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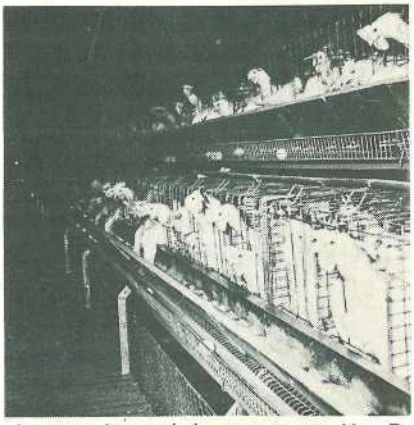

Layers housed in cages on Mr. D. Benfer's modern poultry set-up at Mt. Cotton. *[Story inside.]*

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Flood Damage Relief Scheme

LOW interest loans up to a maximum of $20 000 will be available to flood-affected primary producers in Queensland under a State Government relief scheme now operating.

The loans can be used for carry-on expenditure (when the producer is in necessitous circumstances), re-stocking and repairs or replacement of machinery and property improvements, excluding the owner's dwelling, destroyed or damaged by floods.

The scheme, which is being administered by the Agricultural Bank, was announced by the Minister for Primary Industries (Hon. V. B. Sullivan, M.L.A.).

Application forms for loan assistance have been air-freighted to centres throughout the State and the Bank is geared to process them as rapidly as possible.

'For producers without cash resources and unable to obtain credit from their normal lending sources, interest will be charged at the rate of 3% yearly on loans up to $10 000 and 6% to $20 000 up to a term of 7 years', Mr. Sullivan said.

'Capital repayments may be deferred in the short term and then paid over the remaining period.

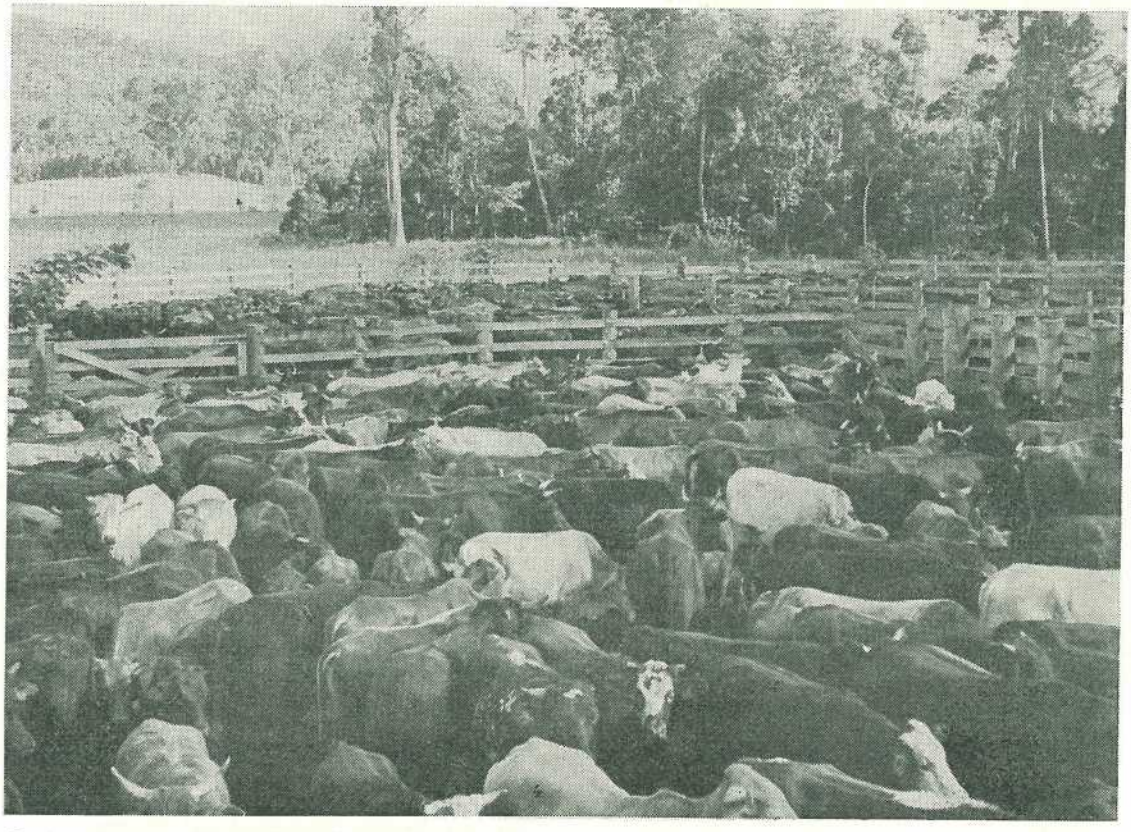
'For producers not in necessitous circumstances but who have suffered flood losses, interest rates will be 4½% and 6%. These applicants must make a prior approach to their own bank and to the Commonwealth Development Bank. In both cases, a statement is required from the usual financial sources that no further finance is available.'

