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Contents



	PAGE.		PAGE.
Event and Comment—		Marketing—	
Unit Herd Testing Scheme ..	67	Production Trends, January ..	120
Encouraging Veterinary Services ..	68	Potato Marketing Board ..	120
Field Crops—		Consumption of Fresh Milk ..	120
Activities of the Bureau of Tropical		General Notes—	
Agriculture	69	Staff Changes and Appointments ..	122
Half a Century in Queensland		Notice of Intention to extend Barley	
Agriculture	82	Marketing Board	122
Vegetable Production—		Marketing Reporting Services ..	122
Marketing Queensland Tomatoes in		Dairy Technology Scholarships ..	122
Sydney	88	The Dairy Products Stabilisation	
Sheep and Wool—		Board	122
The Case for the Mules Operation ..	93	Fauna Sanctuary	122
Plant Protection—		Extending Pineapple Levy Regula-	
Control of Corn Ear Worm on		tion	122
Tomatoes	102	The Farm Home—	
Scab Disease of Gladiolus	104	Training a Child to Eat	123
The Dairy Farm—		Some Appetising Salads	124
Queensland Cheese Production ..	107	Queensland Weather in January ..	125
Production Recording	112	Astronomical Data for March ..	126
The Pig Farm—		Rainfall for January	128
Ailments of Pigs	113	Climatological Data for January ..	128
Animal Health—			
Blackleg	117		

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Volume 66

1 FEBRUARY, 1948

Part 2

Event and Comment.

Unit Herd Testing Scheme.

The Minister for Agriculture and Stock (Hon. H. H. Collins) in a recent statement expressed his pleasure that the Unit Herd Testing Scheme initiated by the Department at Beaudesert in January had got off to a good start and that farmers whose herds are being tested under the scheme were well satisfied with the service.

It is intended that the herd recorder visit each farm monthly for the purpose of weighing, sampling and testing the milk from each cow. The farmer provides accommodation for the recorder whilst he is testing at the farm. When testing is finished, the recorder computes the milk and butterfat production of each cow and hands the results to the farmer.

The cost of operating the units is borne jointly by the farmer, the State Government and the Commonwealth Government. The Commonwealth Government has limited its contribution to an amount of £20,000 per year for the whole of Australia. The cost above the Commonwealth allocation is divided equally between the farmer and the State Government. The cost to the farmer in a unit averaging 800 or more cows per month is 4½d. per cow per test, plus a levy of one halfpenny to defray half the cost of the equipment. The levy will cease when half the cost of the equipment has been met.

The recorder's equipment includes scales, testing machine, milk-testing flasks, sample bottles, acid, and milking-machine test buckets.

The provision of the buckets allows big machine-milked herds to be tested without having to revert to hand milking. Experience gained at Beaudesert shows that the first milking with the buckets is somewhat slower than usual, but the next milking is completed as fast as usual.

The information gained by a monthly test will prove a valuable guide to the members of the units, particularly those who hand feed during portion of the year, and will also provide the information required when culling a herd.

When the scheme is well established it is proposed to institute sire surveys, and thus provide the dairymen with information regarding the ability of herd sires to transmit production to their heifers.

Groups of farmers interested in forming units should communicate with the Department of Agriculture and Stock, and if desired the Senior Adviser (Herd Testing) will attend a meeting of those interested and explain the workings of the units in detail. Although it is late in the season now, intending units should organize with a view to commencing operations in the spring. Prior notice is desired by the Department so that arrangements can be made to obtain the necessary equipment, which is difficult to procure.

Encouraging Veterinary Services.

An ambitious scheme announced recently by the Minister for Agriculture and Stock, should, when fully implemented, meet a long-felt want and prove of far-reaching benefit to stock owners in country centres particularly and the animal industry generally. In announcing the scheme, Mr. Collins said that the Government's proposal was to encourage highly qualified veterinarians to set up in practice in country districts in this State and thus provide stock owners with easy access to veterinary services for attention to the many problems associated with the animal industry. As an incentive to set up in practice, it is proposed to offer these men tuberculin testing work on behalf of the Department, in country districts, to provide them with a means of livelihood whilst establishing a practice in such areas. The first area to be dealt with embraces the country districts surrounding the Greater Brisbane area. At the end of January two veterinarians had indicated that they would avail themselves of the Government's offer, whilst at least two others were expected to agree to the proposal at an early date. As more men become available the scheme will be extended to other areas. With encouragement and assistance from the stock owners, their associations, and co-operative bodies, the plan should prove of inestimable value to the State in due course.

In the meantime, the staff of the Division of Animal Industry of the Department will continue to deal with the control of contagious and infectious diseases, investigations of outbreaks of disease, particularly where large numbers of stock are concerned, and by extension work teach stock owners the value of modern methods of disease control and of animal husbandry generally.



Activities of the Bureau of Tropical Agriculture.

T. G. GRAHAM, Officer in Charge.

THE Bureau of Tropical Agriculture (Plates 18 and 19), which is situated opposite the township of South Johnstone and some seven miles distant from Innisfail, came into being towards the close of 1935. The Station was taken over from the Sugar Bureau, which was vacating the 92 acres of reserve on the South Johnstone River to establish a similar station a little further north on land which was more typical of the bulk of sugar land which their Station was intended to serve. The purpose of transferring this small reserve from the Sugar Bureau to the Agriculture Branch was to enable the latter to investigate the possibilities of crops other than sugar cane in this wet tropical area.

A Director of Tropical Agriculture was appointed to organise the Bureau and set about the establishment of trial areas of tropical crops. Many crops were tried, and it was found that, while most of them grew satisfactorily, the economics of their production did not justify further studies on their agricultural aspects. There were, however, a few crops which, while they did not measure up economically under existing cultural methods employed in their production, had distinct possibilities if the mechanization of harvesting could be applied to them. A strong feeling exists in the minds of a few Queensland agriculturalists that tea and derris come in this category and consequently these two tropical crops have been subjected to further studies at the Bureau.

EARLY PASTURE WORK.

At about the time that this early work was in progress, a northern pioneer in the person of the late Mr. Brice Henry conceived the idea of utilizing the wet coastal belt as a vast fattening ground for cattle from the drier western areas. Experiments were conducted on Mr. Henry's property by the Bureau in conjunction with the Animal Health Station at Oonoonba, and it was quite clearly shown that two-year-old stores could be topped off on coastal pastures within eight months, thus bringing them to maturity at least a year earlier than would have been the case if they were allowed to fatten where they were bred. In addition, stock could be maintained in a fat condition long after the western cattle had commenced to decline and in this manner assist in the extension of the killing period. This work was carried out for the most part with Para grass*, the property in question being ideally suited to this species.

* *Brachiaria purpurascens* Raddi.



Plate 18.

BUREAU OF TROPICAL AGRICULTURE, SOUTH JOHNSTONE.—General view of buildings.

Prior to the impetus given to fat cattle-raising on the coast by Mr. Henry, a small tract of country on the Daintree River had been opened up for dairying. A little later, some country towards the Coastal Range between Innisfail and the Atherton Tableland was established to pastures, and dairying became the occupation of selectors in the area. Factories were established on the Daintree and at Silkwood to handle the produce from these two areas. The principal pasture species used was molasses grass†. Due to annual fires, overstocking, and a fact not known at that time and little appreciated even to-day (namely, that molasses grass will not stand continuous grazing), the pastures deteriorated. The result was that the carrying capacity fell off and



Plate 19.

BUREAU OF TROPICAL AGRICULTURE, SOUTH JOHNSTONE.—View showing stockyards, orchard and pasture areas. Buildings in middle of photograph.

† *Melinis minutiflora* Beauv.

troublesome weeds and inferior grasses threatened to push the farmers out of production. There was also a decline in fertility level because of the absence of a suitable legume, and, in its absence, the failure to apply nitrogen by artificial means.

Early in the Bureau's activities, an attempt was made to determine what leguminous species could be grown in this high rainfall area, in which the soils are extremely acid. By 1939, it had been established that, out of over 200 species tried—many of which were from temperate zones—five legumes were outstanding, namely, puero*, centro†, calopo‡, stylo§, and Sarawak bean||. During the war years, the activities of the Station were largely confined to experiments in connection with the war effort, and unfortunately all other activities had to be curtailed. It was not until 1944 that an attempt was made to sort out the results of the important preliminary work, but steadily the fitting of this early work into some form of agricultural programme began to take shape.

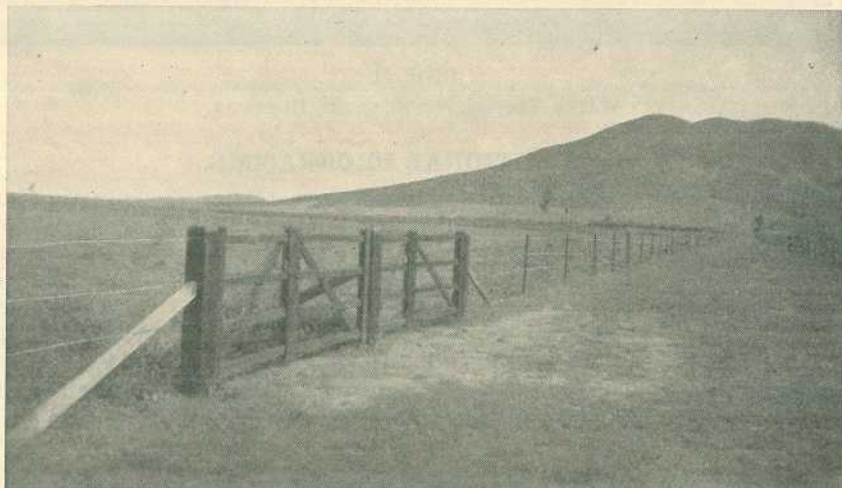


Plate 20.

SHOWING GATES AND FENCES ENCLOSING EXPERIMENTAL AREAS.

While it had been shown that the legumes mentioned grew extremely well on the coast, little was known of their palatability. Moreover, conflicting opinions existed amongst farmers on whose properties small exploratory plots of these legumes had been established.

It had been fairly clearly demonstrated that the future development of this wet coastal belt lay along the lines of animal husbandry. Moreover, it was felt that, if these legumes proved desirable pasture species, the practical application of the knowledge gained could, in some measure, arrest the declining fertility of the cane land as well as the poorly managed pasture areas. With such a weight of evidence and public opinion directed towards this aspect, the Bureau began to change over to pasture investigations, which are described in this article.

* *Pueraria phaseoloides* Benth.

† *Centrosema pubescens* Benth.

‡ *Calopogonium mucunoides* Desv.

§ *Stylosanthes gracilis*.

|| *Dolichos hosei* Craib.



Plate 21.

WATER TROUGH FOR STOCK IN LANEWAY.

TRANSITIONAL PROGRAMME.

The changeover from crop investigations to pasture investigations took considerable time. It entailed a completely new design in layout accompanied by the provision of permanent fixtures such as fencing, yards, shade and shelter, water, and so on (see Plates 20 and 21). In the new programme, certain experimental areas had to be retained in their existing form, which further complicated the layout plan. A design was ultimately arrived at, and an area of two acres selected as a unit for pasture work. All the grass-legume combinations have thus been established in two-acre blocks and each is grazed in rotation.



Plate 22.

CATTLE MOVING THROUGH LANEWAYS TO WATER.

Rather than provide water and shelter in each block, it was decided to erect a laneway linking all blocks with water and shade. The animals could then wander at will between the paddock that was opened for grazing and the other facilities necessary for their husbandry (see Plate 22). This has proved a most desirable arrangement, for the cattle of their own accord visit the paddock for grazing only and spell under the shade of the farm woodlot (Plate 23); in this way the wastage that takes place in pastures as the result of trampling and camping is avoided. It is also the nearest approach to grazing under natural conditions, where stock leave the grazing areas for water and shelter in the shade along the banks of streams.



Plate 23.

STOCK SHELTERING IN WOODLOT.

The farm had a deteriorated woodlot which had to be thickened. As this was the only shade for stock, only half of it could be planted to trees at one time. Accordingly, one section was fenced off and planted, and some 600 trees of various species are now in their third year of establishment. When these have matured sufficiently to be resistant to damage by stock, the areas will be changed over and further plantings will take place.

The construction of a stockyard had to provide for drafting pen, dehorning and branding race, general race for spraying and measuring, weighbridge, and holding yard. The races were fitted with quick-operating slide gates, while easy-moving swing gates were fitted to the enclosures.

PASTURE DEVELOPMENT.**Plant Introduction.**

Plant introduction plays an important part in the pasture programme. An area of the farm has been set aside for this aspect of the work. Any promising species from the introduction plots are placed out into larger legumes or grass seed-increase plots from which more than sufficient seed can be obtained to plant a unit area of two acres.

Palatability Trial.

A palatability trial, consisting of six legumes replicated three times in $\frac{1}{10}$ acre blocks (Plate 24) was commenced in 1945. The legumes are puero, centro, calopo, stylo, Sarawak bean and *Desmodium heterophyllum*. Stock were introduced into the pastures in 1946, and since September of that year the palatability trial has been regularly grazed. Some very interesting information regarding the behaviour of these legumes under stocking, and the stock preference for them, has been obtained. The general procedure has been to take detailed notes of these legumes and determine yield by quadrat sampling before grazing, make observations during grazing, and take detailed notes after grazing. The determination of beast hours during grazing is likely to be misleading if analysed without reference to the other information, for in this locality during summer stock tend to remain under the shade of trees during the heat of the day and do not come out to graze until about 4 p.m. They graze

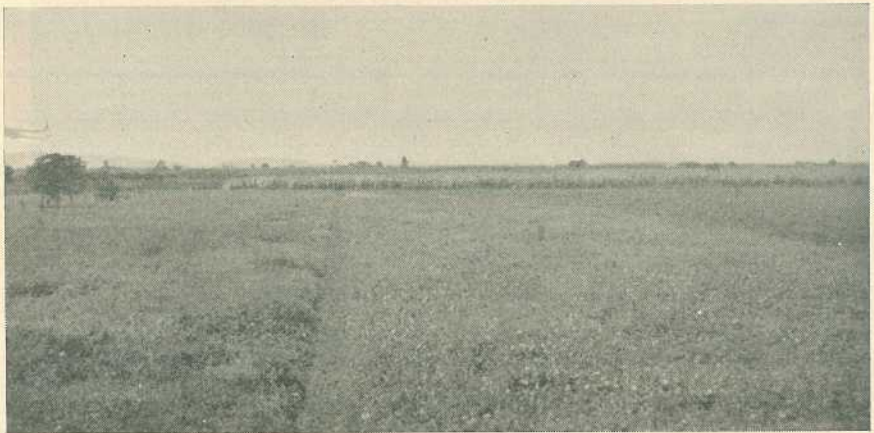


Plate 24.
VIEW OF PALATABILITY TRIAL BLOCK.

during the night and seek shade again about 9 a.m. The number of hours, therefore, during which one can observe grazing comprises only a very short period of the actual grazing hours. The observations are important in determining which species are eaten first and stock preference or otherwise for the various legumes.

The latter end of 1946 was extremely dry, so much so that every dairy farmer felt the strain of lack of fodder. At the Bureau, on the other hand, cattle which were purchased in poor condition continued to put on weight and develop attractive coats all through this period. This success was undoubtedly due to the legumes, particularly in this special instance to centro. Centro showed a remarkable adaptability to dry conditions and remained green and continued to grow after all the other legumes had begun to shed their leaves. It was the legume most favoured by stock in the palatability trial for the first two grazings. In February, when all the plots had made a remarkable recovery owing to bounteous rains, puero was taken in preference to all the other legumes, while Sarawak bean and *Desmodium* were also relished. Stylo was



Plate 25.

LOOKING THROUGH BRUSHED SCRUB AREA AT UTCHEE CREEK.

practically neglected during this grazing, but in May, when the area was opened to stock for the fourth time, the stock grazed stylo to the ground in all three plots before attempting to graze any of the other legumes.

Calopo has been disappointing in this trial. It grows vigorously and forms a dense cover, but unfortunately it is not sought after by stock. Only light grazing has been observed on the calopo plots at any time.

A chance combination of grass and legume seems to have made its appearance in one of the *Desmodium* blocks. This block is separated by a 40-links laneway from a plot of fallow panic grass,* which set a heavy



Plate 26.

BURNT SCRUB AT UTCHEE CREEK, THREE MONTHS AFTER FELLING.

* *Brachiaria miliiformis* Chase.

crop of seed last season and as a consequence was able to invade the Desmodium block while the latter was still recovering from the extremely dry spring of the previous year. Fallow panic was introduced into North Queensland many years ago, but it is only within the last five years that it has come under general notice. In that time it has spread rapidly and the writer, noticing how cattle took to the grass and being attracted by its habit of growth, established a seed-increase block at the Station. At the present time, the grass and Desmodium are growing in an excellent combination. Further studies are planned to observe the behaviour of what promises to be quite an interesting association.



Plate 27.

CENTRO AND PURPLE-TOPPED GUINEA GRASS MIXTURE RECOVERING FROM GRAZING.

Sarawak bean presents some difficulty in establishment. The seed is developed in small pods on the underneath side of the plant and consequently is difficult to harvest. The plots in this trial were established by vegetative means and, running into dry weather following planting, had rather a poor time. For the first eight months it seemed that weeds had the upper hand but eventually an almost complete cover of legume developed over the three plots. Sarawak bean appears to stand up to stocking extremely well.

Grass-Legume Mixtures.

Unit areas of two acres were established and planted to grass-legume combinations. Three grasses had given outstanding results at the Station during the time the legumes were being developed. These were: Para, Guinea*, and molasses grasses. It was decided, therefore, that they should form the basis of the pasture development work and that some of the legumes should be tried in combination with them.

* Varieties of *Panicum maximum* Jacq.

Accordingly, the following mixtures were laid down:—

Centro and Purple-topped Guinea grass*	..	..	2
Stylo and Common Guinea grass†	..	..	2
Calopo and Molasses grass	..	..	2
Puero and Molasses grass	..	..	2

These combinations have been subjected to grazing since late in 1946. While the pasture work was in its early stages, eight two-year-old Hereford steers were used for grazing, but since the total area has been planted to pastures the herd has been increased to 16. The paddocks are grazed with the whole herd for a period of 5 days and spelled for 35 days. This is a tentative arrangement which may have to be altered as experience indicates. At the end of each 5-day period the cattle are weighed. The object is to observe the behaviour of both grasses and legumes under stocking, the degree of grazing necessary to maintain a desirable grass-legume combination, and the differences in carrying capacity of the various mixtures.



