying with a proprietary fly spray. Crack fillers, such as putty or plaster of paris, can be used effectively to close many openings used by cockroaches as avenues of escape to hiding places. This is particularly important if cockroaches are coming in from adjacent apartments, through wall spaces, or along the plumbing fittings.

Sodium fluoride is the best cockroach remedy for use in homes which have already become infested. If the powder is not readily available in pure form, suitable commercial preparations, generally known as insect powders, containing up to 80 per cent. sodium fluoride can be obtained from any grocer. Sodium fluoride is poisonous to man if taken internally in sufficient amounts, and it should be kept out of food and away from children and pets. If used with reasonable care in cockroach control, however, no harm will follow. It may be sprinkled by hand along the back of shelving, draining boards, and other places frequented by the pests. When so placed in the runways the powder adheres to the limbs and is subsequently taken in through the mouth as the insect cleans itself. Sodium fluoride therefore acts as a stomach poison. The powder remains effective indefinitely in dry situations, but in very damp places it may cake and become useless.

Sodium fluoride is best applied with a small duster or bellows and blown into the hiding places. In this way more cockroaches are directly affected, for they die rapidly when the powder is blown directly on them. The application should be made in the evening and the powder left for two or three days. Frequent treatments are usually necessary at intervals of one or two weeks if the pest is to be kept under control.

—D. O. Atherton, M.Sc., Agr.

IN THE FARM KITCHEN.

TOMATOES IN THE MENU.

Tomato and Pineapple Salad.

Take the required number of tomatoes (round shape), some tinned crushed pineapple, 2 sticks celery, mayonnaise, lettuce hearts, curled celery for garnish.

Cut a slice from the stem end of the tomatoes, stand on a plate, cut side down to drain, then put in the ice chest to chill. Drain the syrup from the pineapple. Mix with an equal quantity of diced celery, moisten with the mayonnaise. Sprinkle the tomato cups with a little salt and pepper, and refill with the pineapple mixture, piling well above the tomato. Serve on lettuce heart leaves and garnish with curled celery. Chill again before serving.

Tomato Jellies.

Take 2 lb. tomatoes, 1 bay-leaf, 1 tablespoonful vinegar, 1½ tablespoonfuls gelatine, 1 onion, 1 stalk celery, 1 dessertspoonful castor sugar, 1 cupful cooked peas, peppercorns, salt, pepper, and paprika to taste. Lettuce to garnish.

Wash and cook tomatoes with bay-leaf, celery, onion, and about three peppercorns in a covered pan for ten minutes. Rub through a sieve into a basin, then return to the saucepan. Add sugar and seasoning to taste. Stir in gelatine dissolved in three tablespoonfuls hot water, and the vinegar. Divide the green peas between ten small moulds rinsed out with cold water. Fill up with liquid. Serve the jellies when set on a dish lined with lettuce leaves.

Stuffed Tomato salad.

Take 6 tomatoes, 2 tablespoonfuls diced cooked beetroot, 1 tablespoonful capers, salt and paprika, 2 hard-boiled eggs, 1 tablespoonful minced onion, 2 slices boiled tongne, 2 tablespoonfuls green peas, mayonnaise, lettuce to garnish.

First remove a slice from the top of tomatoes, then scoop out the insides carefully. Place upside down in a cool place while you are preparing the filling. Mince the tongue, capers, and one egg. Mix with onion, peas, beetroot, and salt to taste. Pile into tomato cases. Cover with minced hard-boiled egg, then with mayonnaise. Dredge with paprika. Serve with lettuce leaves.

Tomato Rarebit.

Take 1 cupful strained tomatoes, ½ cupful soft breadcrumbs, ½ lb. grated cheese, ¼ teaspoonful salt, ⅛ teaspoonful pepper, 1 teaspoonful minced parsley. Toast.

Place all the ingredients in a saucepan. Cook till smooth, stirring occasionally. Serve at once on hot buttered toast.

Tomato Honey.

Tomatoes, lemon juice, lemon rind, sugar.

To each pound of tomatoes, allow the grated rind of one lemon. Cut the tomatoes in small pieces. Add the rind. Cook till the liquid is nearly all evaporated. Strain through a fine sieve. Return to the pan after measuring with 1 lb. of sugar and juice of 1 lemon for each pint of tomato pulp. Boil rapidly, skimming well, till thick. Pot and seal.

Tomato and Apple Chutney.

Take 6 large tomatoes, 3 cupfuls brown sugar, ¼ cupful mixed spice. 1 green pepper, 6 apples, 1 quart vinegar, 3 teaspoonfuls salt, 1 cupful stoned raisins, 4 small onions.