In the case of damaged dwellings or personal hardship, farmers should apply to the nearest Clerk of the Court for advice on details of the assistance available.

Flood damage relief assistance application forms are available at Agricultural Bank offices at Atherton, Ayr, Biloela, Brisbane, Bundaberg, Dalby, Emerald, Gympie, Innisfail, Kingaroy, Mackay, Mareeba, Miles, Monto, Nambour, Rockhampton, Roma, Stanthorpe, Toowoomba and Townsville; and at D.P.I. offices at Barcaldine, Blackall, Charleville, Cloncurry, Cunnamulla, Hughenden, Longreach, Mt. Isa, Quilpie, Richmond and Winton.

Beef Cattle Pastures in the

Part I



Cattle yards and fattening cattle in the wet tropics. The cattle are running on country once described as useless.

by J. K. TEITZEL and R. A. ABBOTT, Agriculture Branch; and W. MELLOR, Research Stations Section.

Wet Tropics

FEW areas in Australia present such wonderful opportunities for increasing beef cattle production as the coastal strip from Ingham in the south to Cooktown in the north.

The term coastal strip refers to the land lying between the Pacific Ocean and the Great Dividing Range. Along parts of the Cook Highway north of Cairns, the Great Divide runs directly along the shoreline but, at the other extreme in the Jarrah, Tully and Herbert valleys, the strip is nearly 50 kilometres wide.

Although the potential for fattening cattle in the area has been recognized for a long time, it was not until the early 1960s that development for this purpose really gained impetus. Since then, development has been rapid and large tracts of previously useless country have been converted into good pastures.

Productivity of these pastures is high. Annual liveweight gains of 900 kilograms per hectare from grass-legume pastures and 1100 kilograms per hectare from grass-bag nitrogen pastures are possible. Production per animal is also high.

On good pastures, 0·7 kg per animal per day can be taken as a general figure of liveweight increase throughout the whole year. Cattle can be fattened to top quality export grade. Forward stores can be fattened in 5 to 7 months, while younger or more backward stores take from 9 to 10 months.

The value of the pastures is not limited to fattening. Breeding herds have no unusual problems and a 90% calving can be expected, with high quality baby beef being produced.

Several highly successful dairy farmers are operating in the area, but the beef industry offers more scope. Because of the favourable climate, pastures have the ability to fatten cattle throughout the year. This, with the presence of a source of store cattle on breeding properties in the hinterland and the proximity of modern processing facilities and deepwater ports, makes an ideal situation for a cattle fattening industry.

History of Cattle Fattening

A small cattle fattening industry has been carried on in the area for at least 30 years. The first pastures were of grass only and under the high rainfall conditions, nitrogen soon became limiting and rapid deterioration followed.

Even when there was an adequate bulk of grass in the summer months, the seasonal decline in protein levels, so typical of grasses grown in the absence of legumes or nitrogenous fertilizers, was most evident. At the time, this was by far the greatest drawback to any further expansion of the industry.

It was not until 1935 with the establishment of the South Johnstone Research Station (then known as the Bureau of Tropical Agriculture) that some definite progress into the solving of this problem took place.