Plate 28.

STYLO AND COMMON GUINEA GRASS MIXTURE.

The aim of this work is to obtain pointers to enable experimental work to proceed on a larger scale when sufficient information has been accumulated. For the extended work a property of some hundreds of acres of virgin scrubland (Plates 25 and 26), situated on Utchee Creek ten miles to the south-west of the Station, has been acquired. It is felt that the behaviour of purple-topped Guinea grass + centro (Plate 27), and of common Guinea grass + stylo (Plate 28) is so favourable as to warrant large-scale experimental investigation at the earliest date. Guinea grass

* *Panicum maximum* var. *coloratum*.

† *Panicum maximum* var. *typica*.

and centro both stood up extremely well to the dry conditions experienced towards the end of 1946. They grow remarkably well under the extremely wet summer conditions encountered in this area. They will stand extremely heavy grazing and so far appear to combine quite well as pasture mixtures. Centro was the outstanding legume in the palatability trial. It remained green and produced a large bulk of feed when all the other legumes had lost their leaves and were drying off. Stock put on weight and retained quite a shine on their coats even though the bulk of the pasture was coarse, dry grass. Centro and Guinea grass have been grown in combination at the Bureau for the last six years.

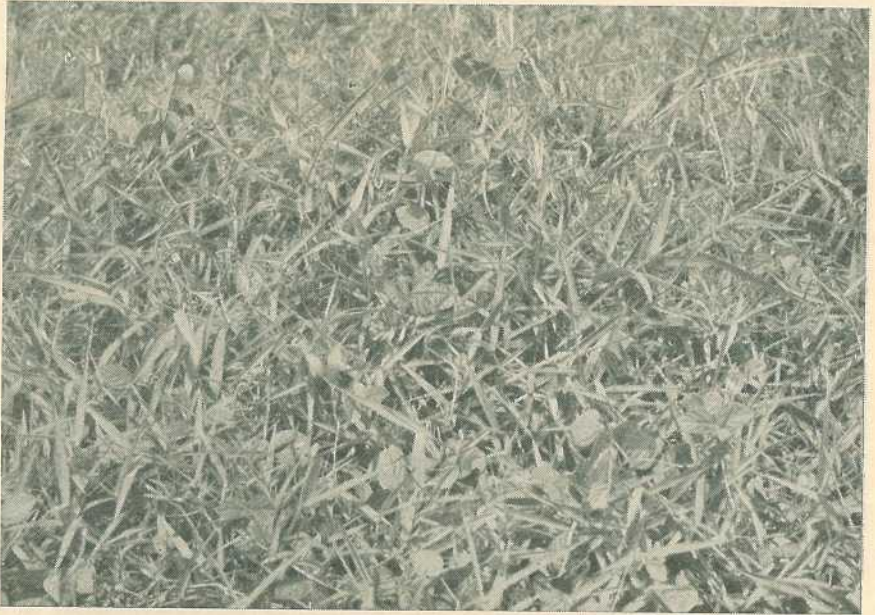


Plate 29.

CALOPO AND MOLASSES GRASS MIXTURE.

Stylo and Guinea grass also grow well together provided the Guinea grass is well managed. Stylo, unlike centro, is not a twining species, and, if the Guinea grass is allowed to grow too tall, the slower-growing stylo is apt to become smothered. It was handled quite satisfactorily, however, in a stand of Guinea grass at the Bureau through the wet months of February and March, 1947. Both grass and legume will stand heavy stocking, they both regenerate well, and they give good results under dry and wet conditions alike.

Apart from the experimental work planned for Utchee Creek and the work with grass and legume mixtures at the Bureau, an area of river flat country on the lower end of the Station has been cleared of sucker growth and allowed to regenerate under Para grass. Scattered patches of Para grass have persisted on this river flat area ever since the days when cane was last grown on the area. As the result of fencing and locking up these paddocks, a reasonably good stand of Para grass has developed and the time has arrived when an effort could be made to establish puero, centro, and stylo in this stand.

Puero and molasses grass have so far given good results in combination, but it is doubtful whether puero will stand up to the heavy rotational grazing necessary to keep the molasses grass in young growth.

Calopo and molasses grass are also growing in association with each other (Plate 29), but there appears to be a very delicate balance, and if this is disturbed one or the other species is inclined to dominate the pasture with the balance in favour of the legume. Guinea grass, on the other hand, seems to be able to resist the spread of calopo (Plate 30). It seems that calopo is grazed slightly better where it forms a constituent part of a pasture. In spite of this observation, one is reluctant at this stage to recommend it for general planting in a pasture mixture.



Plate 30.

GUINEA GRASS AND CALOPO AT UTCHEE CREEK.

Some Promising Species.

Since the establishment of the work already outlined several promising grasses and legumes have made their appearance. Notes on these are given hereunder.

Scrobic.*

This species, procured from the Council for Scientific and Industrial Research, has been established readily from seed and has made good growth at the Station under both wet and dry conditions. The behaviour of this grass on the wet tropical coast will be watched with interest since it would appear that some of our semi-decumbent types of legume have a better chance of developing in association with this grass than with some of our more vigorous species.

Fallow Panic.

Brief mention has already been made of this species, which was introduced to North Queensland some years ago and which within recent times has spread naturally throughout the north coast. A plot has been established at the Station to observe its behaviour under grazing and to determine its value in association with various legumes, notably *Desmodium heterophyllum*.

* *Paspalum scrobiculatum* L.

Desmodium canum.

This is a recent introduction from Hawaii. Seed for the original plot was obtained from the Commonwealth Vegetable Farm at Home Hill but further plantings have been made from seed sent direct from Honolulu.

It germinates readily from seed, but seems very slow to become established at the Bureau. It is an attractive looking legume, and efforts are being made to establish it with several of the more decumbent grass species. From a small plot established last year the natural regeneration gives promise and its spread is watched with great interest.

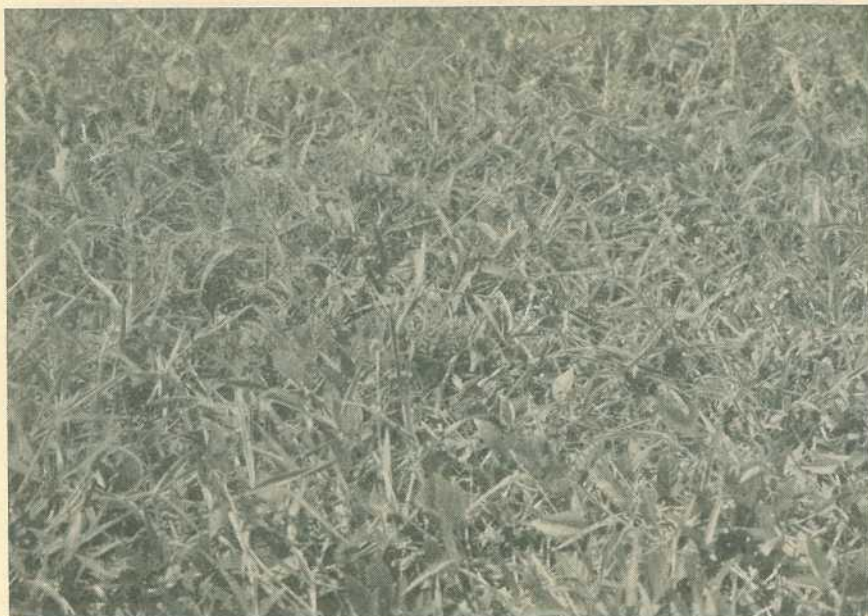


Plate 31.

CENTRO AND MOLASSES GRASS MIXTURE.

Samoan Clover.*

So far, we have not succeeded in properly establishing this legume with a grass, but there is evidence of invasion on the adjoining plots of legumes. It seeds well and the minute hairs around the seed coat give it a ready means of dissemination, since it clings to the hairs of animals.

Common Lespedeza.†

This species of lespedeza was tried in 1946 but did not look at all promising. However, the small plants seeded and a young crop came away in the spring of 1947. Being a summer annual, it might be better suited to a slightly drier area where the seed would germinate with the summer rains.

* *Desmodium scorpiurus*.

† *Lespedeza striata* Hook. et Arn.

Kudzu.*

This famed plant has been growing at the Station for the last ten years. Two years ago it was established in a plot and has made good growth (Plate 32). Unfortunately, it loses its leaves and becomes dormant in the winter, and, by comparison, is vastly inferior to puero in this locality. Its feature lies in the fact that it can be grown in much colder latitudes than puero and, like the latter, is an excellent plant for the control of erosion in broken gullies, &c.



Plate 32.
PORTION OF A KUDZU STAND AT SOUTH JOHNSTONE.

ACKNOWLEDGEMENT.

Many officers of the Department of Agriculture and Stock have been associated with the work of the Bureau of Tropical Agriculture over the past decade. The grassland work has been a continuation of the work commenced on the late Mr. Brice Henry's property ten years ago. This is, therefore, a comparatively young station but its progress is a tribute to the ready co-operation and enthusiasm of all those who have, in some measure, contributed towards its success.

* *Pueraria hirsuta* Scheid.

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STORY OF THE DEPARTMENT OF AGRICULTURE AND STOCK.

PART 4.

(Continued from page 12, Q.A.J. for January.)

J. F. F. REID.

FROM 1909 until the outbreak of World War I. in 1914 was a period of continued expansion of departmental activities.

In 1910 some notable staff changes were made as a consequence of the resignation of Dr. Sydney Dodd, who in 1907 had entered on a three-year engagement with the Department for research work in animal diseases as Principal Veterinary Surgeon and Bacteriologist, in the course of which the Yeerongpilly Stock Experiment Station was established. The work of the station was continued by A. H. Cory (afterwards Chief Inspector of Stock) and C. J. Pound, Government Bacteriologist. A. H. Benson, Instructor in Fruit Culture, who had previously been with the New South Wales Department of Agriculture as Fruit Expert, also resigned to become Director of Agriculture in Tasmania; he rejoined the Department in 1915 as Director of Fruit Culture in Queensland, and remained with it until his retirement in 1927.

RURAL CO-OPERATION.

During this period the rural co-operative movement continued to advance rapidly, particularly in the dairying and pig-raising districts. This movement towards farmers' co-operation was facilitated by legislation providing for financial assistance and which was administered by the Department.

In 1900 the whole of the business of processing dairy products was in the hands of proprietary companies. In 1901, the Queensland Farmers' Co-operative Company was formed and commenced butter manufacture at Booval. From that time onward the co-operative movement made rapid progress, and the dairy industry in Queensland on its manufacturing and marketing sides is now almost entirely under producers' co-operative control. The extension of the principle of co-operation to bacon manufacture and distribution was a natural corollary, and most of the large treatment plants are owned and directed by farmers.

IMPORTATION OF PURE-BRED STOCK.

While on a visit to Europe, John Mahon, the Principal of the Queensland Agricultural College, was commissioned to purchase on behalf of the Department some pure-bred stock, including horses, cattle, pigs and poultry, for the purpose of improving breeding standards. During his absence abroad, the college was administered by H. C. Quodling.

The demand for College-bred stock continued far in excess of the supply, especially of pigs required for foundation herds in the new dairying districts.

A teachers' course attended by 60 State school teachers from many parts of Queensland during their mid-winter vacation was held that year and proved highly successful in its results.

A school of instruction for cheese factory managers was another innovation at the college, with the object of improving quality in the export trade, which was growing rapidly in economic importance.

Reafforestation of a portion of the agricultural college lands at Gatton was under consideration. "Reafforestation should follow the denudation of the land of its natural timber," commented the Under Secretary (Scriven) in his report for the year, "not only from a college point of view, but also as an object lesson to the farmers to go and do likewise on lands . . . stripped of timber."

FARM APPRENTICESHIP COURSES.

It was considered that the farm apprenticeship courses instituted at the State farms at Hermitage and Biggenden three years earlier had been sufficiently long on trial to justify official comment: "The result fully justifies the experiment which was instituted to provide a means of learning practical agriculture for lads, residents of towns for the most part, whose parents are not in a position to pay the expenses of an education at the Agricultural College. The statements by letter or orally from the parents have been a high commendation of the officers to whom the education, morally as well as agriculturally, of these lads has been entrusted for varying periods up to three years . . . The facility with which employment has been obtained by those who have received instruction has fully warranted the experiment, which by its continuance is providing a steady rivulet of good farmers for the well-being of the State."

This system of farm apprenticeship was to be extended to the Roma State farm, beginning with four apprentices, an annual recruitment of three, until a full complement of ten was employed. The appointment of a science master at State farms employing apprentices to supplement the practical instruction of the respective managers was suggested.

The establishment of a State farm at Kairi on the Atherton Tableland in the 1910-11 departmental year marked, as stated in the annual report, "the completion of a desire long expressed by farmers in that neighbourhood for help and education in the later methods of agriculture and will, it is hoped, result in a larger use being made of those fertile lands by our own people instead of continuing the present system, much favoured there by landholders, of leasing those fertile lands to people of other races."



Plate 33.
STAFF OF THE DEPARTMENT OF AGRICULTURE AND STOCK, 1913.

As to State farms generally, the departmental report for 1910 contains this comment: "Much has been said to the detriment of the farms, and to the effect that they involve an expenditure which is not repaid by the gain to the State. Such remarks when analysed, however, are found to have no weight and are based on generalities that will not bear questioning. The demand for the establishment of State farms comes from all quarters and emanates from those who appreciate the work of them . . ."

RURAL PROGRESS.

In the 1909-10 season, the total area under farm crops in Queensland amounted to 606,790 acres. In addition there were 41,310 acres in fallow; 108,438 under introduced grasses as permanent pasture; and 90,347 broken up, but uncropped.

During the first decade of the century, notwithstanding the severe drought losses of 1902, Queensland livestock figures showed the following increases: Horses, 21.6 per cent.; cattle, 15.5; sheep, 89.5; and pigs, 2.1.

Consequent on the subdivision of large estates into smaller holdings, the number of stockowners also increased greatly.

CHILLED BEEF.

The export of chilled beef in place of frozen carcasses was engaging the attention of the meat trade towards the end of the decade. A trial consignment was well received in London. Other shipments followed, but the development of the chilled beef export trade was retarded by the limitation at that time of suitable shipping space for such cargoes.

A SUGAR RECORD.

A new record for the sugar industry was attained in 1910 when the raw sugar output totalled 210,756 tons, a record frequently exceeded, however, in later years. By 1939, a peak year in sugar production in Queensland when the sugar output aggregated 891,422 tons, of which 513,792 tons were exported, the 1910 record had been more than quadrupled.

VISIT OF SCOTTISH FARMERS.

A notable event of that year was the visit of the Scottish Agricultural Commission. A published report of the observations and experiences of its members contains many appreciative references to their Queensland journey across open rolling blacksoil downs and vast stretches of "undeveloped scrub, forest and jungle, with hill and valley following each other in a bewildering sequence of impressive beauty." With the potential wealth of North Queensland, the Scottish farmers were deeply impressed. In their report, published subsequently in volume form*, they wrote: "From Cairns an expedition was made to Atherton . . . The route was by a picturesque line leading from the sea-level up the mountain side. The Queensland people have cause to be proud of their scenery. It is finely diversified and panoramic. Of all the scenes of beauty, possibly the Barron Falls stand out pre-eminent. But the whole distance travelled from Cairns to Yungaburra and Atherton is noteworthy for its picturesqueness and novel charm. The tropical vegetation with its infinite variety; the butterflies and birds whose brightly coloured wings sparkle like jewels in the sunlight;

* *Australia, Its Land, Conditions and Prospects. The Observations and Experiences of the Scottish Agricultural Commission of 1910-11.*

the hills towering into the blue; the Barron River, now a raging torrent pouring its flood over the most rugged of rocks, now still and silent as a pool—all combined to make the journey unforgettable."

Of the Atherton Tableland they said: "The heavy timber still standing speaks of the quality of the soil. The land already cleared shows how well it repays labour and expenditure." They deplored the destruction of stands of valuable trees: "It is a pity, however, that the clearing of the Atherton land has involved the destruction of so much fine timber. The axeman has been ruthless. Doubtless the cost of conveying timber to Sydney, or even to Brisbane, is great, perhaps prohibitive, but surely such magnificent trees deserve a better fate than reduction to ashes." In after years the remaining stumps of many of these trees, notably walnuts, were profitably exported as highly valued cabinetwoods to America.

In the course of considered comment the Commissioners commended the standard of practical agricultural education already achieved by the Department at the Gatton College and on the State farms and demonstrational areas. Particular commendatory reference was made by one of the visiting Scotsmen, Dr. J. H. Wilson of the University of St. Andrews, a noted plant breeder of his day, to the wheat and other plant-breeding work then in progress at the Roma State Farm under the direction of R. E. Soutter.

A FISH EXPERIMENT.

The stocking of Queensland waterways with trout and other game fish has often been considered. From time to time efforts have been made to acclimatise trout, but apparently the only lasting success achieved with such projects is the stocking of some of the Southern border streams with head waters in the high country of the New England district of New South Wales. In 1910, arrangements were made through the Department for an experiment in acclimatising trout in the streams of the northern uplands around Herberton. The stocking of the surrounding country with introduced game birds, including pheasants and partridges from Britain, also was under consideration. An acclimatisation society was formed at Herberton to foster the game fish project. Rainbow trout ova were obtained through the New Zealand Department of Agriculture and from the hatchery of the Acclimatisation Society of Southern Queensland near Killarney (Queensland) and placed in a fish hatchery on the Wild River. Young fish were subsequently liberated in Nigger Creek and other northern tableland waters which were regarded as suitable, but no notable success was achieved by this experiment, probably because of the northern climatic conditions.

THE DAIRY INDUSTRY—CONTINUED EXPANSION.