Skin the tomatoes. Peel and core the apples. Chop the tomatoes, apples, raisins, and green pepper finely. Add remainder of ingredients, tying the spice in a muslin bag. Boil for one and a half hours. Remove the spice bag. Turn the pickle into sterilised jars and seal.

Tomato Jam.

Take 8 lb. tomatoes, 6 lemons, 7 lb sugar.

Cut the fruit into slices, peel the lemons as thin as possible, and cut the peel into shreds. Squeeze the juice, and add, with the sugar, to the tomatoes. Boil all together till sufficiently thick. Green tomatoes may be used, and oranges substituted for the lemons, using an orange to every pound of tomatoes. Pot in the usual way and store in a dry place.

Tomato Wiggle.

Take 2 eggs, 2 tomatoes, ¼ cupful breadcrumbs, ¼ lb. grated cheese, 2 oz. butter, pepper, and salt.

Drop the tomatoes into boiling water and skin them. Whisk the eggs, chop the tomatoes, and mix with breadcrumbs and cheese, season rather highly. Leave in a basin till required, then melt a knob of butter (or margarine) in a saucepan, and stir "wiggle" over the gas till nearly set. Serve on toast for breakfast.

Tomato Pudding.

Take 1 lb. tomatoes, ½ lb fine breadcrumbs, 1 large onion, a few mashed potatoes, 1 egg, chopped parsley, seasoning to taste.

Skin the tomatoes by dropping them into boiling water, then mash them with the breadcrumbs, finely-chopped onion, a little chopped parsley, a few mashed potatoes, pepper and salt, and the well-beaten egg. Mix the ingredients together. Well grease a pie-dish and bake in a moderate oven for one hour. A little good gravy may be added if not moist enough.

Tomato Chutney.

Take 4 lb. tomatoes, 1 large onion, 1 lb. brown sugar, 2 tablespoonfuls mustard, 2 tablespoonfuls salt, 2 tablespoonfuls pickling spice and peppercorns.

Peel and slice the tomatoes and onion and sprinkle with salt. Leave overnight. Heat vinegar, sugar, and mustard, tie spices in a muslin bag, and add with tomatoes and onion. Simmer for half to three-quarters of an hour. Bottle until required.

Green Tomato Chutney.

Take 2½ lb. green tomatoes, 6 eschalots, 1 lb. stoned raisins, 1 oz. mustard seed, 2 lb. green apples, ½ head garlic, ½ lb. brown sugar, ½ lb. dates, 1 quart good vinegar, salt, and cayenne to taste.

Put the finely-sliced tomatoes, peeled and finely-chopped apples, sugar, and mustard seed, &c., into a saucepan. Add the seasonings. Pour over the vinegar and boil to a pulp. Turn into dry jars and seal down.

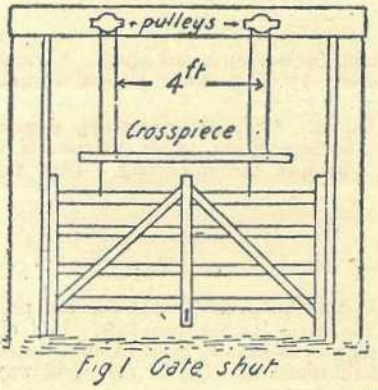
Scalloped Tomatoes.

Take 6 tomatoes, 1 cupful breadcrumbs, 2 tablespoonfuls margarine or butter, salt, and pepper.

Scald and skin the tomatoes. Place a layer at the bottom of a well-greased fireproof baking dish. Cover with a layer of breadcrumbs. Season to taste with salt and pepper. Dab with margarine. Continue the layers till the dish is full and the last layer is breadcrumbs. Sprinkle with salt and pepper. Dab with margarine. Bake in a moderate oven for one hour.

HANDY LIFT GATE.

The lift gate illustrated has the great advantage of dispensing with balancing weights. The gates are made of 3-inch by 1-inch timber throughout, 10 feet long,



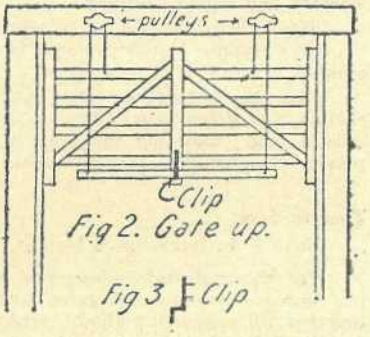


Plate 149.

the battens being spaced 6 inches apart, the bottom batten 7 inches from the ground and the top bar 3 feet from the ground. The pulleys are ordinary cast pulleys, fastened with four screws, costing only a shilling or two each. They are placed 4 feet apart. The fillets between which the gates run are 2 inches by 1½ inches. The iron clip (Fig. 3) is made of 1¼-inch by ¼-inch flat iron of the shape shown, and is bolted on to middle stay of gate. The crosspiece which goes under the clip and holds the gate up is 5 feet long by 2-inch by 2-inch pine. The clip has sufficient turn to take a crosspiece of this thickness.—*New Zealand Farmers' Weekly.*