Introductions, followed by screening experiments, resulted in the release of the legumes centro, puero, stylo and calopo in 1939. Experiments demonstrated that, when these legumes were grown in association with grasses such as guinea, para, elephant and molasses, the pasture mixture was not only highly productive but also capable of maintaining this high production for long periods. The nitrogen fixing ability of the legumes was responsible for this feat.

The introduction of these grass-legume pastures permitted consideration of cattle fattening and dairying as solid, long-term investments for the region.

Interest at first centred on the development of the high fertility rain-forest soils. On these, the establishment of grass-legume pastures was not very difficult and animal performance was good. There was also some development of poor quality rain-forest and better class open forest in the Ingham and Tully districts, but most attempts at developing the open forest and tea-tree areas failed.

Research Programme

With the opening up of large tracts of this poor country in the 1960s, a new technology had to be developed. An intensive research programme by officers of the South Johnstone Research Station and the development of new methods by farmers themselves have resulted in successful pasture development.

The main achievements have been:—

- The discovery of a range of introduced grasses and legumes that give reasonably high production.
- The determination of the cultural practices and fertilizers required to establish pastures on almost any part of the wet tropical coast.

The South Johnstone Research Station actually comprises three separate areas of land. The headquarters for staff is an area of 46·5 ha on the bank of the South Johnstone River. Some 17·6 km west is the Utchee Creek sub-station with 267 ha of basalt and metamorphic soils carrying rain-forest. Different soil-vegetation types are represented at the Silkwood sub-station, of 12 ha, where soil fertility is low and drainage poor.

Laboratory facilities, plant houses and other experimental equipment at South Johnstone allow carefully controlled experiments to be carried out on that station while large-scale grazing trials are possible at Utchee Creek. Small field experiments study the improvement of pasture productivity on the poor soils at Silkwood.

Because of the wide diversity of land types found in the wet tropical coast, many experiments have to be carried out away from these base stations. To date, experimental data have been gathered from more than 80 trial sites on private properties.

While all this information is aimed primarily at the coastal belt lying between Ingham and Cooktown, it can be applied with some modifications to areas of Cape York Peninsula and to the Mackay–Proserpine region where the annual rainfall exceeds 1 500 mm.

Climate

The dominant climatic feature is the rainfall, which ranges from 1 800 to 4 500 mm a year depending on locality. Despite the enormous variation between localities, the distribution of rainfall remains remarkably constant with a clearly-defined pattern of heavy falls from January to March, and a drier period in spring.