Further expansion in the dairy industry in that year was reported by the Dairy Expert (E. Graham), who referred to an inclination of farmers in the wheat districts to change from grain growing to dairying; and also to the "possibilities of adding to our present production by the extension of railways to new country." An outstanding example of the wisdom of building railways in advance of settlement had already been provided in the South Burnett by the completion of plate laying to the 56-mile peg at Kingaroy before the opening for selection of the large tracts of dense vine "scrub" traversed by the new line. The South Burnett is now known as one of the most productive and progressive provinces of the Commonwealth.

John Mahon, who had been Principal of the Queensland Agricultural College for over 13 years died on 25th December, 1911. Throughout his career from the time he came to Queensland as manager of one of the travelling dairy plants and afterwards as Principal of the College, his constant aim had been to raise agricultural education and practice in the State to the highest attainable standard. Mr. H. C. Quodling was appointed Acting Principal.

The death of John Mahon was recorded in many Press appreciations of his service to Queensland as manager of a unit of the Travelling Dairy which attained a position of importance in the rural life of the 'nineties. It is appropriate, therefore, to give a brief account of that system of taking practical instruction to the farmer on his own farm, and which had a definite influence in the development of the dairy industry in this State.

Some years before 1888 a travelling dairy had been in operation in Victoria and had achieved such sound results and had so impressed the then Minister for Lands in Queensland (M. H. Black) that he decided to institute a similar system here. At that time, agricultural matters were administered by the Department of Public Lands.

Towards the end of 1888, the first unit of the Queensland Travelling Dairy was formed under the management of Baron Jones who had had experience of similar work in Victoria. His assistant was T. Spence, who was succeeded later by James McCormick. When Baron Jones retired, he was succeeded by Spence who, in turn, had as his assistant, F. J. Watson, who had been with the No. 2 T.D. Unit.

John Mahon came from Victoria, where he had had long experience as an expert in dairy practice, to start the No. 2 Unit of the Travelling Dairy in September, 1889. His assistant was C. Hitchcock, who in that capacity was followed successively by F. J. Watson, R. Winks, and Charles McGrath (afterwards Supervisor of Dairying).

The functions of the Travelling Dairy were to give farmers an idea of the butter and cheese factory system; to teach cheese and butter making on the farm; and to spread knowledge on the installation and use of separators. Included in the plant of each unit were a large cream separator operated by a horse gear (or whip); two hand separators; a cream testing outfit; two wooden box churns; a cheese vat, a cheese press, a curd rack, a curd cutter; and a quantity of cheese moulds.

Local committees of farmers were formed in each centre to make all necessary prior arrangements for the operation of the plant and attendance of farmers. The plant was conveyed by horse transport, whenever necessary, from the local railway siding to neighbouring rural centres. Before the Travelling Dairy ceased operations (No. 1 Unit in 1892, and No. 2 Unit in 1896) both plants had operated in most dairying districts in Southern and Central Queensland to as far North as Mackay.

The success of the Travelling Dairy, demonstrating as it did the widespread desire of farmers for technical agricultural education, led, it is said, to the founding of the Queensland Agricultural College at Gatton. On the opening of the College in 1897, John Mahon was appointed Principal and, under his direction, it became one of the most noted institutions of its kind within the Commonwealth.

[TO BE CONTINUED.]



Marketing Queensland Tomatoes in Sydney.

J. H. SAINT-SMITH, Adviser, Horticulture Branch.

IN 1946, from the beginning of June to the middle of November, realizations for Queensland tomatoes were such that even average quality tomatoes could be marketed in Sydney at prices payable to growers. During the 1947 season the position was very different, and for considerable periods average quality Queensland tomatoes were sold at prices which would not cover the costs of production and marketing.

In 1946, 385,951 cases of tomatoes from Queensland were received in Sydney from 1st June to 28th September. In 1947, 322,820 cases were received for the same period. From a comparison of the weekly total quantities and the market quotes for these two years it is obvious that factors other than the total quantities received from Queensland were operating in determining market prices.

Production in New South Wales.

A comparison of the temperature and rainfall conditions in Sydney for the months of June, July, August and September, 1947, and the average for eighty-eight years shows that in 1947 the winter was much drier than the average. Also, it was somewhat warmer in 1947 than the average of the eighty-eight-year period, June mean average temperature being 1.9° F. above the previous average, July 1.5° F., August .2° F. and September .4° F. The effect of this warmer- and drier-than-average winter, which also was frost-free in Sydney, was to allow good quality tomatoes to be marketed from field crops grown near Sydney until September, and also to cause glasshouse-grown tomatoes to appear in quantity on the Sydney market in the first week of August instead of their usual time in the first week of September. The effect of this continuous supply of tomatoes, which could be and was marketed at low cost to growers and at just the stage of maturity which the particular market required, was to depress values of Queensland-grown tomatoes below figures which would be payable to growers, particularly for average and below-average quality consignments.

From the above facts it might be assumed that, because 1947 was not a normal year climatically, Queensland growers might expect higher prices for average quality winter and spring production in average years. This, however, is not likely to occur because of a number of factors, some of which are discussed here.

Glasshouse Production.

One factor which has some effect and which is now permanent is that between the years 1943 and 1946 a considerable number of glass-houses were erected within a few miles of Sydney and were paid off by growers when the average winter and spring prices for tomatoes were very high (up to 48s. a case in 1943). Although present returns may not make it possible for further large expansion of the area under glass, due to high capital cost, the fact remains that the present area yields approximately 2,000-3,000 cases a week, with an all-time record week of 20,000 cases, during the period when the market is usually largely supplied from Bowen and Yarwun.

Condemnations.

A considerable quantity of Queensland tomatoes has been condemned by inspectors of the New South Wales Department of Agriculture for diseases, immaturity and topping.

Most lines condemned during the coldest weather period in 1947 were condemned for immaturity. These condemnations cause some dismay to one accustomed to the time taken for tomatoes to ripen in Brisbane—where the mean average temperatures for the winter period are June 60.1° F., July 59.5° F., August 60.6° F. and September 65.3°—until it is realised that air temperatures in Sydney during the winter (even in such a "warm" winter as 1947, when the mean average temperatures were 56.6° for June, 54.5° for July, 55.5° for August and 59.7° for September) were below the most satisfactory ripening temperatures for tomatoes. At these temperatures mature green tomatoes will either ripen very slowly or ripen more or less abnormally, whereas in Brisbane mature green tomatoes will ripen at winter temperatures. This difference in ability to ripen at air temperatures causes the New South Wales standard for maturity to be different from the Queensland standard, although the wording of the Government regulations governing maturity is very similar in both States. Experience has taught the New South Wales inspectors that the ripening of green tomatoes during cold weather is very slow and frequently not normal and that skin-blemished tomatoes are likely to show severe wastage during ripening. Consequently tomatoes which were showing no red colour or which were blemished were withheld from sale.

Coloured tomatoes were also condemned in Sydney for immaturity if the tomatoes were very soft and the juice readily exuded when the fruit was cut. It is contended that such fruit must have been picked in an immature condition.

Other tomatoes were condemned for diseases and skin blemishes. No tolerance for such defects as "cat-face," growth cracks, diseases, insect damage, decay or sunburn are laid down in the New South Wales standards for tomatoes. Thus a considerable number of cases which could have been sold in Queensland as "B" grade could have been condemned under the New South Wales regulations. The number of lines condemned was greater than in previous years when the enforcement of the regulations was not so strict. The stricter enforcement in 1947 of regulations in relation to tomatoes applied to all consignments, irrespective of their origin.

Market Requirements.

The requirements of Sydney, for tomatoes in particular, have changed since the war. At present the market needs a much higher quality than satisfied it previously. The ideal requirements are—

- (a) Fruit well packed with at least 24 lb. to the case.
- (b) Fruit of the one size in the cases (New South Wales regulations allow of only $\frac{1}{2}$ -in. variation in size of tomatoes in a case).
- (c) Fruit at least $2\frac{1}{4}$ in. in diameter (smaller sizes sell at much lower rates and depress the market for good sizes).
- (d) Fruit of uniform maturity, with the maturity grade marked on the case. It is not possible to indicate one stage of maturity as being the most favoured, because at some times coloured fruits bring more than green—this frequently happens when the price is liable to fall—while at others mature green are preferred. However, it is most important that at all times tomatoes should be sufficiently mature that they will ripen normally—that is, arrive in Sydney showing a tinge of colour in winter and mature green in the warmer period.
- (e) Fruit free from all defects. The most common defects are in relation to—
 - (1) Texture; tomatoes should be firm to very firm, as soft types are not wanted.
 - (2) Skin blemishes; clean-skinned tomatoes are necessary.
 - (3) Cat-face and other shape irregularities.
 - (4) Pests and diseases, of which *Alternaria* rots, bacterial rots, and mosaic are the most common affecting Queensland tomatoes.
- (f) Cases to be branded with size and maturity as well as grower's name and address and consignee's number.
- (g) Cases to be papered with clean paper.
- (h) Cases to be new or, if not new, at least clean and free from dirt.

Whilst it is fully realized that commercial growers may not be able to market all their fruit in such condition, it must be emphasized that the nearer they approach such an ideal the nearer will their returns be to the highest realization on the market. Further, as freight and cartage—1s. 11 $\frac{3}{4}$ d. per case from Bowen, as compared with 4d. per case for glasshouse tomatoes—are very considerable items for Queensland growers, the higher their realizations per case the lower the proportion of their returns which will be absorbed by these charges. Another point to be considered is that at present market quotations invariably show higher prices for tomatoes produced nearer Sydney than for those grown further away in Queensland, and this price difference is stimulating New South Wales production. This development could quite easily go on to such an extent that it would become unprofitable for many Queensland tomatoes to be marketed in Sydney except under unusual conditions.

Realizations show that the winter preference in Sydney for tomatoes is, first, glasshouse and local; second, Coff's Harbour; third, South Queensland; fourth, Bowen and Yarwun; and fifth, Home Hill and Proserpine. There is a tendency for Coff's Harbour to replace glasshouse for first place; this is because the New South Wales Department of Agriculture has been able to improve Coff's Harbour tomatoes by instruction to growers and by enforcement of grading regulations. During the coldest weather there is a preference for "coloured" lines ("coloured" means showing a tinge of colour up to three-quarters coloured but no riper).

Regulating Market Supplies.

Variation in Quantities in the Sydney Market.—Sydney market can very quickly change from a very short market to a heavily over-supplied one for tomatoes and *vice versa*. Supplies can be moved to Sydney from Brisbane or Melbourne in one day (by passenger rail from Brisbane or road transport from Melbourne); also local growers can rush in supplies to a short market.

Clearing the Market.—As it is a recognised fact that accumulations of inferior lots will depress values even for good quality, an examination of the facilities available for moving lower-grade tomatoes from the market is desirable. Winter tomatoes are not wanted by factories irrespective of price, because (1) the factories are busy on other products during the winter; (2) factories will not buy tomatoes in the winter just to clear the market when they can get regular and direct supplies in summer; (3) Bowen tomatoes are too pale and have too thick a skin for efficient manufacture of good quality products; (4) the wartime demand for processed tomato products has gone; (5) there is a tin-plate shortage.

Recent police action in Sydney has practically removed "pirate" barrowmen, who sold a considerable amount of inferior fruit and vegetables. Thus the only way to clear the market seems to be the enforcement of grading regulations. This also means that in times of extreme over-supply the market price can fall to levels just sufficient to cover the cost of marketing local Sydney tomatoes; such price levels would be unpayable to all Queensland growers.

Total Quantities which the Sydney Market can Handle.

The maximum total quantities of tomatoes which could be profitably marketed in Sydney from Queensland cannot be ascertained, and, even if it could for one set of conditions, it would be only misleading for other conditions. For the calendar year 1946, 689,461 cases of Queensland tomatoes were received in Sydney by C.O.D. trains, and at all times the best quality returned growers payable prices. In the week ending 12th October, 1946, 42,887 cases were received, and the price range was 7s. to 16s.; yet in the week ending 1st June, 1946, there were only 2,705 cases received, and the price range was 6s. to 12s., due to considerable New South Wales supplies. It must also be remembered that the Sydney market can supply to or draw from the three eastern States; that the Melbourne market is supplied by Western Australian field-grown and South Australian glasshouse-grown tomatoes during the winter and spring, and that even these can quickly be moved to Sydney if prices are attractive. In a normal year, the Sydney market is lightly supplied from local sources from June to August inclusive.

The chief producing areas supplying Sydney are—

1. *New South Wales*—
 - (a) Metropolitan, field grown, December to May, large amounts;
 - (b) Metropolitan, glasshouse, August to November, large amounts (not early hothouse);
 - (c) Coastal and inland—comprising (i.) Murrumbidgee Irrigation Area, January to June, in large quantities; (ii.) northern coastal, consisting of Coff's Harbour, Port Macquarie and Far North Coast, from September to early October to December, in large quantities.
2. *Victoria*—Shepparton and Portland in February.
3. *Queensland*—
 - (a) Bowen, Yarwun, in winter period;
 - (b) Redland Bay, usually in autumn and October-November;
 - (c) Stanthorpe in February.

Artificial Ripening.

There are a number of ripening rooms in Sydney used for colouring tomatoes. However, there is some doubt as to whether it is economically sound to handle green tomatoes in ripening rooms in view of low prices, handling costs involved, variations in market prices and the fact that, although immature tomatoes may be coloured, they are not properly ripened by artificial treatment. It is estimated that at present about 10 per cent. of Queensland tomatoes are either ripened or repacked by repackers during the winter, but these operators have, on a number of occasions, made considerable losses on their dealings.

Method of Selling on Sydney Market.

Tomatoes are sold in Sydney in grower's lines. Other things being equal, there is a preference for large lots over small lots, as under these conditions the buyers for the larger shops and country order trade can obtain their requirements at one place and time and will pay for this privilege by giving slightly more for the same quality. The fact that sales are by grower's lines means that the grower's name on the cases helps or hinders the sale of the line according to the usual quality sent.

Recommendations.

The above summing-up of market prospects may seem gloomy from the Queensland point of view, but it is only by facing the facts and taking prompt remedial action that production in coastal Queensland can be maintained on a profitable basis.

The suggested action to be taken includes—

- (a) Much greater care to be taken in the selection of suitable varieties. Some types are definitely unsuitable. These include all the soft ripening types, such as Pearson and all varieties which ripen to other than a full red colour, such as the Bowen Buckeye Globe. To assist growers in this respect, the Department of Agriculture and Stock is planning to expand its variety-testing programme into all the main tomato-producing districts.
- (b) Strict adherence by growers to the grading regulations of both New South Wales and Queensland.



The Case for the Mules Operation.

G. R. MOULE, Officer-in-Charge, Sheep and Wool Branch.

ALTHOUGH fifty years have passed since the blowflies that strike sheep first appeared in Queensland these parasites still constitute one of the greatest troubles facing the pastoral industry. More than once large rewards have been offered for the control of strike and it has been estimated that flies have cost Australia £3,000,000 per annum.

Various sources contribute to such a loss—high death rates, decreased lambing percentages, higher labour costs, lighter wool cuts and an increased proportion of tender fleeces, with consequent lowering of wool prices. In addition there has always been the fear in the minds of wool growers that a bad fly wave may be “just around the corner.”

In Queensland a very large proportion of all strike occurs in the breech of ewes. There are some districts where body strike is quite prevalent at certain times of the year and in almost all pastoral areas a bad fly wave occurs every few years when strike may originate in situations other than the breech. The fact remains, however, that for the majority of sheep under average seasonal conditions breech strike, which includes strike originating on the crutch or on the tail, is far more common than any other type.

The control of breech strike then is of paramount importance to the sheep industry and it is a problem which has received a good deal of attention from wool growers and scientists working in closest collaboration. As a result means have been provided whereby breech strike of sheep in Queensland can be reduced so that it is no longer a source of economic loss.

The prevention of breech strike is not dependent upon any one method, though certain procedures are more important than others, and the purpose of this article is to describe the various methods which might be employed to reduce losses from breech strike to a minimum.

THE CAUSE OF STRIKE.

In order to understand the control of breech strike it is necessary to appreciate the cause of strike. Two factors are important in its development:—(1) blowflies; (2) sheep which are attractive to the flies.

Wool growers often suggest that it would be preferable to attack the blowfly problem by decreasing fly populations. In practice, however, a much more effective control is attained by reducing the attractiveness of the sheep. This, incidentally, removes the breeding ground of the flies, as it has now been demonstrated clearly that the green flies which initiate strike breed much more freely in struck sheep than in carcasses.

The attractiveness of sheep to blowflies depends largely upon putrefactive odours which result from an area of local inflammation of the skin. This is initiated, in the majority of cases of breech strike, by moisture which comes almost entirely from urine or faeces. Skin which is constantly wet becomes red and sore and bacteria flourish in the exudate on its surface. The odours which arise from these changes are attractive to blowflies and, should these be present, eggs are soon laid on the moist parts of the fleece. The maggots which soon develop find warmth, food, moisture and protection, and accordingly they flourish at the expense of their unfortunate host.

Several factors predispose to the commencement of bacterial activity likely to produce odours attractive to blowflies. They are:—

1. The conformation of the breech of the sheep, with special reference to the extent of the unwooled skin surrounding the urogenital opening and to the wrinkliness of the skin of the crutch.
2. The way in which the sheep's tail has been cut.
3. The length of the wool on the crutch.

PREVENTING CRUTCH STRIKE.

Crutching.

Because of the importance of wool length, crutching is commonly employed as a method of controlling breech strike. The cost, which often approximates 2½d. per sheep, is a disadvantage as only about six weeks protection is given. Accordingly it may have to be repeated two or three times in a bad year. Another disadvantage is that a certain amount of organising, such as engaging teams and mustering sheep is often necessary before the work can be undertaken. As the result of such delays heavy losses, due to fly strike, may be incurred.

Spretting and Jetting.

Spretting and jetting are much more readily applied than crutching and can be quite effective, depending upon the thoroughness with which the work is performed. In a survey made during the six years, 1941 to 1947, it became clear that jetting is rather badly done in the majority of instances. As it is usually carried out by the available station labour, it requires the minimum organisation and can be undertaken at any time, provided the necessary plant is available.