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF FEBRUARY, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING 1938 AND 1937, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Feb.	No. of years' records.	Feb., 1938.	Feb., 1937.		Feb.	No. of years' records.	Feb., 1938.	Feb., 1937.
North Coast.	In.		In.	In.	*Central Highlands.*	In.		In.	In.
Atherton	10·69	37	16·68	12·17	Clermont ..	4·18	67	4·88	3·58
Cairns	15·75	56	14·91	4·90	Gindie	2·75	39	0·10	4·60
Cardwell	17·00	66	12·23	6·63	Springsure ..	3·84	69	0·24	4·33
Cooktown ..	13·72	62	13·36	9·24					
Herberton ..	7·98	52	15·28	9·64					
Ingham	16·21	46	28 83	6·32					
Innisfail	22·65	57	28·99	7·30					
Mossman Mill ..	18·47	25	20·90	20·64	*Darling Downs.*				
Townsville ..	11·16	67	15·35	4·70					
					Dalby	2·80	68	0·32	1·04
Central Coast.					Emu Vale ..	2·53	42	1·69	2·32
					Hermitage ..	2·37	32	0·40	0·61
Ayr	9·13	51	12·87	5·24	Jimbour ..	2·60	50	..	1·33
Bowen	5·74	67	9·94	5·76	Miles	2·69	53	0·01	3·08
Charters Towers ..	4·45	56	5·84	3·82	Stanthorpe ..	3·14	65	1·86	2·36
Mackay	11·78	67	12·86	15·38	Toowoomba ..	4·51	66	1·80	2·96
Proserpine ..	12·50	35	12·18	6·08	Warwick ..	3·02	73	2·12	0·89
St. Lawrence ..	7·77	67	2·01	9·55					
South Coast.									
					Maranoa.				
Biggenden ..	4·37	39	0·54	3·17					
Bundaberg ..	6·53	55	0·72	6·06	Roma	2·91	64	0·65	3·75
Brisbane	6·33	86	5·62	5·25					
Caboolture ..	7·77	51	3·80	6·53					
Childers	6·60	43	2·13	4·72					
Crohamhurst ..	12·81	45	2·27	9·37					
Esk	5·42	51	1·48	2·15					
Gayndah	4·21	67	1·34	1·77					
Gympie	6·79	68	1·76	6·49	*State Farms, &c.*				
Kilkivan	4·91	59	0·55	4·09					
Maryborough ..	6·81	67	1·86	6·59	Bungeworgoral ..	2·24	24	0·80	3·43
Nambour	9·70	42	4·22	7·82	Gatton College ..	3·50	39	0·83	..
Nanango	4·04	56	0·68	1·72	Kairi	..	..	..	..
Rockhampton ..	7·75	67	0·46	10·63	Mackay Sugar Experiment Station	11·20	41	11·56	22·77
Woodford ..	8·43	51	1·13	7·48					

A. S. RICHARDS, Divisional Meteorologist.

CLIMATOLOGICAL TABLE—FEBRUARY, 1938.

COMPILED FROM TELEGRAPHIC REPORTS.

Districts and Stations.	Mean Atmospheric Pressure, at 9 a.m.	Shade Temperature.						Rainfall.	
		Means.		Extremes.				Total.	Wet Days.
		Max.	Min.	Max.	Date.	Min.	Date.		
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cooktown	29·70	88	75	93	24, 25	68	24, 25, 26, 28	1,336	17
Herberton	..	80	65	89	4	52	27	1,528	18
Rockhampton	29·76	96	75	105	23,24,25	70	19	46	3
Brisbane	29·81	87	71	97	26	63	19	562	7
Darling Downs.									
Dalby	29·80	92	65	104	12	54	6, 27	32	5
Stanthorpe	..	83	58	99	12	44	27, 28	186	6
Toowoomba	..	85	62	98	13	54	27	180	6
Mid-Interior.									
Georgetown	29·74	90	72	96	7, 11, 12	59	27	619	12
Longreach	29·74	94	73	106	12	62	26	400	8
Mitchell	29·77	92	66	102	12	53	27, 28	202	4
Western.									
Burketown	29·71	89	75	96	7	65	23	797	9
Boulia	29·75	93	72	109	2	57	6, 7	275	7
Thargomindah	29·70	97	72	111	12	61	5	32	3