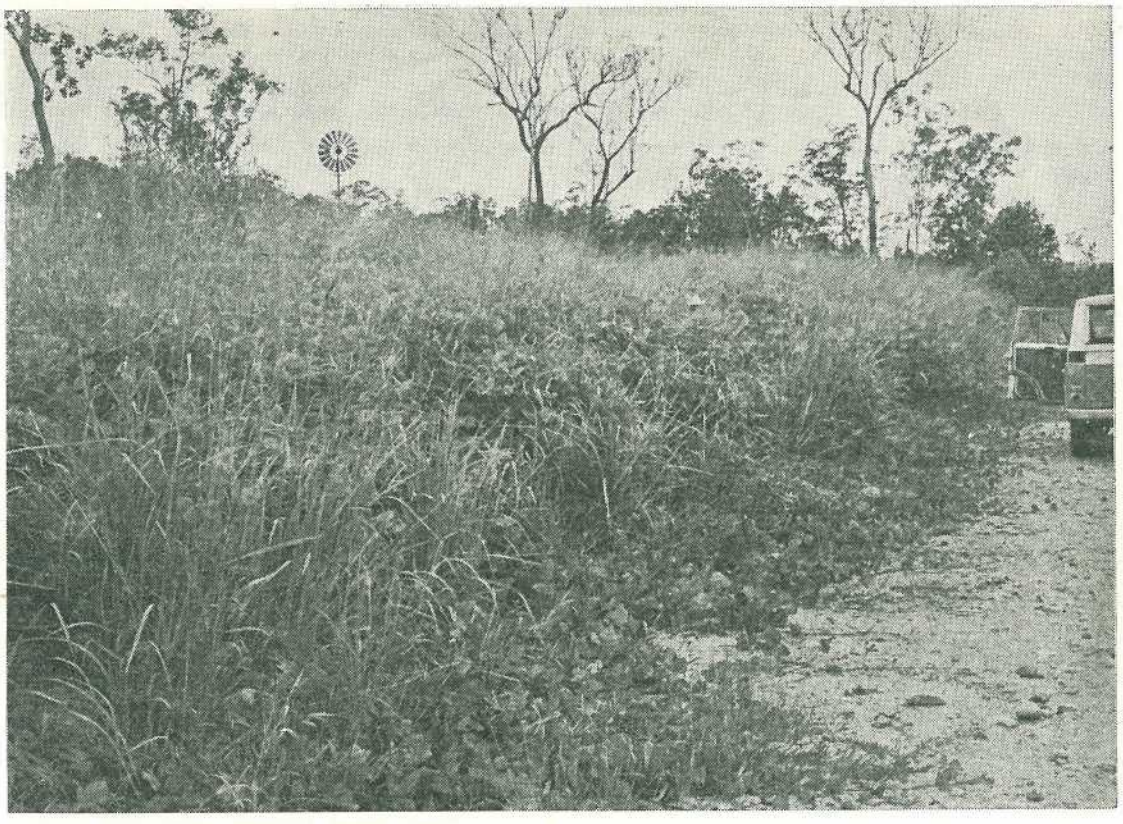
Undesirable features of the wet season include the danger of leaching plant nutrients from the soils. As well, maximum plant growth is not possible because of the almost continuous cloud cover. In the wetter areas, there is no prolonged period of moisture stress. However, the dry season is well defined and, in the drier areas in particular, there are periods of a month or more which receive less than 50 mm of rain and plant growth is limited by moisture shortage.

Temperatures are highly favourable for plant growth although light frosting does occasionally occur in some areas. Average monthly maximum temperatures for South Johnstone Research Station range from 23·6°C in July to 30·8°C in December, and average monthly minimum temperatures range from 13·7°C in July to 21·8°C in February.

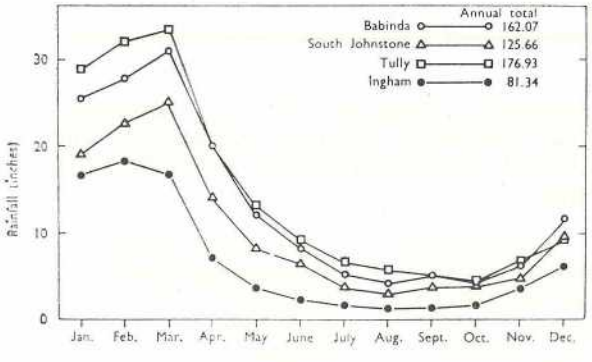
Although there is no fully dormant season, tropical pasture species are notoriously sensitive to cool weather and there is a serious slowing down in growth during winter. It is during the winter and spring that there may also be times of moisture shortage. Trial results have indicated that both these influences are aggravated by shortage of soil nitrogen.

Native Vegetation

Native vegetation may be classified in many ways but the following groupings have been found convenient for land development purposes.



▲ *A good grass-legume (guinea grass-puero) pasture in the wet tropics.*



◆ *Average rainfall over more than 30 years (figure 1).*

RAIN-FOREST (MESOPHYLL VINE FOREST). This is the most complex of all plant communities with plant development in its most luxuriant form. A range of species dominates, all of which are large trees with a fairly distinctive 'rain-forest' growth form. Some of these forests are periodically damaged by cyclones leading to an abundance of lawyer vines (*Calamus* spp.), silver quandong (*Elaeocarpus* spp.), lantana (*Lantana camara*) stinging tree (*Laportea* spp.) and some other pioneer species. Some eucalypts (*Eucalyptus* spp.), wattles (*Acacia* spp.) and messmates (*Tristania* spp.) may also be present in less luxuriant rain-forests.