The protection given depends partly on the materials used. These cost only about ¼d. per sheep, but, even when carried out under the best conditions, jetting or spretting will rarely protect sheep for more than four or five weeks. Accordingly the sheep may have to be treated on several occasions during the year, so the total cost for materials may be as high as 1d. to 1¼d. per head. In addition there is the capital

charge against the plant and equipment to consider. This varies with the type of plant and race used, but it may be as high as 2d. per sheep per annum and it should be remembered that this is a charge which goes on, year in, year out, irrespective of whether the plant is used or not.

Additional mustering and handling of the sheep are involved in these operations, especially when they have to be undertaken several times during the year, and this can be expensive because, besides the labour charges incurred, repeated working of the sheep through yards may make the wool very dusty.



Plate 34.

SHOWING THE STRETCHED BARE AREA ON A LAMB ONE MONTH AFTER THE MULES OPERATION.

Docking and the Mules Operation.

The two most recent developments in blowfly control have focussed attention on the Mules Operation and the importance of correct tailing of lambs.

Many woolgrowers do not seem to realise that the main and most important effect of the Mules Operation is to stretch the bare area surrounding the urino-genital opening, which is clearly demonstrated in Plate 34. In correctly treated sheep the bare area usually measures about 4 inches across, as against about $1\frac{1}{2}$ inches in untreated animals. In this way repeated soiling, by urine, of the wool-growing skin is prevented, and this means of course that areas attractive to flies will not develop. It is an acknowledged fact that wrinkly breeched sheep are more susceptible to strike than plain-bodied sheep and, because of this, the late Mr. J. W. H. Mules suggested the surgical removal of the

crutch wrinkles likely to cause trouble. The present technique used in performing the Mules Operation, which was developed by C.S.I.R., removes any crutch wrinkles which may be present, but its effectiveness does not depend entirely upon this fact as the following experimental results indicate:—

Class of Sheep.	Percentage Crutch Strike in 12 Months.	
	Mules Operated (Off Shears).	Untreated.
Completely plain breeched sheep	4	19
Wrinkly breeched sheep	4	98

These figures demonstrate clearly that the Mules Operation can give added protection from crutch strike even to plain breeched sheep and this of course results entirely from the stretching of the bare area.

Recent investigations have shown that two factors are of major importance in the docking of lambs' tails:—

- (1) The way in which the tail is cut;
- (2) The length of the tail.

In lamb marking it is important to turn the bare skin from the under surface of the tail back over the severed stump. On healing this means that there is no wool-growing skin opposite the vulva in a position where it is likely to become soiled by urine. Under these circumstances areas attractive to flies are not likely to develop on the tail and this will mean a material reduction in the incidence of strike.

The length of the tail is important for two reasons. The rapidity with which the tail heals after being docked depends upon whether the wound becomes infected or not. It has been found that cutting lambs' tails short increases the risk of infection entering the wound, whereas, if the tail is cut long enough to cover the tip of the vulva, the chances of infection are greatly decreased. This means that lambs' tails cut at this length heal more rapidly than the ones which are cut shorter.

In addition longer tails, that is, those cut level with the tip of the vulva, confer a marked degree of protection against strike originating on both the tail and in the crutch, as the following results indicate:—

THE EFFECT OF TAIL LENGTH.
(EWES NOT MULES OPERATED).

Tail Length.	Percentage Crutch Strike in 12 Months.	Percentage Tail Strike in 12 Months.
Vulva Covering	29	4·8
Medium	45	10·7
Short	53	17·9

The importance of correct tailing methods can be readily appreciated when it is remembered that every lamb has its tail cut and the way in which the docking operation is done can influence the

susceptibility of the sheep to fly strike for the rest of its life. Very much the same thing applies to the Mules Operation. Correctly applied it means protection to the sheep for the rest of its life. The labour costs of performing the Mules Operation, mustering and returning the sheep to their paddock is about 2d. per head and this, spread over an effective life of about six years, is approximately $\frac{1}{3}$ d. per annum.

When combined with optimum tail lengths the Mules Operation is capable of giving a phenomenally high degree of protection against breech strike, as the following results from controlled experiments indicate:—

PERCENTAGE BREECH STRIKE IN 12 MONTHS.

	Vulva Covering Tail.	Short Tails.
	Per cent.	Per cent.
Mules Operated	0.9	8.3
Untreated.. .. .	20.9	56.2

The Arguments Used Against the Mules Operation.

Despite the fact that the Mules Operation has given excellent results under field conditions for the last five years in Queensland, where there are now well over one million treated sheep, and its application to all sheep would help to eliminate crutch strike, many wool growers are antagonistic to its use. One notable feature about the controversy is that those who oppose the Mules Operation have never tried it, while all wool growers who have given it a reasonable trial are enthusiastic about its merits!

The following arguments are often advanced against the Mules Operation:—

1. *Cruelty*.—Some wool growers, most of whom have done a good deal of lamb marking and the other usual operative procedures undertaken by men on the land, consider the Mules Operation to be cruel. No doubt the man who is keen on his sheep is anxious to protect them from any unnecessary suffering and there is probably none worse than that caused by repeated attacks by blowflies. As the Mules Operation is such an efficient preventive against crutch strike it is the obvious method to adopt to prevent the suffering it causes. When performed by an experienced operator it is done quickly and easily, healing is rapid and the sheep are comparatively safe from crutch strike for the rest of their lives. Surely it is a good deal kinder to the animals to perform the operation and protect the sheep for life rather than to let them endure the misery and discomfort of several strikes!

2. *Why Treat Plain Breeched Sheep?*—It is often stated by wool growers that their sheep are bred for plainness of breech and accordingly there is no need to perform the Mules Operation. Obviously these people have not appreciated the importance of the stretching of the bare area and they consider the Mules Operation to be simply a matter of dewinking. The answer to their argument is found in Plate 34 and in the results set out in the table on this page, showing that Mules-treated sheep are less susceptible to crutch strike than perfectly plain breeched untreated animals.



Plate 35.
SHOWING SPECIAL TAIL OPERATION.

3. *Disguising Wrinkly Sheep.*—Some growers object to Mules Operation on the grounds that it disguises wrinkly breeched sheep and they consider this may upset their breeding policy. Actually the Mules Operation does not interfere with breeding policy at all, as any slight alteration it makes to the conformation of the sheep is hardly likely to deceive the experienced sheepman. In addition, field observations indicate that sheep which would have been culled for excessive development would most likely have some other defect that would lead to their being rejected from the flock.

In any case when in doubt it is always possible to perform the operation on sheep after they have been classed into the flock or stud.

4. *The Longer Tail and Increased Shearing Costs.*—Some wool growers object to the longer tails because of the increased rates which have to be paid for shearing. The decision must surely rest on which will be most expensive—paying a couple of pounds per thousand extra for shearing or standing the losses resulting from several hundred strikes per thousand sheep per year.

In any case, if it is not considered desirable to cut the lambs' tails long enough to cover the tip of the vulva, consideration can be given to performing an operation to remove a considerable amount of the wool-bearing skin from the dorsal surface of the tail.

This is most easily done at marking time before the tail is docked. Sharp dagging shears are used and the cut should commence well above the base of the tail with a sharp "V" and gradually extend in width leaving a thin fringe of wool-growing skin on either side. The cut should extend well down the centre of the tail and the end result is shown in Plate 35.

This operation draws the wool-growing skin well up over the mid-line of the tail, thus helping to protect against tail strike.

The Mules Operation and Production.

The development of efficient methods of controlling breech strike made it possible to study the effect of blowfly strike on wool production and on lambing percentages. The results, which are set out in the following tables, of some of the experiments conducted by officers of the C.S.I.R., make it perfectly clear that Mules Operation protects against the losses caused by fly strike due to:—

- Decreased wool production,
- Decreased proportion of tender fleeces in a clip,
- Decreased lambing percentages.

WOOL PRODUCTION AND STRIKE. DIFFERENT SIZE STRIKES AND WOOL PRODUCTION.

Mules Operated.		Not Mules Operated..			
Average Wool.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.
Weight (greasy)	12 4	12 0	12 0	11 11	11 6
Strikes .. .. .	..	1 small	2/4 small	1 medium	1 large

STRIKE AND TENDER WOOL.

Strike Size.		Percentage Sound.	Per cent. Tender.
Not Mules Operated ..	Small/medium	85	15
	1 or more large	56	44

FERTILITY AND STRIKE. FERTILITY OF EWES, STRUCK AND UNSTRUCK.

Ewes.	Percentage Wet.	Percentage Lambs.
Not Mules Operated, Struck	75	79
Mules Operated, Unstruck	92	100

EFFECT OF MULTIPLE STRIKES ON FERTILITY.

		Number Strikes.						Percentage Ewes Wet.
Mules Operated	0	..	..	..	..	..	92
Not Mules Operated	1	..	..	..	..	..	88
"	2	..	..	..	..	..	73
"	3	..	..	..	..	..	58
"	4	..	..	..	..	..	47

Thus by decreasing crutch strike the Mules Operation assists to maintain wool weights, improve lambing percentages, decrease the proportion of tender fleeces and assures a better price for the clip.

Other Advantages of the Mules Operation.

There are several other indirect advantages to be derived from applying the Mules Operation. These may be stated as follows:—

1. *Crutching*.—It is far easier to crutch sheep which have been treated by the Mules Operation. This is an important factor both to the man who does his own crutching and to the owner who has this work done by contractors. It means better work and greater contentment amongst the shearers and there are less stained pieces.

2. *Jetting and Spretting*.—While it is not usually necessary in Queensland to jet or spret sheep which have been treated by the Mules Operation and which are crutched once a year, it may have to be done if it is difficult to arrange for crutchers. Should this occur, it will be found that it is a good deal easier to get even penetration of the wool by the jetting fluid. This of course means better jetting or spretting and better protection.

3. *The Fly's Breeding Ground*.—It has been shown conclusively that the primary fly, that is, the one which initiates the majority of strikes, breeds mainly in strike on living sheep. The Mules Operation virtually robs the fly of its breeding ground and in this way it is an important direct attack on the fly population itself.

4. *Relief from Worry*.—One of the most important indirect advantages of the Mules Operation is the mental relief it affords owners and managers, who in the days before the Mules Operation could never feel quite certain that there was not a bad smash just around the corner as the result of a fly wave suddenly developing. If the sheep have been subjected to the Mules Operation even the worst fly wave is unlikely to be responsible, either directly or indirectly, for heavy losses.

5. *Property Management*.—The Mules Operation has an immense effect on property management. It reduces blowfly control measures to a minimum and what used to be a continuous and onerous task is now a simple job, which can be expeditiously performed. This means more time is available for constructive work such as the erection and maintenance of improvements. This was well borne out during the war when station labour was difficult to obtain. Properties which practised Mules Operation on each year's "drop" of ewe weaners soon had complete flocks which had been treated. Relieved of the work usually associated with fly control, the available labour could be devoted to constructive work.

CONCLUSIONS.

In the light of present knowledge, which has been gained from carefully planned experiments and substantiated by extensive field experience under most severe fly wave conditions, the control of breech strike is readily achieved in Queensland by adopting the following methods:—

1. Performing the Mules Operation correctly on all ewes, and where necessary on the wethers.

2. Cutting lambs' tails at the optimum length, that is, level with the tip of the vulva, and turning the unwoolled skin from the under-surface of the tail back over the severed stump and/or performing the special tail operation.

3. Undertaking a mid-season crutching.

4. Should an emergency arise, which prevents the usual crutching, jet or "spret" if necessary.

As the emphasis is on performing the Mules Operation *correctly*, seek the assistance of a Sheep and Wool Adviser, who will demonstrate the correct technique to use.

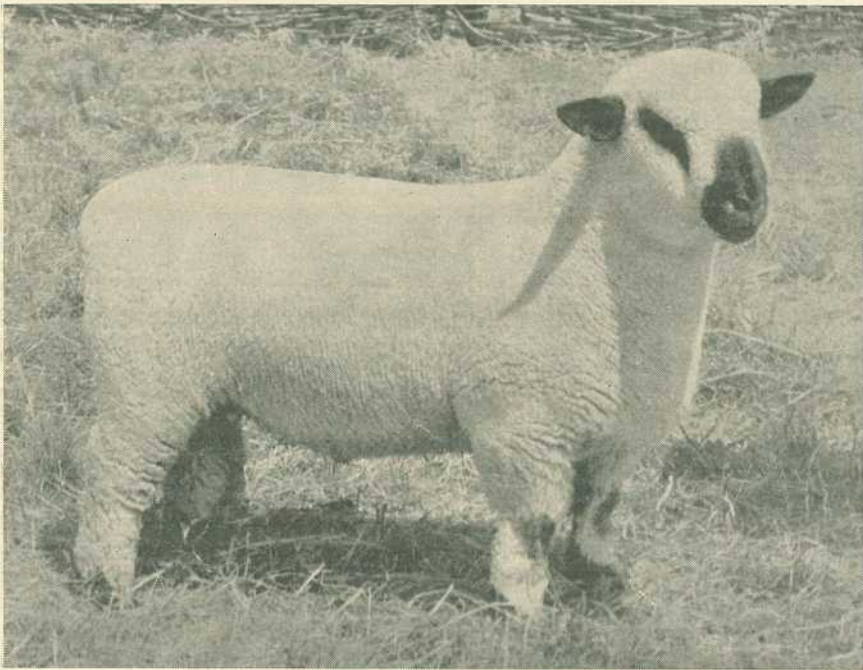
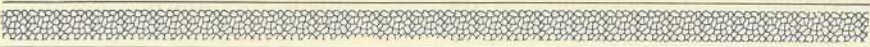


Plate 36.

A TYPE OF A BRITISH BREED (HAMPSHIRE CHAMPION RAM LAMB). First Prize and Challenge Cup at the famous British sheep fair held every year at Salisbury, England, in July; exhibited by Sir William Rootes.

PLANT PROTECTION

Control of Corn Ear Worm on Tomatoes.

I. F. B. COMMON, Assistant Entomologist.

FOR some time, DDT has been available to tomato-growers and many have been using it in dust or spray form to control the corn ear worm or tomato grub.* This insecticide has been tested experimentally in Central Queensland and recommendations can now be made concerning its effectiveness against tomato pests.

Pest control on tomatoes is necessarily linked with disease control. Hitherto, lead arsenate has been the insecticide in general use, and it has been a constituent of composite dusts and sprays designed to combat corn ear worm, tomato mite,† and various fungus diseases, such as target spot. The recommended combination dust contained 5 parts of lead arsenate, 3 parts of sulphur, and 2 parts of copper carbonate. The combination spray, on the other hand, included 1½ to 3 lb. lead arsenate, 1 lb. colloidal sulphur, and 2½ lb. copper oxychloride (equivalent to 4-4-40 Bordeaux mixture) to 50 gallons of water.

When lead arsenate, used either alone or in combination dusts and sprays, was applied thoroughly at 7-10 day intervals, corn ear worm was usually kept in check. At times, however, when the pest was very active, considerable fruit losses were experienced even when the insecticide was applied at 7-day intervals. Moreover, a coverage which is thorough enough to be effective tends to aggravate the poison-residue problem at harvesting.

DDT Dusts.

In many vegetable-growing areas, insecticidal dusts are preferred to sprays, so early experimental work was designed to compare dusts containing 2 per cent. DDT and those containing 50 per cent. lead arsenate, either alone or in combination with sulphur and copper carbonate. It was soon evident that a dust containing 2 per cent. DDT alone or mixed with sulphur and applied at 14-day intervals gave a control of corn ear worm comparable with that obtained from the composite lead arsenate-sulphur-copper carbonate dust applied weekly. The leaf-eating looper,‡ however, was not controlled by the DDT dusts used. Furthermore, copper carbonate or copper oxychloride mixed with DDT in a combined dust markedly reduced the efficiency of the insecticide. Thus, where DDT dusts are substituted for lead arsenate in pest- and disease-control schedules on tomatoes, the copper fungicide must be applied to the crop separately, allowing a few days to elapse between the two treatments. In general, therefore, DDT cannot be recommended as a substitute for lead arsenate in composite dusts for tomatoes.

* *Heliothis armigera* Hbn.

† *Phyllocoptes lycopersici* Mass.

‡ *Plusia argentifera* Gn.

At present, there is some justification for using DDT dusts on tomatoes in districts where the tomato jassid* and the potato tuber moth† are pests. Whereas lead arsenate will not control these insects, DDT in dust or spray form has proved highly effective. In such cases, a dust containing DDT and sulphur should be applied at fortnightly intervals, followed seven days later on each occasion by a copper fungicide. This schedule, therefore, necessitates treatment with the DDT-sulphur dust and a copper fungicide in alternate weeks.

DDT Sprays.

In further experiments, DDT sprays have been compared with DDT and lead arsenate dusts against corn ear worm on tomatoes. In each case it was ascertained that DDT applied as a spray is the most effective insecticide so far used against this pest. When the plants were treated with an 0.2 per cent. spray at fortnightly intervals from the commencement of flowering, fruit loss due to corn ear worm was of a very low order. Furthermore, it appears that both sulphur and copper oxychloride may be incorporated in DDT sprays with little or no detrimental effect upon the insecticide.

A general recommendation can accordingly be based on these results. Fortnightly applications of a composite spray containing water-dispersible DDT powder, wettable sulphur, and copper oxychloride should provide a very high degree of control of corn ear worm and also keep in check tomato mite and fungus diseases. As this spray contains DDT, it also controls jassids and the potato tuber moth. Treatments should begin when the plants commence to flower and continue until picking has reached a maximum.

DDT Does Not Control Mites!

It should be emphasized that the use of DDT dusts or sprays on tomatoes does not dispense with the necessity of applying sulphur regularly to control tomato mite. Fortunately, sulphur may be incorporated in both dusts and sprays containing DDT. The grower, therefore, should not neglect this very important aspect of pest control.

Spray or Dust Residues.

Regulations provide that tomatoes, when marketed, must not carry arsenical deposits in excess of .01 grains of arsenic trioxide per pound of fruit. Until more is known about the effect of DDT when consumed by humans, DDT residues must also be kept at a low level. Growers should, therefore, ensure that all fruit, whether treated with lead arsenate or DDT, is thoroughly cleaned before marketing.

Conclusions.

The following recommendations should be a practical guide to growers:—

(1) For general use, apply fortnightly treatments of a DDT-sulphur-copper oxychloride spray. It should contain 2 lb. of 50 per cent. water-dispersible DDT powder, 2 lb. wettable sulphur, and 2½ lb. copper oxychloride to 50 gallons of water.