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	April. 1938.		May. 1938.		April. 1938.	May. 1938.
	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					a.m.	a.m.
1	6·2	5·50	6·18	5·20	6·8	7·3
2	6·3	5·49	6·18	5·19	7·11	8·8
3	6·3	5·48	6·19	5·18	8·13	9·13
4	6·4	5·46	6·20	5·17	9·18	10·11
5	6·4	5·45	6·20	5·17	10·22	11·3
6	6·5	5·44	6·21	5·16	11·22	11·50
					p.m.	
7	6·5	5·43	6·21	5·15	12·18	12·34
8	6·6	5·42	6·22	5·14	1·7	1·13
9	6·6	5·41	6·22	5·14	1·51	1·51
10	6·7	5·40	6·23	5·13	2·33	2·29
11	6·7	5·39	6·24	5·12	3·13	3·14
12	6·8	5·38	6·24	5·11	3·51	3·43
13	6·8	5·37	6·25	5·11	4·26	4·22
14	6·9	5·36	6·26	5·10	5·4	5·3
15	6·9	5·35	6·26	5·10	5·44	5·48
16	6·10	5·34	6·27	5·9	6·25	6·35
17	6·10	5·34	6·27	5·9	7·8	7·25
18	6·11	5·33	6·28	5·8	7·53	8·18
19	6·11	5·32	6·29	5·8	8·41	9·10
20	6·12	5·31	6·29	5·7	9·32	10·1
21	6·12	5·30	6·30	5·7	10·24	10·53
22	6·13	5·29	6·31	5·6	11·15	11·47
23	6·13	5·28	6·31	5·6	..	..
					a.m.	a.m.
24	6·14	5·26	6·32	5·5	12·9	12.42
25	6·14	5·25	6·32	5·5	1·5	1·37
26	6·15	5·24	6·33	5·4	1·59	2·36
27	6·15	5·24	6·34	5·4	2·55	3·37
28	6·16	5·23	6·34	5·3	3·53	4·41
29	6·16	5·22	6·35	5·3	4·53	5·56
30	6·17	5·21	6·35	5·2	5·57	6·54
31			6·36	5·2		7·56

Phases of the Moon, Occultations, &c.

1st April	●	New Moon	4 52	a.m.
8th „	☽	First Quarter	1 10	a.m.
15th „	○	Full Moon	4 21	a.m.
23rd „	☾	Last Quarter	5 14	a.m.
30th „	●	New Moon	3 28	p.m.

On the 15th Venus will indicate the invisible planet Uranus. They will apparently be so near each other that even with some magnifying power they might be seen as one object. Both Uranus and Neptune are of little interest to ordinary observers; yet the story of their discovery will for all time be an outstanding event in the history of astronomy. Uranus, in fact, was the first planet that was ever "discovered"; the other wandering stars, known for ages before, were simply "there," and no stargazer was ever mentioned as having seen a planet for the first time. Even more remarkable than the discovery of Uranus by Sir William Herschel was the discovery of Neptune by Adams and Leverrier, simultaneously, not by observation but by intricate calculations at their study table.

Mercury rises at 7.28 a.m., 1 hr. 26 min. after the Sun, and sets at 6.38 p.m., 48 min. after it, on the 1st; on the 15th it rises at 6.59 a.m., 50 min. after the Sun, and sets at 5.59 p.m., 24 min. after it.

Venus rises at 7.4 a.m., 1 hr. 2 min. after the Sun, and sets at 6.42 p.m., 52 min. after it, on the 1st; on the 15th it rises at 7.28 a.m., 1 hr. 18 min. after the Sun, and sets at 6.30 p.m., 56 min. after it.

Mars rises at 8.35 a.m. and sets at 7.31 pm. on the 1st; on the 15th it rises at 8.26 a.m. and sets at 7.10 p.m.

Jupiter rises at 2.25 a.m. and sets at 3.35 p.m. on the 1st; on the 15th it rises at 1.40 a.m. and sets at 2.50 p.m.

Saturn rises at 5.51 a.m. and sets at 5.51 p.m. on the 1st; on the 15th it rises at 5.3 a.m. and sets at 5.1 p.m.

The evening sky is still very luminous with the fine northern and southern constellations. It will now be interesting to watch the various positions of the two great constellations, Centaurus and Argo Navis, as they swing with the Southern Cross around the South Celestial Pole. Regulus, in Leo, is due north of the zenith about 9.30, and Virgo, with Spica, is well above the horizon in the north-east. Then the great Orion sets in the west, while the beautiful curves of the Scorpion arise in the east.

7th May	☽	First Quarter	7 24	a.m.
14th „	○	Full Moon	6 39	p.m.
22nd „	☾	Last Quarter	10 36	p.m.
29th „	●	New Moon	11 59	p.m.

Perigee, 2nd March, at 11.0 p.m.
Apogee, 18th March, at 7.0 p.m.

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

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

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