BASTARD RAIN-FOREST (SCLEROPHYLL-MESOPHYLL VINE FOREST). Large eucalypts, wattles and messmates are found emerging above a fairly low rain-forest type canopy. Because of less fertile soil, the rain-forest timber species do not grow to the same size as they do in true rain-forest and the canopy is less dense. Many pioneer species are also present.

Open forest (layered sclerophyll forest).

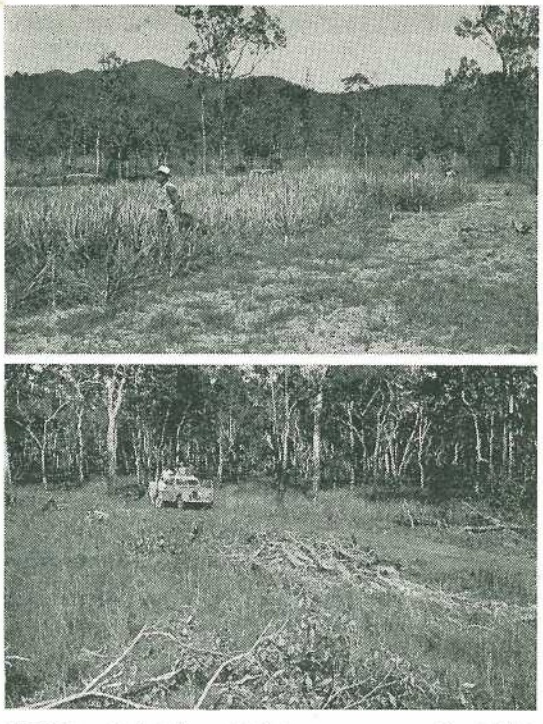
PALM SWAMP FOREST (MIXED MESOPHYLL PALM VINE FOREST). The vegetation association is characterized by the presence of either *Archontophoenix* (feather palm or piccabeen palm) or *Licuala* (fan palm) and rain forest species. The palms need not be dominant.

OPEN FOREST (LAYERED SCLEROPHYLL FOREST). This is made up of relatively large trees of various eucalypt and wattle species together with some messmates, oaks (*Casuarina* spp.) and tea-tree (*Melaleuca* spp.). All possible combinations of these are found. There is also a sparse ground layer similar to that of the grassy woodland but it is not as well developed.

GRASSY WOODLAND (LIGHT SCLEROPHYLL WOODLAND). The trees in this group are smaller and less dense than those found in the open forest. As a result the ground layer of vegetation is better developed. This consists of grasses such as spear (*Heteropogon contortus*), kangaroo (*Themeda australis*), blady (*Imperata cylindrica* var. major), wire (*Aristida* spp.) in addition to some other plant types.

NARROW-LEAF TEA-TREE (TALL *Melaleuca* SWAMP FOREST). The predominant species are tall tea trees (*Melaleuca* spp.) with narrow leaves. They are found in poorly drained areas of intermediate fertility.

BROAD-LEAF TEA-TREE (LOW LAYERED *Melaleuca* WOODLAND). A low growing broad leaved variety of tea-tree is the dominant species in this vegetation type which is usually found in poorly drained areas of low fertility. A ground layer of various plant types is also found. It is better developed than that found in the preceding group but is similar botanically.



UPPER. *A fertilizer trial in grassy woodland (light sclerophyll woodland) country.*

LOWER. *Narrow-leaf tea-tree (tall* Melaleuca *swamp forest).*

TREELESS PLAIN. Although occasional pandanus trees (*Pandanus* spp.) are found, the vegetation consists mainly of grasses such as blady, spear, kangaroo, wire and love (*Eragrostis* spp.).

SEDGE SWAMPS. Vegetation of these consists of a number of sedges (*Cyperaceae*) with an occasional stunted tea-tree.

MANGROVES. These are complex formations which occur in areas affected by sea water, with a number of genera and species.

SOIL TYPES

The following parent material classification has been found the most useful for practical purposes.