* *Empoasca terra-rcinae* Paoli.

† *Gnorimoschema operculella* Zell.

(2) If a dust is required where corn ear worm and leaf-eating looper are the major pests, apply a standard combination lead arsenate-sulphur-copper carbonate dust at 7-day intervals. It should contain 5 parts of lead arsenate, 3 parts of sulphur, and 2 parts of copper carbonate. An occasional extra treatment with a DDT dust or spray, when corn ear worm is very active, will improve this schedule.

(3) If a dust is required in districts where jassids or the potato tuber moth are prevalent, then apply a DDT-sulphur dust (containing 2 per cent. DDT and 30 per cent. sulphur) at fortnightly intervals, with applications of a copper fungicide (containing 7-10 per cent. copper) seven days after each DDT treatment.

Scab Disease of Gladiolus.

T. MCKNIGHT, Pathologist, Science Branch.

THE rapid increase in the commercial production of gladioli has been accompanied by a more intense interest in the diseases and insect pests of this flower. Scab disease, caused by a bacterium*, is the major disease of gladioli in Queensland and has caused considerable concern among growers over the last few years.

Despite its common occurrence the cause of the disease is not well appreciated and, particularly among new growers, the culling of diseased corms and the standard corm disinfection method are rarely adopted to keep the disease in check.

Symptoms.

The most readily recognised symptoms of scab disease are produced on the corm when the infection is more or less advanced, and consist of hard, sunken, dark brown to black lesions with a slightly raised margin or border (Plate 37). In the earlier stages of infection the spots are small and yellowish, becoming darker in colour and sunken as they enlarge, but leaving a slightly raised border around the lesion. A bacterial "sheen" or a more prominent gummy exudate may be seen on these spots in the early stages. On the husks the scab infection produces small oval or round spots with a water-soaked appearance which become dark brown or black as the husks dry out. On the leaves small, reddish-brown, slightly sunken spots may be produced (Plate 38).

In 1947 the "neck rot" stage of the disease appeared in some plantings. This may occur under wet weather conditions when the leaf spots coalesce in the region of the fleshy basal part of the plant to produce a gummy breakdown of the tissues which results in the collapse of the plant.

Control.

The gladioli scab bacteria live in the soil, and the folly of subsequently replanting an area where the disease has been present is obvious. Overseas workers have shown that the scab organisms survive for at

* *Bacterium marginatum*.

least two years in the soil, and that it is necessary to adopt a crop rotation system which does not include gladioli more often than once in four or five years in order to effect a commercial control of the disease.

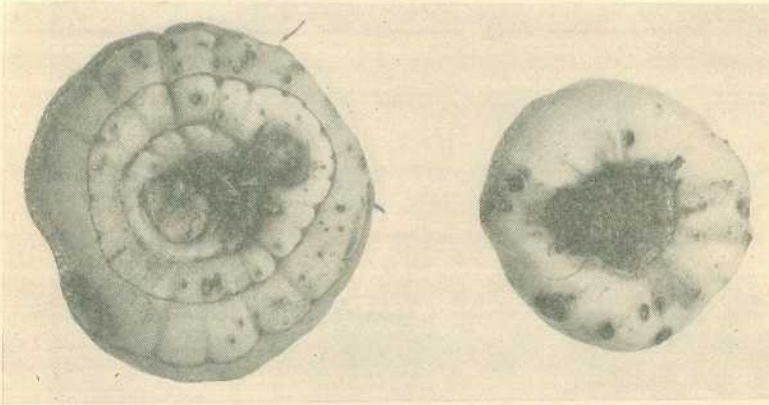


Plate 37.

AFFECTED GLADIOLUS CORMS SHOWING THE PROMINENT SCABS.

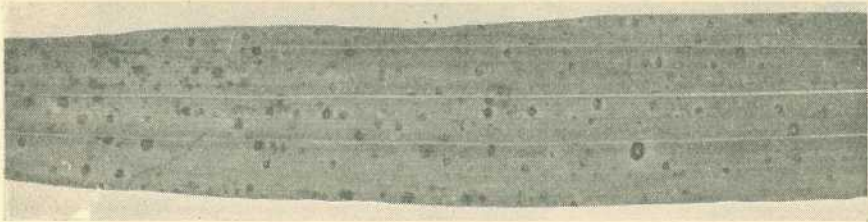


Plate 38.

SYMPTOMS OF SCAB DISEASE ON A GLADIOLUS LEAF.

The standard treatment for the disinfection of corms involves the use of a 1 in 1,000 corrosive sublimate solution. Corrosive sublimate tablets, with directions for the preparation of the solution, are obtainable from chemists, or the solution may be prepared at the rate of 4 oz. corrosive sublimate to 25 gallons of water. The corrosive sublimate is dissolved in a small quantity of hot water, to which about 1 oz. of common salt has been added. This solution is made up to the required volume with cold water. The corrosive sublimate solution should be prepared in an earthenware or wooden vessel or in a metal container with the inside well coated with tar or a bitumastic paint. The corms should be completely immersed in the solution for twelve hours, removed and washed in running water, and planted immediately.

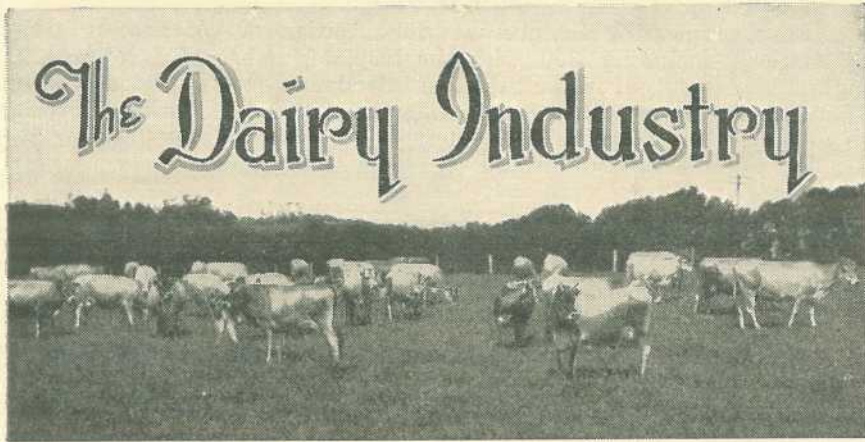
Corrosive sublimate is highly poisonous, and every precaution should be taken in its use.



Plate 39.

A DRAFT OF "FATS" ON KINGPAH, NEAR MOOGRA, WEST MORETON.—These bullocks, reared and fattened on Kingpah by Mr. J. Faulkner, were sold in the paddock for £20 a head,

[Photo., Department of Agriculture and Stock.



Queensland Cheese Production.

E. B. RICE, Division of Dairying.

QUEENSLAND cheese production in 1946-47 was 17,291,768 lb. in comparison with 26,943,245 lb. in 1945-46. The values were £887,919 and £1,365,919, in the respective years. The decline in production was mainly attributable to the adverse season, but the diversion of large quantities of milk from the Toowoomba and Warwick factories for the Brisbane market milk trade was also a contributory factor.

Milk produced for cheese manufacture returned to the producer an average price of 2s. 3d. per pound butter fat. There was a slight change over from supplying cheese factories to producing cream for butter manufacture, but the price margin in favour of the cheese factory supplier ensured the retention of most suppliers to cheese factories.

Grading.

The scheme for reciprocity between Commonwealth and State officers in the grading of butter and cheese was continued this year. It enabled the official grading of a much higher proportion of the cheese production than could have been carried out by State officers alone. The total quantity graded was 9,480,521 lb. The grading results were as follows:—

	lb.	Per cent.
Choice and first grade	6,844,074	72.19
Second grade	2,453,233	25.88
Third grade	183,214	1.93

The above results are almost similar to those of the preceding season, the corresponding figures for which were 70.27 per cent. choice and first and 28.28 per cent. second. This is an achievement for which the cheese industry is to be complimented, for the protracted drought caused a serious imbalance of milk constituents, especially protein and mineral salts, which, in turn, created much difficulty in maintaining cheese quality. Butter fat content of milk received at some factories in the drought fell to the low average of 3.3 per cent., casein 2.2 per cent., and cheese yield 9.0 lb. per 100 lb. milk; the normal figures average fat 4.0 per cent., casein 2.7 per cent. and yield 10.7 lb. per 100 lb. milk.

Milk Grading.

Another pleasing feature was the decision of yet another three associations, including that with the largest number of factories and highest cheese output in the State, to introduce systems for the grading of milk supplies and payment of differential prices for milk according to quality. The methylene blue test is used as the only test for the grading of milk by Queensland cheese factories, and is proving quite satisfactory.

Bacteriophage.

Observations on the control of bacteriophage by propagating cheese starter cultures in a starter room completely isolated from the main factory building were continued. The starter cultures, both mother and bulk, were kept free from phage. Nevertheless, slow acid development during the making process was experienced on occasions. Factory hygiene was satisfactory and all equipment was rinsed with chlorine prior to starting manufacture every day. It seems that bacteriophage may be introduced in the milk cans used by suppliers in sufficient amount to slow acid production during cheesemaking. Investigations will be continued with a view to finding means for effective control of phage brought to the factory via farmers' milk supplies. The isolated starter room, by enabling propagation of phage-free starters, has, at least, minimised phage so that serious breakdown in acidity during manufacture does not occur.

Experiments are also being made in inoculating starter cultures in factories under a mercury quartz vapour lamp and also in using an "oil seal" on the starter milk to exclude bacteriophage from starter cultures.

Cheese Mites.

Reports have been received from England about mite infestation in Australian cheese. The increasing trouble in this connection was probably brought about by a lowered standard of curing room hygiene due to overcrowded premises as a result of the expansion of cheese manufacture, manpower shortage and the longer time of holding cheese in factories through irregular shipments in recent years.

In conjunction with officers of the Science Branch, Division of Plant Industry, investigations on the control of cheese mites (*Tyrophagus putrescentiae*) were made during the year. For ordinary cheese factory curing rooms the trials were made by spraying dichlorethyl ether by means of an atomising spray trigger gun with an adjustable fine spray nozzle. The atomising gun was fitted to a compressed air system and the apparatus operated at 70-75 lb. pressure per square inch. Standard army gas masks were used by the men doing the work. Dosage was 1 lb. per 1,000 cubic feet of room space. After the first treatment, the rooms were closed for 48 hours, then opened and aired, and all cheeses turned on the shelves. A second treatment was then given and the room again closed for about 72 hours.

The method of treatment has given good results inasmuch as all mites on exposed surfaces were destroyed, although mites under cheese and sometimes in cracks were not affected. Observations are being made over a six months period to see how long the rooms remain mite-free or, at any rate, in populations not serious enough to be of economic importance. Even if two or three applications to curing rooms may be needed yearly, the cost would be small and the method practicable for all cheese factories.

The investigations have been extended with the object of developing a method for treating large cheese maturing rooms such as at central cold stores. A method of utilising the dichlorethyl ether in gaseous form has been worked out and trials in the large cheese room at the Hamilton Cold Stores are in progress.

Non-Fat-Leaking Cheese.

For several years officers of the Division have been attempting to produce a type of cheese which would not exude fat at tropical temperatures. The advantages of such a cheese are obvious. The work was successfully accomplished and a factory has installed the necessary plant for commercial manufacture. Many enquiries have been received from the near East and other countries about the prospects of obtaining supplies of this cheese. It is understood export licences will not be issued at the present time.

Pliofilm Wrapping.

Preliminary trials with the packaging of cheddar cheese in consumer-size $\frac{1}{2}$ lb. and 1 lb. packs, using a transparent, rubber wrapping known as pliofilm, were carried out. The packaging of cheese in this manner should prove a distinct sales advantage in the retail trade.

Varieties of cheese other than cheddar are evidently increasing in popularity among Queensland consumers, for their production is steadily expanding. Gouda cheese is now being made at one factory and ready sales are obtained.

Cheese manufacture was commenced during the year at the factory of the Queensland Farmers Co-operative Association, Booval. This plant was installed mainly to enable treatment of milk surplus to the market milk requirements of Ipswich during the flush production of summer.

Field officers are giving service to cheese factories in checking yields of cheese in relation to the composition of milk. These surveys assist factories in taking any action necessary to reduce avoidable losses during manufacture.

Table 1 summarises the results of the operations of all factories in the year under review.

SUMMARY OF PRODUCTION AND YIELDS OF CHEESE FACTORIES FOR YEAR ENDED 30TH JUNE, 1947.

Milk Received ..	Lb. 172,373,761	Yield of cheese per 100lb. milk, 10.32 lb.
Cheese Made	17,291,768	Yield per lb. of butterfat, 2.67 lb.
Butter Fat Paid ..	6,475,127	Average Test, 3.81 per cent.

GRADES OF CHEESE.

Total.	Choice.	First.	Second.	Third.
9,480,521	181,685 1.92%	6,662,389 70.27%	2,453,233 25.88%	183,214 1.93%

MANUFACTURE AND GRADINGS OF QUEENSLAND CHEESE FACTORIES FOR THE YEAR ENDED 30TH JUNE, 1947.

Factory.	Milk Received.	Production and Yield.						Gradings of Cheese.			
		Cheese, Green Weight.	Butterfat.	Cheese Yield.		Average Test.	Total Submitted.	Choice.	First.	Second.	Third.
				Per 100 Lb. Milk.	Per Lb. Butterfat.							Per cent.	Per cent.
	Lb.	Lb.	Lb.	Per cent.	Per cent.	Per cent.	Lb.				
Aubigny	1,352,855	138,521	50,146	10.24	2.76	3.71	137,168	..	91,514	45,210	444
Biddeston	6,810,101	718,198	248,898	10.55	2.95	3.65	433,547	5,738	66.72%	32.96%	.32%
Coalstoun Lakes	1,692,297	171,146	62,865	10.11	2.72	3.72	42,150	1.32%	404,093	23,154	562
Dareedale	1,592,353	152,909	56,889	9.60	2.69	3.57	127,253	..	93.21%	5.34%	.13%
Downs, Boodua	2,149,208	212,211	81,566	9.87	2.6	3.8	167,568	..	..	35,470	6,680
Downs, Toowoomba	19,633,330	1,812,705	770,096	9.23	2.35	3.92	1,252,053	..	..	84.15%	15.85%
Dundarra	1,075,180	105,979	40,850	9.86	2.59	3.8	27,539	..	77,948	48,260	1,045
Felton	4,437,580	461,656	169,372	10.4	2.73	3.82	205,560	..	61.25%	37.93%	.82%
Greenmount	2,918,192	305,061	109,571	10.45	2.78	3.75	172,532	..	76.425	85.086	6,057
Highgrove	1,290,212	127,720	46,630	9.9	2.74	3.61	95,511	..	45.61%	50.78%	3.61%
Irongate	3,896,995	380,470	140,378	9.76	2.71	3.6	355,033	..	727,437	471,490	53,126
Kelvinhaugh	1,427,098	149,286	52,520	10.46	2.84	3.68	130,953	..	58.10%	37.66%	4.24%
Kooroongarra	3,833,060	387,683	140,680	10.11	2.76	3.67	360,880	..	..	24,858	2,681
Lillyvale	1,028,498	201,618	72,393	10.45	2.79	3.75	174,439	..	..	90.26%	9.74%
Macclagan	5,468,290	559,242	202,804	10.23	2.76	3.71	311,387	..	146,218	59,342	..
Macclagan, Kulpi	4,004,335	395,671	144,472	9.88	2.74	3.61	312,178	..	71.13%	28.87%	..
Malling	3,994,741	390,307	149,617	9.77	2.61	3.75	..	..	..	140,607	31,925
Maryborough, Tansey	4,174,265	423,964	174,884	10.16	2.42	4.19	113,807	..	..	81.50%	18.50%
Maxam, Cooranga North	4,268,545	465,568	172,807	10.91	2.69	4.05	334,253	..	..	73,148	22,363
Moola	2,728,772	266,772	96,572	9.78	2.76	3.54	99,184	..	..	76.59%	23.41%
Mount Sibley	2,622,579	273,369	99,909	10.42	2.74	3.81	250,056	35,005	305,679	13,702	647
Mount Tyson	6,076,097	601,993	218,624	9.91	2.75	3.60	204,703	9.86%	86.10%	3.86%	.18%
								628	97,916	32,098	311
								.48%	74.77%	24.51%	.24%
								9,066	300,802	51,012	..
								2.51%	83.85%	14.14%	..
								6,247	133,344	34,848	..
								3.58%	76.44%	19.98%	..
								..	169,406	136,786	5,195
								..	54.4%	43.93%	1.67%
								..	265,750	44,116	2,303
								..	85.13%	14.13%	.74%
							
							
								12,359	101,448	..	..
								10.86%	89.14%	..	..
								13,560	263,948	55,380	1,365
								4.06%	78.97%	16.57%	.4%
								..	92,833	4,822	1,529
								..	93.60%	4.86%	1.54%
								..	247,876	2,180	..
								..	99.13%	.87%	..
								..	156,114	46,349	2,240
								..	76.26%	22.64%	1.10%