BASALTIC SOILS. Basaltic soils occur mainly in the Palmerston area west of Innisfail, but smaller isolated areas are found at Utchee Creek, Dinner Creek, Bartle Frere, Upper Mulgrave, and Green Hill. Topography is undulating but is generally suitable for cultivation.

The basalt gives rise to deep, friable, well-structured red soils called krasnozems.

MIXED ALLUVIAL SOILS CONTAINING SOME BASALTIC DERIVATIVES. These soils are derived from mixed parent material containing basaltic derivatives in sufficient quantity to affect the fertility status of the soil. They occur towards the mouths of the major river systems where the flood plains are very broad. The fine basaltic material eroded from the headwaters was deposited from slow-moving flood waters.

These soils are very fertile and have been largely taken over by the sugar industry.

METAMORPHIC SOILS (ALSO KNOWN AS SCHIST SOILS). The oldest rock formations occuring are the Barron River and Barnard metamorphics. The Barnard metamorphics are higher grade equivalents of the Barron River formations and occur only in a small area near Mission Beach. The Barron River metamorphics are found as low coastal ranges north of Mourilyan Harbour and at the edge of the Dividing Range north from El Arish.

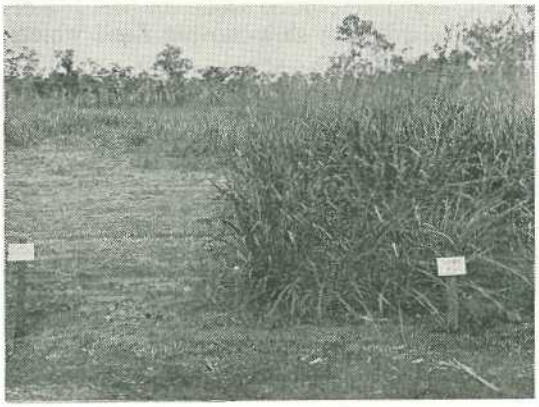
The soils which develop are variable but, in general, can be described as silty clay loams, red to grey to almost black in colour.

MIXED ALLUVIAL SOILS WITH LITTLE IF ANY BASALTIC DERIVATIVES. They are predominantly derived from a mixture of metamorphic and granitic parent materials. Small amounts of basaltic material may be present but never in quantities large enough to have an effect on the low fertility status.

GRANITIC SOILS. Granite mountains dominate large areas of North Queensland and, in the area under study, three main granite complexes are recognized.

Mareeba Granite forms the Dividing Range and a coastal range north from Babinda. The Tully Granite Complex extends from Tully to Millaa-Millaa, while the country from Koombooloomba Dam southwards is largely occupied by an unnamed granite of variable grain size.

The resultant soils are extremely variable but most are infertile. Large areas are available for improved pastures.



UPPER. *Broad-leaf tea-tree (low-layered* Melaleuca *woodland).*

LOWER. *A typical phosphate response in pasture test plots on open forest country.*

BEACH SANDS. Fossil beach sands occur in interrupted stretches along the coast. Their old coastline patterns are clearly discernible on air photographs. In some areas they occur as far as 10 km inland.

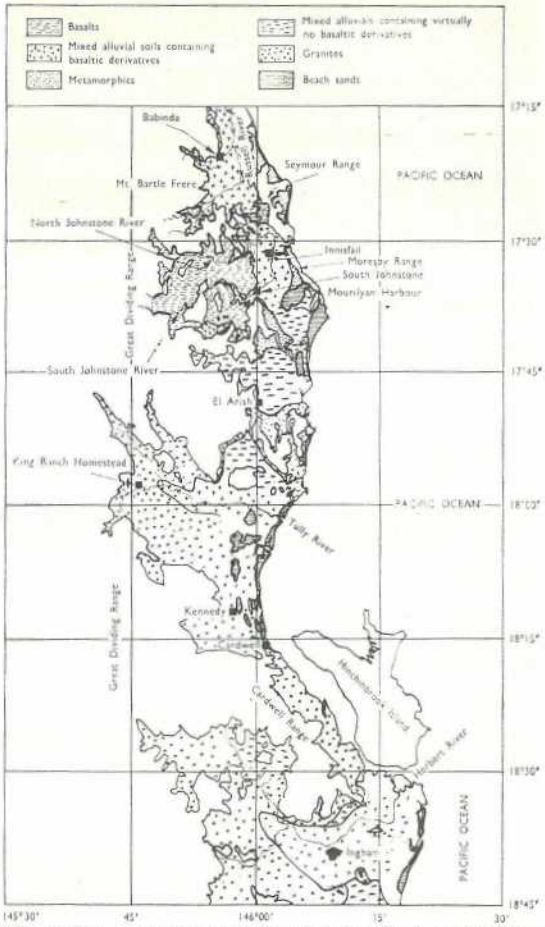
Soils are deep, coarse sands with a dark surface layer that changes to red, yellow or white with depth. They contain practically no clay, are acid and generally infertile.