Pittsworth, Pittsworth ..	6,049,048	587,344	237,230	9-71	2-48	3-92	255,901	1,436 56%	247,248 96-62%	7,177 2-80%	40 -02%
Pittsworth, Brookstead ..	2,513,096	257,010	94,065	10-23	2-73	3-74	205,636	..	138,513 67-30%	67,123 32-64%	..
Pittsworth, Linthoppe ..	2,787,276	272,986	102,810	9-79	2-66	3-69	216,185	..	107,493 49-72%	108,692 50-28%	..
Pittsworth, Scrubby Mountain	2,244,602	231,770	83,401	10-33	2-78	3-72	163,913	..	107,900 65-83%	52,708 32-16%	3,305 2-01%
Pittsworth, Springside ..	2,472,721	261,338	91,126	10-57	2-87	3-69	173,988	54,186 31-14%	118,537 68-13%	1,265 -73%	..
Pittsworth, Yarranlea ..	3,585,759	359,322	132,675	10-02	2-71	3-70	268,624	..	185,188 68-94%	82,472 30-70%	964 -36%
Port Curtis, Bracewell ..	3,571,587	344,163	120,965	9-63	2-85	3-39	56,176	..	52,320 93-14%	3,856 6-86%	..
Port Curtis, Theodore ..	2,333,257	242,353	87,919	10-39	2-76	3-77	..	..	..	..	..
Q.A.H.S. and College, Lawes	23,406	2,402	958	10-22	2-51	4-08	..	..	..	..	..
Quinalow	4,239,864	419,088	149,867	9-88	2-80	3-53	243,985	..	181,143 74-24%	62,842 25-76%	..
Ramsay	1,728,153	171,660	65,663	9-93	2-61	3-80	164,213	..	108,929 66-33%	55,284 33-67%	..
Rockview	1,794,561	182,896	66,366	10-19	2-76	3-70	109,275	..	87,048 79-66%	22,227 20-34%	..
Rocky Creek	3,259,562	338,137	118,247	10-37	2-86	3-63	286,986	4,396 1-53%	173,407 60-42%	107,267 37-38%	1,916 -67%
Rosemount	2,469,130	235,811	88,288	9-55	2-67	3-58	135,228	..	64,535 47-72%	61,165 45-23%	9,528 7-05%
Southbrook	6,714,230	669,495	243,357	9-97	2-75	3-62	325,516	..	285,141 87-60%	38,061 11-69%	2,314 -71%
South Burnett, Goomeri ..	4,680,049	488,819	184,297	10-44	2-65	3-94	377,777	..	322,962 85-49%	54,815 14-51%	..
South Burnett, Murgon ..	4,018,783	387,911	153,172	9-65	2-53	3-81	46,546	..	29,681 63-77%	16,865 36-23%	..
Sugarloaf	1,624,411	160,871	64,423	9-90	2-50	3-97	129,491	..	83,976 64-85%	45,515 35-15%	..
Sunnyvale	1,305,048	130,535	52,162	10-00	2-50	4-00	66,388	..	3,693 5-56%	52,450 79-00%	10,245 15-44%
Warwick, Greymare	2,132,508	220,588	78,885	10-34	2-80	3-70	35,486	..	3,873 10-91%	27,450 77-36%	4,163 11-73%
Warwick, Talgai	1,095,823	108,607	41,575	9-91	2-61	3-79	..	..	..	..	..
Warwick, Victoria Hill ..	740,415	74,528	25,843	10-07	2-88	3-49	..	..	..	..	..
Warwick, Mill Hill	17,328,371	1,796,299	657,331	10-37	2-73	3-79	396,869	39,064 9-84%	331,630 83-56%	26,175 6-60%	..
Woodleigh	1,177,235	113,247	42,209	9-62	2-68	3-59	108,749	..	47,809 43-96%	52,034 47-85%	8,906 8-19%
Yamsion	2,170,826	235,335	80,394	10-84	2-93	3-70	223,905	..	143,560 64-12%	76,985 34-38%	3,360 1-50%
Yargullen	2,939,367	297,204	109,856	10-11	2-70	3-74	191,282	..	179,043 93-60%	12,239 6-40%	..
Totals	172,373,761	17,291,768	6,475,127	..	..	..	9,480,521	181,685	6,662,389	2,453,233	183,214

PRODUCTION RECORDING.

List of cows and heifers officially tested by Officers of the Department of Agriculture and Stock, which qualified for entry into the Advanced Register of the A.I.S. Jersey, Guernsey, and Ayrshire Societies' Herd Books, production records for which have been compiled during the month of December, 1947. (273 days unless otherwise stated.)

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORN.				
MATURE COW (STANDARD 350 LB.).				
Arolla Velvet 3rd	W. Hinricksen, Clifton	10,424.6	400.373	Parkview Limerick
Rosenthal Hansome 36th	S. Mitchell, Rosenthal	8,272.55	380.649	Rosenthal Archer
JUNIOR, 4 YEARS (STANDARD 310 LB.).				
Jamberoo Winnie 7th	Hart Bros., Headington Hill	12,595.45	477.857	Murray's Bridge Florrie's Prince
Rosenthal Choice 18th	S. Mitchell, Rosenthal	8,696.15	335.075	Rosenthal Lilac 4th Emblem
JUNIOR, 3 YEARS (STANDARD 270 LB.).				
Balatur Dainty	T. Fowler, Kenston	7,882.23	333.533	Fairvale Dairyman
JERSEY.				
JUNIOR, 3 YEARS (STANDARD 270 LB.).				
Brookland Merry Melrose	H. T. W. Barker, Oakey	4,991.7	313.626	Bulby Maria's Keepsake
SENIOR, 2 YEARS (STANDARD 250 LB.).				
Englebourne Dainty	M. May, Hermitage	5,919.3	267.384	Oxford Floss' Remus
JUNIOR, 2 YEARS (STANDARD 230 LB.).				
Hocknell Bravo Melody	L. Harmer, Beaudesert	5,498.2	270.964	Navua Victoire's Lad
Windsor Lady Alice	H. T. W. Barker, Oakey	3,548.8	250.747	Brooklands Sultan's Victory
GUERNSEY.				
JUNIOR, 3 YEARS (STANDARD 270 LB.).				
Laureldale Pamela	W. A. K. Cooke, Maleny	9,399.6	438.802	Minnamurra Topsy's Sequel
AYRSHIRE.				
SENIOR, 3 YEARS (STANDARD 290 LB.).				
Leafmore Harriet 3rd	J. P. Ruhle, Motley	9,700.3	344.849	Leafmore Jerrard



Ailments of Pigs.

A. L. CLAY, Divisional Veterinary Officer.

SOME of the ailments of pigs about which information is not always readily available have been selected for inclusion in this article. The information is by no means complete but sufficient is given to assist the reader to recognize the several conditions and have a working knowledge of what to do when confronted by them.

Middle Ear Infection (Otitis Media).

In this condition, the head is held to one side and the affected animal often walks round in a circle, the circling being in the same direction as that in which the head is held. In any event the pig has only partial control over its equilibrium, the gait is unsteady, and the sense of direction faulty.

The cause of the condition is an infection of the middle ear with one or other of the pus-forming bacteria, and the infection probably derives from the throat region by way of what is known as the Eustachian tube.

Pus may be present in the middle ear for some time before finally bursting through the ear drum and discharging externally. No discharge may therefore be apparent in the external ear until the case is of some considerable standing.

Treatment is unlikely to be satisfactory and as affected pigs are usually "poor doers" they are best written off as a dead loss.

Prevention is tied up with good management, and attention aimed at a better standard of housing and hygiene can be expected to eliminate the condition from the piggery.

Prolapse or Protrusion of the Rectum.

In this condition, the rectum (or hind gut) is protruded backwards through the anus. If seen soon after the prolapse occurs, the mucous membrane, which ordinarily lines the rectum but which now appears on the outside of the protruding structure, is red, moist, and glistening, but soon becomes dry, discoloured and, later still, cracked.

The cause of protrusion of the rectum is not always very obvious. It is sometimes seen in association with either diarrhoea or constipation. In both these conditions evidence of straining is of course present. Then

again any factor which causes irritation of the bowel may play a part. In this connection worms may be concerned and perhaps especially mass invasion of the bowel wall by worm larvae.

Protrusion of the rectum is most frequently seen in young pigs in the latter half of the suckling period. This corresponds with the period during which pigs are most prone to pick up infective worm eggs. No doubt this is only part of the full story but it is worth keeping in mind.

It is remarkable how at times nearly all pigs in a litter will become affected, suggesting to some people that perhaps an hereditary predisposition may be involved.

Whatever the cause may be, treatment is likely to be unsatisfactory and affected pigs are probably best dealt with by immediate slaughter in order to salvage the pork. If seen early, however, the prolapsed rectum can be washed with lukewarm weak disinfectant solution, smeared with olive or salad oil and then gently replaced. The affected pigs should then be dosed with a dessertspoonful of liquid paraffin.

Surgical treatment is often necessary, though, and in its absence recurrences need not surprise.

Ulcerative Granuloma.

In this condition, when it is well established, the skin is lost over well defined areas of the body and replaced by a flat ulcer with a hard uneven surface which is dark brownish or black in colour. The ulcers are usually roughly circular in shape. Their size varies greatly but it is not uncommon to see them up to six inches in diameter. Should the trouble occur following castration, the appearance of the resultant condition in the neighbourhood of the castration wounds is rather different. There is much swelling, often as big as a coconut and sometime almost as big as a football. These swellings break out at one or sometimes several points and pus oozes out of the openings.

Finally, in some cases there is ulceration of the inner aspects of the cheek, the gums and the tongue. This applies particularly to very young pigs.

The primary cause of ulcerative granuloma is a spirochaete. This is a form of bacterium which instead of being more or less straight has a series of waves along its length. This spirochaete is almost invariably present only in piggeries in which there is a good deal of slush and filth. Even if just a reasonable standard of hygiene is maintained no trouble need be anticipated.

So far as treatment is concerned, any swollen areas must be incised to allow of free drainage. Superficial ulcers can be dusted with tartar emetic powder and if treatment is commenced early good results can be expected.

Diarrhoea or White Scours in Piglets.

This condition usually occurs when piglets are only a few days old and is associated with overfeeding of the sow prior to and immediately after farrowing. It is also associated with sudden changes in the sow's diet and at times with unsanitary conditions. The presence of mud and slush on the sow's udder will certainly not help matters.

The prevention of scours in piglets is almost entirely a matter of correct management of the sow. For the first 24 hours after farrowing she should be given only water to drink, no food; she should then be gradually brought on to full feed, taking a week to ten days in the process.

Once the scours appear in the piglets, the sow's feed should be reduced immediately and each sucker given a teaspoonful of castor oil. One or two teaspoonsful of formalin can be added to the sow's feed twice daily in the hope that sufficient of the formalin will be excreted in her milk to have a beneficial effect on the sucklings.

Eclampsia, Tetany of Parturition, Parturient Hypocalcaemia, Milk Fever.

This rather imposing list of names refers to a condition seen in the sow at the time of or soon after farrowing. The sow is usually found lying down and obviously in great distress. She may make convulsive movements from time to time and perhaps endeavour (without success) to get on her feet. There may be muscular spasms (tetany). There is of course no appetite and the sow's milk flow is suppressed.

It is important to recognize that the condition is analogous to milk fever in cattle and is amenable to treatment along similar lines. Add $\frac{3}{4}$ oz.-3oz. of calcium-boro-gluconate to 2 $\frac{1}{2}$ -3 fluid ounces of water and boil until dissolved. Allow to cool to blood heat and then administer as a hypodermic injection, using a number of different sites along either side of the sow in the process. If muscular spasms are much in evidence then it is wise to include in the injection 1 drachm ($\frac{1}{8}$ oz.) of magnesium sulphate (Epsom salts).

Spasm of the Back.

Although this condition is still uncommon it appears to be on the increase. Under Queensland conditions it seemingly is peculiar to pigs of the Large White breed and is usually seen in animals during the first month after weaning. It is a peculiar condition, to say the least. The affected pig is seen to develop quite suddenly a dip or depression in the back just behind the tops of the shoulder blades. This dip may remain in evidence without interruption for some considerable time, but more often the dip disappears and then reappears perhaps three or four times within a short space of time. Quite often the dipping of the back is accompanied or is closely followed by a spasm of the forequarters which results in the pig going down on its knees, but within a matter of seconds the animal is on its feet again apparently none the worse for its experience.

Other symptoms which have been described are a rapid stamping of a fore or hind limb, and vigorous swishing of the tail.

The cause of the condition is quite unknown at present and no suggestions can be offered on either prevention or treatment. However, affected pigs do not appear to suffer any lasting ill effects.

Arthritis.

This condition considered in its simplest form may be defined as inflammation of a joint. There is swelling of varying degree over or around a joint and some degree of heat can at times be felt with the

hand. There may be some evidence of pain if pressure is applied over the swollen area and some degree of lameness is almost invariably present, at least in the early stages.

In very young pigs the condition is usually caused by pus-forming bacteria which make their entry either by way of the unhealed navel cord or the mouth. This being the case, the importance of hygienic surroundings for young pigs is self-evident.

In older pigs, arthritis is sometimes a manifestation of more serious troubles, such as swine erysipelas or of infection with a germ known as *Haemophilus influenzae suis* (the so-called Glasser's disease). This latter condition, though still not common, has been present in Queensland since about 1937 and must be kept in mind.

Arthritis in pigs is an unsatisfactory condition to treat, and if it does not respond within a reasonable time to clean, comfortable surroundings, coupled with good feeding, then affected animals are probably best written off, if only for the reason that they are usually "poor doers."

Prevention can be materially assisted by having sows farrow in pens which have been cleaned and disinfected, dried and then provided with clean dry straw bedding.

QUEENSLAND SHOW DATES, 1948.

Barcaldine	May 12-13	Kalbar	May 29
Beaudesert	May 6-8	Kilkivan	May 25-26
Biggenden	May 20-21	Kingaroy	May 6-8
Biloela Rodeo	May 21	Laidley	June 25-26
Biloela Show	May 19-20	Lawnton	July 30-31
Boonah Campdraft	May 27 and 29	Lowood	June 11-12, 14
Boonah Show	June 4-5	Mackay	June 22-24
Bowen	June 30-July 1	Malanda	September 3-4
Brisbane R.N.A.	August 7-14	Marburg	May 7-8
Bundaberg	June 3-5	Maryborough	May 27-29
Cairns	July 20-22	Miles	May 19-20
Charleville	Abandoned	Millmerran	April 9-10
Childers	May 31-June 1	Monto	April 28-29
Chinchilla	May 13-15	Mount Perry	April 17
Cooroy	August 28	Murgon	May 20-22
Cooyar	March 5-6	Nambour	July 1-3
Crow's Nest	May 28-29	Nanango	April 29-May 1
Dalby	April 29-May 1	Oakey	March 17-18
Dirranbandi	May 28-29	Pittsworth	April 6-7
Eidsvold	May 3-4	Proserpine	June 25-26
Esk	May 14-15	Rockhampton	June 16-19
Gatton	July 15-17	Roma	May 5-6
Gaydah	May 12-14	Rosewood	July 9-10
Gin Gin	June 7-8	St. George	May 14-15
Gladstone	June 10-12	Tara	May 7-8
Goombungee	March 20	Taroom	May 3-5
Goomeri	May 17-19	Thangool	May 14-15
Goondiwindi	May 1 and 3	Toogoolawah	June 18-19
Gympie	May 20-22	Toowoomba	April 17, 19-22
Ingham	July 16-17	Townsville	July 6-8
Inglewood	May 7-8	Wallumbilla	April 30-May 1
Innisfail	July 30-31	Warrill View	May 22
Ipswich	May 11-13	Wondai	May 13-15
Jandowae	April 26-27		

ANIMAL HEALTH

Blackleg.

C. R. MULHEARN, B.V.Sc., Divisional Veterinary Officer, Kingaroy.

BLACKLEG, or Black Quarter, is an infectious disease of calves and young cattle and to a lesser extent of sheep. It is very common in Queensland and occurs practically every year in the coastal and sub-coastal country from the New South Wales border to Townsville.

The incidence varies from year to year, and in some years only a small number of cases are detected, whilst in others the outbreaks are very extensive and widespread and occur almost in epidemic form. The disease is also seasonable, in that it is most prevalent during certain periods of the year, such as summer and autumn, in Southern Queensland and autumn and winter in Northern Queensland.

Animals Affected.

Calves from about 4 to 18 months old are chiefly affected with the disease, but cases also occasionally occur in young cattle up to two years old and rarely even in older animals. All classes of animals may be affected, but the biggest and strongest calves appear to be more susceptible. Often well-grown bulls are the first animals to die. As the disease usually follows beneficial seasonal conditions, most animals are in good condition when outbreaks occur.

The disease has been reported from sheep in Queensland, and young rams appear to be most susceptible. The symptoms assume a slightly different form in sheep, and the changes are chiefly confined to the head and neck.

The disease is caused by a bacillus, but it is not directly contagious from animal to animal. When a beast becomes affected the organisms multiply in certain parts of the body, and when the animal dies, as most usually do when affected with this disease, the bacilli which are present in millions through the carcass become scattered over the surrounding areas as the carcass decomposes or is broken up. The bacilli, on being exposed, form spores—that is, they become enclosed in a protective covering, and in this condition they remain highly resistant to outside agencies, such as sunlight and cold, and they continue to be infective for years. They remain in the soil, and at some subsequent period may be carried upon blades of grass or through some other agency, gain entrance to an animal's body, and cause a fresh case of the disease. It is therefore easily understood how a pasture becomes contaminated and why outbreaks of Blackleg regularly occur in certain paddocks. The more cases that occur, particularly if the carcasses are not adequately disposed of, the greater will be the risk of infection in these areas in subsequent years.

Symptoms.

The bacilli must gain entrance to the calf's body before the disease can develop, and it is thought that this may happen through injuries in the legs or lower extremities or through small abrasions in the mouth,

stomach, or intestines. It is considered that the wounds on rams' heads resulting from fighting are a common means by which they gain entrance to the system in these animals.

When the causal organism enters the body it becomes established in one of the large muscle groups, such as the hindquarters, forequarters, or neck, and produces the changes which give rise to the disease.

As the disease is very sudden in onset and may kill the animal in less than twenty-four hours, it frequently happens that no symptoms are detected, an animal which is apparently healthy one day may be found dead the next. However, some animals may last up to forty-eight hours between onset of sickness and death and an occasional animal may even recover.

The symptoms consist of fever, and this is usually present in some degree before any change is noticeable in the animal. Dullness and depression become obvious, and if temperature is then taken it will be found to be several degrees above normal and may be from 104° to 106° F. Muscular tremors may also be noticeable, and when the animal is moved, pronounced lameness in either the hind or forelimbs will be evident. On closer examination a swelling will be detected in one of the groups of muscles usually in the hindquarters, but it may be along the belly or about the forequarters. This swelling may at first be small, but within a matter of hours it becomes enlarged and extensive and is very painful. At a later stage and usually just before death the skin over the swelling becomes dark and dry with a parchment-like consistency. If the swelling is manipulated it will "crackle," due to the presence of gas and fluid in the underlying tissues. On being opened (an unwise procedure) a dark, frothy, sour-smelling liquid will drain away.

Following the early symptoms the animal discontinues feeding, shows dullness, rapid breathing followed by exhaustion, loss of consciousness, and death, with little or no signs of struggling. Death is actually caused by the circulation through the system of poisonous substances (Toxins) produced by the bacilli within the swelling described above.

Post-mortem Findings.

The post-mortem findings are important in connection with the diagnosis, as it frequently happens that the animals are found dead without showing symptoms, and an immediate diagnosis is desirable in order that the necessary preventive measures can be undertaken. As the disease usually occurs when putrefaction sets in rapidly, one finds the affected carcass to be badly "blown" within a few hours of death, due to the formation of gas under the skin. This causes the legs on the upper side of the carcass to extend straight out. However, if the body is closely examined it is possible to find the seat of the trouble in the form of a swelling which crepitates or "crackles" under pressure of the hand. This crackling is quite distinctive and is not found in other parts of the body. If this area is opened it will be found to contain a dirty, blackish, frothy fluid mixed through the tissues. The muscles are also much darker than normal, and the whole area is not unlike a bad bruise. There is a distinctive smell in this lesion which is quite different from the smell of an ordinary decomposing carcass and which has been described as resembling rancid butter. The presence of these changes in the carcass of an animal under two years is sufficient to warrant a diagnosis of blackleg and to institute immediate preventive

measures. It is not wise to open up the carcass, as the body discharges become scattered, and with them the organisms, which may give rise to outbreaks of the disease in later years. However, should the body of a recently dead animal be opened up, one usually finds up to half a gallon of blood-stained fluid in the abdominal cavity and the liver and kidneys are congested and swollen.

Prevention and Control.

The opportunities for treatment are rare, but if the occasion arises the sick animal should be held in the shade and given ample supplies of water to which potassium nitrate (nitre) has been added at the rate of 1 oz. per 4 gallons. Valuable animals, such as stud bulls, could be also treated with penicillin. The old adage that "prevention is better than cure" cannot be too strongly stressed in this disease, and preventive measures consist of minimizing the risk of animals becoming exposed to infection and immunizing susceptible animals so that they will be resistant to the disease.

As already pointed out, the bacilli responsible for blackleg multiply in enormous numbers within the diseased animal's body and are scattered in a very resistant form when the carcass is opened up. These organisms may live for years in the soil and be responsible for fresh outbreaks of the disease. Unless action is taken to adequately dispose of the unopened carcasses, the soil and pastures in the vicinity become grossly contaminated with the infection and outbreaks of the disease regularly occur, and the area becomes more heavily charged with infection each year until it becomes recognised as a "hot bed" of the disease.

The best method of destruction of carcasses is by burning, and after a diagnosis has been established wherever possible this action should be taken. The carcass should be moved as little as possible, and it should not be opened, as the body discharges will scatter the germs. If burning is not possible, deep burial and thorough disinfection are recommended.

In areas where the disease regularly occurs, preventive inoculation of all young cattle should be undertaken each year. The inoculation should be carried out prior to the anticipated time of the outbreaks, such as in the spring in Southern Queensland and in the autumn in Northern Queensland. Some owners, particularly in areas where the disease is not so prevalent, prefer to wait until a case is detected before they go to the expense of inoculation, as the outbreaks may be spaced years apart. The decision as to whether regular yearly or intermittent inoculations are carried out will depend on the history of the disease in the individual area.

There are several vaccines on the market both in a liquid and solid form, and the liquid vaccine prepared by the Commonwealth Serum Laboratories has been extensively used by the writer with successful results. This vaccine is injected under the skin by means of a syringe, and it produces an immunity within about fourteen days. The immunized animals usually remain resistant until they pass the age at which they are susceptible to the disease, but it may sometimes be advisable, particularly during a year when outbreaks are extensive, to reinoculate the calves when they are about eighteen months old. The second inoculation will minimize the risk of loss and give a lasting immunity.

MARKETING

Production Trends, January.

Dairy production reached its peak for the season during the first half of January, but the drying off of mature forage crops in some districts caused a slight decline in production towards the end of the month.

Potato deliveries from the 1947 spring crop up to the end of January were approximately 18,000 tons, and the total crop will probably reach 19,000 tons.

The total quantity of wheat bagged for the season, including wheat retained by growers for seed and feed purposes, will exceed 10,500,000 bushels.

Plantings of grain sorghum on the Darling Downs are much lighter than last year. Fair to good yields are expected from early crops. Reports indicate that later sowings are particularly light.

Hot dry conditions in the main cotton growing districts have caused severe checking of plant growth in the earlier crops, and good soaking rain is required.

The Southern Queensland pineapple crop will reach its peak during February, but heavy supplies will continue until the end of March.

Receipts of eggs by the South Queensland Egg Marketing Board for January were 682,113 dozen, compared with 606,105 dozen for January, 1947.

Potato Marketing Board.

The recently elected Potato Marketing Board held its inaugural meeting in the Department of Agriculture and Stock on the 22nd and 23rd January, 1948. The Board is comprised of five representatives of the growers, one from North Queensland, one from Central Queensland, and three from South Queensland, and the Director of Marketing. The grower members are Messrs. T. J. Ford, College road, Gatton (Chairman), C. F. Giffard, Home Hill, M. W. Reeves, Imbil, J. J. Dwyer, Gap View, via Kalbar, and W. Utz, Mt. Tarampa, via Coominya.

The marketing of potatoes will be continued by the Commonwealth Government under the National Security (Potatoes) Regulations until 31st October, so that the new Board will not be called upon to implement its marketing policy until 1st November, that is to say, it will be required to market the 1948 spring crop.

However, in the intervening months, the Board will be required to frame its marketing policy generally, and in particular will require to consider the question of Interstate trade in potatoes. Preliminary discussions on this matter will take place at a Potato Conference in Adelaide on 25th February at which the Queensland Board will be represented by Messrs. T. J. Ford and J. J. Dwyer and the other States will each have two representatives.

Consumption of Fresh Milk.

The significance of modern trends towards correcting nutritional deficiencies and their effect on the pattern of consumption of primary commodities is emphasized by an examination of current trends in fresh-milk consumption in many countries of the world. The joint effect of improved methods of handling and distributing milk and of the publicity given to the need to enhance standards of nutrition is illustrated most aptly by the statistical data furnished below which gives some indication of the increased consumption of milk in this country and certain overseas countries.

Such a world-wide increase in fresh-milk consumption cannot but have a marked influence on the supplies of butter available, and it does represent one important factor which will tend towards continued shortages of this commodity unless a considerable development of dairy production can be encouraged.

Queensland.

In the city of Brisbane supplies of Brisbane Milk Board-controlled milk for consumption in the city area increased from 4,569,807 gallons in 1940-41 to 10,929,807 gallons in 1946-47, whilst throughout Queensland over 14,000,000 gallons more were consumed in 1945-46 as milk and ice cream than during 1940-41.

Australia.

The following table extracted from Dairying Industry Statistics published by the Commonwealth Bureau of Census and Statistics shows the increase in consumption in Australia of fresh milk which occurred between 1940-41 and 1946-47:—

Year.	Million Gallons.
1940-41	176
1946-47*	229

*Subject to revision.

United Kingdom.

The following information has been extracted from the chairman's report to the annual meeting of the United Kingdom Milk Marketing Board:—

“Milk production in the United Kingdom during 1946 exceeded all previous records, amounting to 1,275,000,000 gallons, which is an increase of 38,000,000 gallons on the previous year. Ninety per cent. of the milk production was sold as liquid milk, the demand for which is still considerably in excess of supplies. The unsatisfied consumer demand is something like 150,000,000 gallons.”

U.S.A.

The following data, extracted from Agricultural Statistics of the United States Department of Agriculture, 1946, shows the increase in consumption of fluid milk in that country during the war years:—

	1941.	1945.*
	Million Gallons.	Million Gallons.
Consumed as fluid milk or cream—		
In cities and villages ..	4,054	5,433
On farms where produced ..	1,400	1,361
Total	5,454	6,794

*Preliminary.

Ontario, Canada.

Figures showing commercial sales of fluid milk in the Province of Ontario, Canada, on a 30-day month basis, show that sales have increased from 8,213,750 gallons for April, 1944, to 8,971,375 gallons for July, 1947.

South Africa.

The Union of South Africa is another country in which milk consumption has increased. The following statement, made by the Hon. J. G. N. Strauss, Minister of Agriculture, is an extract from a report of the High Commissioner for Australia at Capetown on 13th May, 1947:—

“Even under the existing unfavourable circumstances, milk production had actually increased, but there had also been an enormous increase in fresh-milk consumption.”

GENERAL NOTES

Staff Changes and Appointments.

Mr. L. G. Newton, Q.D.A., B.V.Sc., Veterinary Officer stationed at Oonoonba, has been appointed Officer in Charge of the Department of Agriculture and Stock's Animal Health Station at Oonoonba, near Townsville.

Notice of Intention to extend Barley Marketing Board.

An Order in Council has been issued under *The Primary Producers' Organisation and Marketing Acts, 1926 to 1946*, giving notice of intention to extend the operations of The Barley Marketing Board for a further period of six years from 24th April, 1948. Nominations have been invited for the election of two growers' representatives on the Board for a period of three years from 24th April next.

Marketing Reporting Services.

The activities of the Marketing Reporting Service of the Department, which was inaugurated for the purpose of providing primary producers and others interested with authentic daily reports of wholesale prices and market conditions for primary produce, has been extended to cover daily reports of sales of farm produce at the Roma Street Railway Goods Yard.

These reports are now included in the Daily Official Market Quotations, which cover also the Brisbane Wholesale Fruit and Vegetable Markets.

Dairy Technology Scholarships.

The Department of Agriculture and Stock announced recently its intention to grant scholarships in dairy technology as from the commencement of the 1948 New Zealand university year to selected Queensland University students with the necessary qualifications. Scholarships in dairy technology have been allotted to Messrs. W. D. Mitchell, a cadet in the Dairy Research Laboratory of the Department, and T. A. Morris (Mitchelton). These young men will attend the Massey Agricultural College School of Agriculture, University of New Zealand, for a period of three years.

The Dairy Products Stabilisation Board.

An Order in Council has been issued under *The Dairy Products Stabilisation Acts* constituting the Seventh Dairy Products Stabilisation Board for a period of three years from 1st February, 1948, and appointing the members of the Butter and Cheese Marketing Boards and the Director of Marketing to be members of such Board.

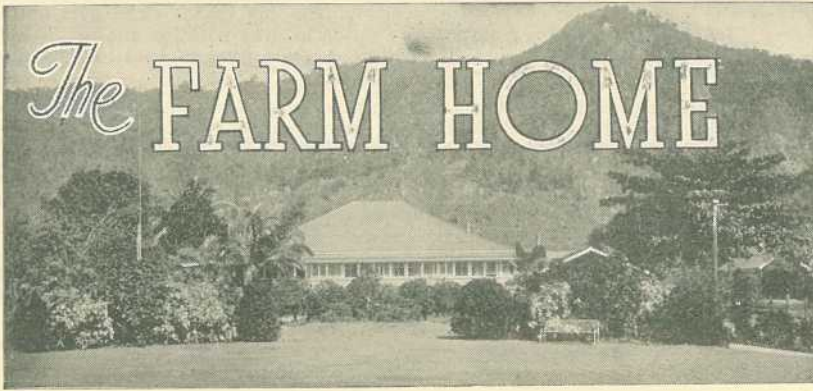
The members are: Messrs. A. H. Bulow (Mulgilde), O. O. Madsen, M.L.A. (Yangan), A. G. Muller, M.L.A. (Boonah), J. McRobert (Maryborough), T. F. Plunkett, M.L.A. (Beaudesert), and J. Purcell (Toowoomba), representatives of the Butter Marketing Board; Messrs. R. C. Duncan (Toowoomba), D. G. O'Shea (Southbrook), M. McIntyre, M.L.A. (Mount Tyson), representatives of the Cheese Marketing Board, and Mr. H. S. Hunter (Director of Marketing).

Fauna Sanctuary.

An Order in Council has been issued under *The Fauna Protection Act of 1937* declaring an area embracing the Alliance and Ibis dams at the State Treatment Works, Irvinebank, as a sanctuary for fauna. Mr. C. C. Wyatt, mill foreman at Irvinebank, has been appointed an Honorary Fauna Protector.

Extending Pineapple Levy Regulation.

The Pineapple Levy Regulation under *The Fruit Marketing Organisation Acts* has been extended for a further period until the 31st December, 1948. An amendment of the Regulation provides for an additional levy at the rate of sixpence (6d.) per case on all pineapples purchased by the Committee of Direction of Fruit Marketing from farm produce agents for supplying to fruit canners.



Care of Mother and Child.

Under this heading an article supplied by the Maternal and Child Welfare Service of the Department of Health and Home Affairs, dealing with the welfare and care of mother and child, is published each month.

TRAINING A CHILD TO EAT.

A CHILD wants to repeat the things that give him pleasure and satisfaction, therefore to help baby form good eating habits we must see that he gets satisfaction out of doing the things we want him to do.

The change from breast to bottle feeding is a big step for the baby in growing up. Later steps will be easier if the baby finds this one pleasant. All changes in feeding must therefore be gradual, as sudden changes are likely to be resisted.

When the baby gets his first taste of cereal or other solid food he is starting a new experience. Mother would like him to enjoy it so that he wants to repeat it. Up to this time he has taken his food in liquid form and he knows of only one way of satisfying his appetite, namely, sucking, from which he gets great satisfaction. When a small amount of solid food is put into his mouth he does not know what to do with it and he may at first spit it out for this reason. If he keeps it in his mouth you can see him feeling it with his tongue, turning it over, finding out for himself what it is. If now you will encourage him by looking pleased and speaking of the 'nice breakfast' you will let him see that you are pleased with the attempt. If he then pushes it out with his tongue give him another small portion to try again. Do not laugh at his funny faces—treat the situation as a serious but pleasant lesson in eating and always praise him for trying. He will thus learn to associate eating with pleasant words and looks from mummy.

Take it for granted that he will like every new food, and offer it to him in small amounts each day until he eats it well. Never ask a child whether he likes a food and above all do not suggest to him by the expression of your face or any other way that he may not like it. Quite a little baby will understand your attitude even if he does not understand your words. Good, well-cooked food and pleasant surroundings are necessary for the greatest pleasure in eating but it must not be forgotten that even more important is the need for being hungry at meal times. So do not give children biscuits, sweets or indeed anything except fruit or fruit juice between meals.

Many children learn quickly and well to eat new foods, others more slowly. Do not be anxious or worried if your child is slow in learning or if he refuses to eat. If you are, the child will know it and will soon learn to get extra attention by continuing to refuse. All children like attention so give them approval when they eat well but ignore them when they refuse to eat. In this case just take the food away without showing any excitement and offer it again at the next meal time. Do not talk about the child's refusal to eat in front of him or allow yourself or other members of the family to express their dislike for certain foods in his presence. Children are great copyists. Do not force or coax your child to eat.

When a baby sees his mother using a spoon to feed him he may wish to use one also. Let him have a spoon even if he is messy. The joy that a child gets out of directing a bit of cereal into his mouth with a spoon or even with his hands is taking the place of the joy he used to have in sucking. A child likes to hold his cup also. Steady it for him and let him do as much as he can.

A child will learn to like all the foods that are good for him if they are given to him in such a way that he gets satisfaction out of eating them. He will not cry for foods he has never tasted so do not let him taste foods you know are bad for him.

Mothers should learn all about the foods that build up strong healthy bones and muscles and create resistance to illnesses. Ask Sister at your Welfare Centre to explain them to you.

Any other advice on this and other matters connected with children may be obtained by communicating personally with the Maternal and Child Welfare Information Bureau, 184 St. Paul's Terrace, Brisbane, or by addressing letters "Baby Clinic, Brisbane." These letters need not be stamped.

Some Appetising Salads.

Mixed Salad.

One pound of cold new potatoes, $\frac{3}{4}$ pint cold peas, any fruit available, lettuce, vinegar, seasoning mayonnaise, paprika pepper. Slice potatoes; sprinkle with 1 tablespoon seasoned vinegar, leave to marinate for 10 to 12 minutes. Add peas and fruit, and mix. Bind with mayonnaise. Line salad bowl with washed and well dried lettuce leaves, fill in salad, top with lightly sprinkled paprika.

Salad Dressing.

To make quick mayonnaise place in the maker in the following order: One cup of lemon juice, one cup of melted butter or oil, one tin of condensed milk, one unbeaten egg, one teaspoon of salt, a little pepper and a tablespoon of made mustard. Beat together rapidly until light and frothy like whipped cream, when it is ready for use. This is a savoury dressing; if a sweet one is desired omit the salt, pepper and mustard and add a little sugar if desired.

Salad Ring Mould.

Half pint mixed cold peas, diced carrot and potato, $\frac{1}{2}$ pint thick custard, seasoning, vinegar, mustard, pinch of sugar, $\frac{1}{2}$ oz. gelatine, watercress and radishes. Make custard with half as much as usually used for sweets, and do not sweeten. Add to the hot custard the gelatine previously softened with 2 tablespoons water, stir till dissolved. Leave till just setting. Season with about 1 teaspoon salt, pepper, $\frac{1}{2}$ level teaspoon sugar, 1 level teaspoon dry mustard mixed with 1 dessertspoon vinegar; stir in 2 to 2 $\frac{1}{2}$ dessertspoons more vinegar. Mix in vegetables. Fill into a 1-pint wetted border mould, leave to set. Unmould, fill centre of ring with watercress; trim dish with watercress and radishes. Enough for 4 to 5 people.

Sweet and Sour.

For each person allow about 2 tablespoons shredded raw cabbage, and an equal quantity of grated raw carrot. Moisten cabbage with salad cream or seasoned vinegar, place in centre of dish, surround with carrot. Top with sliced tomato. Just before serving, strew with chopped raw cauliflower head (delicious nutty taste) and sprinkle with sugar if desired.

"Poinsettia" Salad.

Wipe firm, round, large tomatoes, 1 to 2 per person. Cut off thin slice from blossom end, scoop out pips. Cut flesh from top to bottom into sections, but do not slice all the way through; turn back to form petals. Insert slice of cucumber in each cut; fill centre with chopped hard boiled egg. Top with mayonnaise, sprinkle with chopped parsley. Serve on lettuce leaves.

Salad in Jelly.

Mixture: One tablespoon gelatine, $\frac{1}{2}$ cup cold water, 1 cup boiling water, $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ cup vinegar, 2 tablespoons lemon juice, 1 teaspoon salt. Prepared vegetables: One cup shredded celery, $\frac{1}{2}$ cup shredded cabbage, $\frac{1}{2}$ cup peas, $\frac{1}{2}$ cup cooked beetroot, $\frac{1}{2}$ cup shredded carrot, lettuce. Salad dressing, fine cress. Put gelatine mixture in a pan. Dissolve and allow to cool. Add prepared vegetables. Mould in either large or individual moulds. Garnish with salad and some salad dressing.

QUEENSLAND WEATHER IN JANUARY.

District rainfall averages were mostly well below normal, except for the flood areas of the Far North Coast (Barron and Herbert). Some heavy totals were also reported from parts of the Peninsula, Gulf Country and east Carpentaria during the northern cyclonic rain depression operating between the 10th and 14th.

Although there were scattered coastal showers late in the month and scattered thunderstorms in the South Moreton district 13th/14th, there was very little rain over most of the State, apart from variable thunderstorm falls 2nd/3rd in most districts. These falls included a fair percentage of useful over one inch totals in the central and southern interior. Most of the pastoral and agricultural areas of the State are still in good condition following the record spring rains, but, with the gradual decrease in distribution during December and January, a good soaking monsoonal rain during February and March would be very beneficial.

Pressure.—An inland trough and cold southerly front brought the State-wide distribution of variable thunderstorms from the 1st—3rd. By the 5th and 6th increased tropical activity was shown in the shallow depression area from the Gulf of Carpentaria to the North Coral Sea, and on the latter day a small but intense cyclonic centre moved over Thursday Island at midday causing structural damage. By the 8th the depression had moved south-east to about 100 miles east-north-east from Cooktown, losing wind energy but becoming a heavy rain depression which brought much flooding in the adjacent coastal area Cooktown to Cardwell during the weekend 10th/12th. At the same time another depression around the south-eastern corner of the Gulf of Carpentaria brought heavy local rains. With the centre south of Normanton on the 13th rains continued during the 14th as the centre moved over-night to the east-north-east of Townsville. By the 15th the centre was 300 miles east of Mackay and it continued its south-east movement to the south of New Caledonia, holding up aircraft movement from that place. During the latter half of the month a more or less permanent high pressure ridge along the coast and a weak dip formation inland were the main controls, but cyclonic conditions to the west of the New Hebrides developed considerable intensity and moved slowly southward west of New Caledonia to a deep centre east of Lord Howe Island on the 31st. Strong south to south-east winds and rather rough weather were maintained on the Queensland coast during this period. On the 8th, 9th, 10th there was also rough south-east weather south from Townsville which gradually moderated by the 14th, except for erratic squalls accompanying the rain cyclone. 13th—Small but sharp tornadic squall Sandgate (metropolitan).

Some heavy monthly flood rain totals included 1412 points Croydon, 1813 Karumba, 1186 Normanton, while along the north coast many 20/30 inch amounts were recorded—4019 points Babinda, 4458 Innisfail, 5252 Tully (second highest January record).

Temperature.—One of the coolest Januarys on record. Maximum temperatures averaged 1 to 2 deg. below normal up to 3.5 deg. at Thargomindah. Minimum readings ranged from 1 deg. below at Palmerville to 4.2 deg. and 6.2 deg. below at Thargomindah and Mitchell. During the latter half of the month inland temperatures became warmer, with 19 days over 100 deg. at Boulia and 18 at Camooweal. Highest maximum 110 deg. on 29th and 30th at Camooweal and Urundangle.

Brisbane.—Mean pressure $\frac{9 + 3}{2}$ 29.905 ins. (normal 29.809 ins.). *Temperature.*—Coolest January on record. Mean maximum 81.8 deg. (normal 85.4 deg.); (third lowest on record). Mean minimum 65.7 deg. (normal 69.1 deg.); (lowest on record). Mean temperature 73.7 deg. (normal 77.3 deg.); (lowest on record). Rainfall 478 points on 11 days (average 634 points on 13 days). Sunshine 277.0 hours (normal 234.8 hours).

The rain position is summarised below—

Division.	Normal Mean.	Mean January, 1948.	Departure from Normal.
	Points.	Points.	Per cent.
Peninsula North	1389	880	37 below
Peninsula South	935	777	17 "
Lower Carpentaria	725	567	22 "
Upper Carpentaria	628	424	32 "
North Coast, Barron	1328	1802	36 above
North Coast, Herbert	1411	2120	50 above
Central Coast, East	893	329	63 below
Central Coast, West	537	207	61 "
Central Highlands	400	62	85 "
Central Lowlands	321	105	67 "
Upper Western	316	69	78 "
Lower Western	170	3	98 "
South Coast, Port Curtis	658	175	73 "
South Coast, Moreton	671	392	42 "
Darling Downs, East	375	179	52 "
Darling Downs, West	298	153	49 "
Maranoa	302	115	62 "
Warrego	214	158	26 "
Far South-West	191	148	23 "

ASTRONOMICAL DATA FOR QUEENSLAND.

MARCH.

Supplied by W. J. Newell, Hon. Secretary of the Astronomical Society of Queensland.

TIMES OF SUNRISE AND SUNSET.

At Brisbane.			MINUTES LATER THAN BRISBANE AT OTHER PLACES.					
Day.	Rise.	Set.	Place.	Rise.	Set.	Place.	Rise.	Set.
	a.m.	p.m.						
1	5.41	6.20	Cairns	31	27	Longreach ..	36	34
6	5.44	6.15	Charleville	27	27	Quilpie ..	35	35
11	5.46	6.10	Cloncurry ..	51	48	Rockhampton ..	10	10
16	5.49	6.04	Cunnamulla	29	29	Roma ..	17	17
21	5.52	5.59	Dirranbandi	19	19	Townsville ..	25	23
26	5.54	5.53	Emerald ..	19	19	Winton ..	41	39
31	5.57	5.48	Hughenden	35	33	Warwick ..	4	3

TIMES OF MOONRISE AND MOONSET.

At Brisbane.			MINUTES LATER THAN BRISBANE (SOUTHERN DISTRICTS).								
Day.	Rise.	Set.	Charleville 27;		Cunnamulla 29;		Dirranbandi 19;		Quilpie 35;		
			Roma 17; <td>Warwick 4. <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </td>	Warwick 4. <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>							
At Brisbane.			MINUTES LATER THAN BRISBANE (CENTRAL DISTRICTS).								
Day.	Rise.	Set.	Emerald.		Longreach.		Rockhampton.		Winton.		
			Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.	
1	p.m. 10.05	a.m. 11.07	1	27	13	43	28	18	3	50	31
2	10.47	12.07	6	30	10	46	24	21	0	53	27
3	11.32	1.06	11	22	17	38	33	13	8	44	37
4	..	2.02	16	12	27	27	43	2	18	30	51
5	a.m. 12.21	2.54	21	11	29	26	44	0	20	28	52
6	1.14	3.41	26	22	18	38	33	13	9	43	38
7	2.08	4.23	31	30	9	46	24	21	0	53	26
8	3.03	5.00									
9	3.58	5.33									
10	4.52	6.04									
11	5.46	6.34									
12	6.39	7.02									
13	7.33	7.31									
14	8.28	8.02									
15	9.25	8.37									
16	10.25	9.16									
17	11.28	10.01									
18	p.m. 12.32	10.54									
19	1.35	11.54									
20	2.33	..									
21	3.27	a.m. 1.00									
22	4.14	2.10									
23	4.56	3.20									
24	5.34	4.29									
25	6.10	5.36									
26	6.45	6.41									
27	7.20	7.45									
28	7.58	8.50									
29	8.39	9.52									
30	9.24	10.54									
31	10.13	11.53									

At Brisbane.			MINUTES LATER THAN BRISBANE (NORTHERN DISTRICTS).							
Day.	Rise.	Set.	Cairns.		Cloncurry.		Hughenden.		Townsville.	
			Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	47	12	63	38	47	24	39	12		
3	54	5	67	34	51	20	44	6		
5	55	3	68	32	51	18	45	4		
7	53	7	67	35	50	21	44	8		
9	45	14	61	40	46	25	37	14		
11	36	24	55	46	40	32	30	21		
13	26	34	47	54	32	39	22	29		
15	16	44	41	60	26	46	14	37		
17	7	52	36	65	20	50	7	44		
19	3	55	34	67	18	52	4	45		
21	7	52	36	65	20	50	7	44		
23	18	43	42	59	27	45	16	36		
25	29	31	50	52	35	37	25	27		
27	41	20	57	44	42	29	34	18		
29	51	9	65	36	49	22	42	9		
31	55	3	68	32	51	18	45	4		

Phases of the Moon.—Last Quarter, March 3rd, 2.35 a.m.; New Moon, March 11th, 9.15 a.m.; First Quarter, March 18th, 10.27 p.m.; Full Moon, March 25th, 1.10 p.m.

Equinox, March 21st.—At 2.57 a.m. on March 21st the Sun will cross the Equator, and it will then rise and set at true east and true west respectively. On March 12th and 25th the Moon will rise and set respectively at true east and true west.

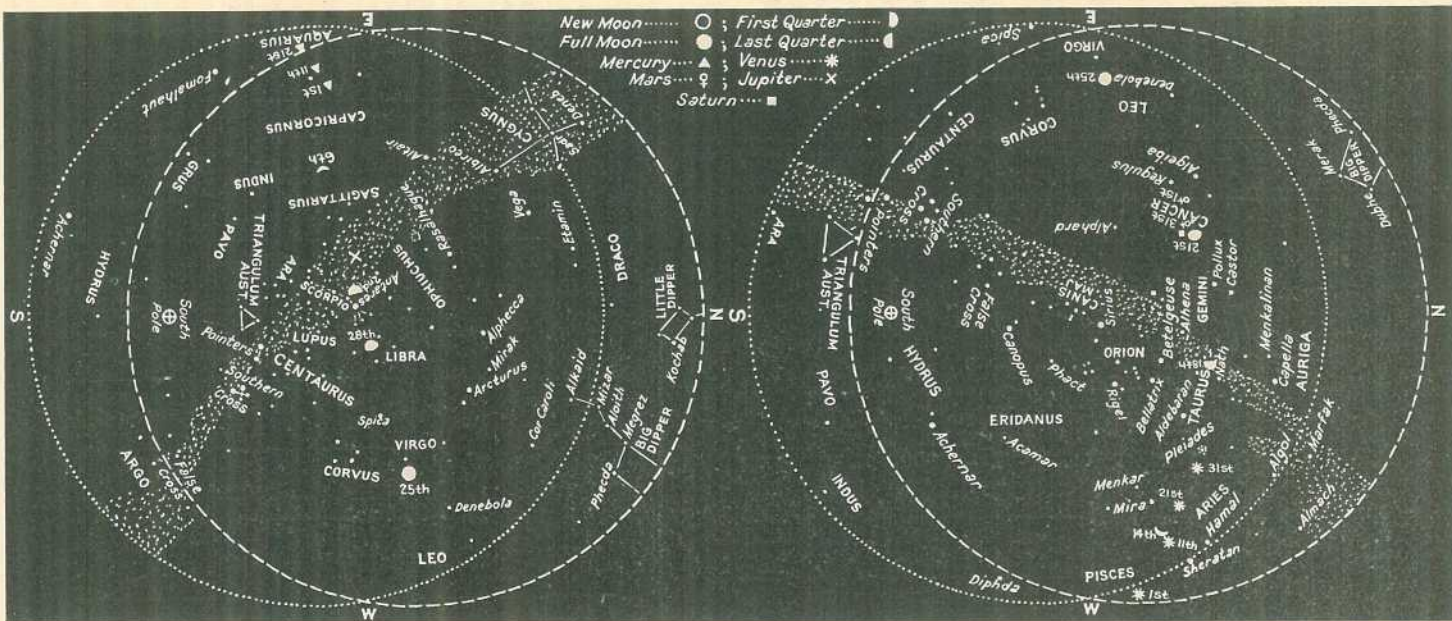
Mercury.—Favourably placed as a morning object all this month in the constellation of Aquarius. On the 1st it will rise 1 hour 21 minutes before the Sun, and on the 17th will reach its greatest angle west of the Sun, when it will rise over 2 hours before sunrise. On the 31st it will rise 1 hour 50 minutes before the Sun.

Venus.—In the constellation of Pisces will set 1 hour 56 minutes after sunset on the 31st, and after passing 10 degrees south of Hamel on the 11th, on the 31st, in the constellation of Aries, will set 2 hours 11 minutes after the Sun.

Mars.—Now rising during the afternoon and is visible almost all night. On the 7th will be about midway between Regulus and Saturn. By the 31st it will have almost caught up to Saturn, when it will set about 2 hours after midnight.

Jupiter.—In the constellation of Sagittarius, will rise about midnight on the 1st, and between 10.15 p.m. and 11.30 p.m. on the 31st.

Saturn.—On the 1st will rise half an hour before Mars, and on the 31st on the boundary between Leo and Cancer, and about 1 degree south of Mars will set about 2 hours after midnight, 8 minutes before Mars.



Star Charts.—The chart on the right is for 7.15 p.m. in the south-east corner of Queensland to 8.15 p.m. along the Northern Territory border on the 15th March. (For every degree of longitude we go west the time increases 4 minutes.) The chart on the left is for 9 hours later. On each chart the dashed circle is the horizon as viewed from Cape York and the dotted circle is the horizon for places along the New South Wales border. When facing north hold "N" at the bottom; when facing south hold "S" at the bottom and similarly for the other directions. Only the brightest stars are included and the more conspicuous constellations named. The stars which do not change their relation to one another, moving east to west arrive at any selected position about 4 minutes earlier each night. Thus at the beginning of the month the stars will be in the positions shown about one hour later than the time stated for the 15th, and at the end of the month about one hour earlier than that time. The positions of the moon and planets which are continually changing in relation to the stars are shown for certain marked days. When no date is marked the position is for the middle of the month.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

JANUARY.

(Compiled from Telegraphic Reports.)

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Jan.	No. of years' records.	Jan., 1947.	Jan., 1948.		Jan.	No. of years' records.	Jan., 1947.	Jan., 1948.
<i>North Coast.</i>					<i>South Coast—cont.</i>				
Atherton	In.		In.	In.	Gayndah	In.		In.	In.
Cairns	11-52	42	4-42	12-00	Gatton College ..	4-32	44	5-17	1-17
Cardwell	16-43	61	3-63	27-74	Gayndah	4-70	72	1-64	0-55
Cooktown	16-99	71	0-22	33-15	Gympie	6-57	73	3-71	2-40
Herberton	14-10	67	1-31	18-44	Kilkivan	5-63	62	1-63	0-65
Ingham	9-31	57	2-37	7-89	Maryborough ..	6-97	72	6-25	3-42
Innisfail	15-96	51	1-42	17-06	Nambour	9-37	47	7-25	5-54
Mossman	20-24	62	0-81	44-58	Nanango	4-65	61	2-00	0-99
Townsville	18-87	19	5-32	23-50	Rockhampton ..	7-39	72	0-42	0-87
	11-05	72	0-35	8-75	Woodford	7-72	55	6-03	3-63
<i>Central Coast.</i>					<i>Central Highlands.</i>				
Ayr	10-95	56	0-51	4-14	Clermont	5-02	47	2-63	0-53
Bowen	9-65	72	0-19	6-77	Springsure	4-21	74	1-71	0-35
Charters Towers ..	5-35	61	1-29	2-17	<i>Darling Downs.</i>				
Mackay	13-50	72	1-66	4-42	Dalby	3-44	73	4-61	0-98
Proserpine	14-95	40	2-02	11-56	Emu Vale	3-22	47	8-84	1-78
St. Lawrence	8-93	72	0-82	1-31	Jimbour	3-51	64	3-12	0-72
<i>South Coast.</i>					Miles	3-83	58	2-23	0-83
Biggenden	5-25	44	1-97	1-15	Stanthorpe	3-68	70	6-61	2-20
Bundaberg	8-52	60	3-29	2-94	Toowoomba	5-16	71	7-20	1-40
Brisbane Bureau ..	6-38	95	11-91	4-78	Warwick	3-58	78	5-55	2-20
Caboolture	7-96	67	9-92	5-45	<i>Maranoa.</i>				
Childers	7-23	48	5-46	2-13	Roma	3-20	69	2-18	1-11
Crohamhurst	11-78	50	7-87	5-62	St. George	2-64	62	0-24	1-55
Esk	5-64	56	6-92	1-70					

CLIMATOLOGICAL DATA FOR JANUARY.

(Compiled from Telegraphic Reports.)

Divisions and Stations.	Atmospheric pressure. Mean at 9 a.m.	SHADE TEMPERATURE.		EXTREMES OF SHADE TEMPERATURE.				RAINFALL.	
		Mean Max.	Mean Min.	Max.	Date.	Min.	Date.	Total.	Wet Days.
<i>Coastal.</i>									
Cairns	In.	Deg.	Deg.	Deg.	30	Deg.	16	Pts.	22
Herberton		87	73	92		68		2774	
Townsville		81	63	88	18	53	16	789	19
Rockhampton		88	74	94	3	68	14	875	14
Brisbane	29-86	90	69	98	29	66	3	87	6
	29-93	82	70	88	30	62	10	478	11
<i>Darling Downs.</i>									
Dalby		86	60	95	31	51	17	98	3
Stanthorpe		77	54	85	31	45	17	220	9
Toowoomba		80	58	89	31	52	30	140	7
<i>Mid-Interior.</i>									
Georgetown	29-81	92	71	98	27	60	16	709	8
Longreach	29-85	98	70	108	31	61	4, 15	93	3
Mitchell	29-89	90	61	100	29	50	16	108	4
<i>Western.</i>									
Burketown		95	74	105	9	66	16	584	6
Boulia	29-81	101	73	109	21, 29	60	4	4	1
Thargomindah	29-86	94	70	106	21, 29	59	2, 3	94	4

A. S. RICHARDS.

Deputy Director, Meteorological Services.