ORGANIC SOILS. In certain situations, notably near Mirriwinni, Babinda, and Bellenden Ker, organic soils occur. Plant remains (fibrous peat) dominate the upper 30 cm of the profile and overlie gleyed and mottled clay. These soils occupy only small areas and are unimportant commercially.

Soil Fertility

Soil fertility was the major obstacle to successful pasture development in the large tracts of poor open forest, which, even as late as 1962, were described as unsuitable for development.

No successful development of this class of country occurred until producers began to apply the results of experiments which had shown the need for phosphatic fertilizer. Detailed studies also showed that other fertilizers were required in some areas.



The soils of Queensland's wet tropical coast from Ingham to Babinda.

Natural vegetation was found to be a good indicator of soil fertility. Experimental results agreed with commercial experience in showing that rain-forest or scrub soils were fertile. It was also found that, as the proportion of sclerophyll species (gums, wattles, tea-trees, messmates and she-oaks) increased, fertility decreased. Then, within the pure sclerophyll vegetation groups, the most infertile areas were indicated by stunted, fairly sparse trees with a well developed grass layer.

Trial results also showed that poorly-drained areas had different fertilizer requirements to well-drained areas. A measure of the fertility status of a particular soil is given in the following table:—

Well Drained*	Poorly Drained*
Rain-forest	Palm forest
↓	↓
Bastard scrub	Narrow-leaf tea-tree
↓	↓
Open forest	Broad-leaf tea-tree
↓	
Grassy woodland (light open forest)	

* Arrows indicate declining fertility

Treeless plain, sedge swamp and mangrove swamp do not appear to fit into a fertility series and are probably associated with soil physical conditions, very poor drainage and a tidal influence respectively.

Vegetation and Parent Soil

A relationship between soil parent material and the natural vegetation classes also became apparent early in the study. Only rain-forest vegetation types were found on red basalt soils and only open forest vegetation types were found on soils derived from beach sands.

It was considered that the basaltic soils were fertile enough for rain-forest and beach sands too poor. Yet, on the soils derived from granite, usually thought of as infertile, the whole range of vegetation classes occurs. A wide range was also found on soils derived from metamorphic rocks, but on these and other non-basaltic soils the rain-forest vegetation groups are found only in areas of nutrient accumulation such as the levee banks of streams and the foothills of ranges.

Apparently, local enrichment through nutrient accumulation can, to some extent, make up for soil parent material differences. However, with beach sands as the most outstanding example, it is obvious that nutrient accumulation is unable to overcome soil parent material differences completely.

Soil types classified on a parent material basis have particular mineral deficiency patterns. The elements found deficient on each of the soil types are given below.

Soil Type	Mineral Deficiencies Recorded
Basaltic	phosphorus, molybdenum, calcium, sulphur
Mixed alluvial containing basaltic derivatives	phosphorus
Metamorphic	phosphorus, potassium, molybdenum, calcium, sulphur
Mixed alluvial with little if any basalt	phosphorus, potassium, calcium, copper
Granitic	phosphorus, potassium, copper, zinc, calcium, sulphur
Beach sand	phosphorus, potassium, copper, zinc, calcium, sulphur, molybdenum, boron

The best way to judge whether these likely deficiencies do, in fact, occur in a particular soil type is by observing the types of natural vegetation on the site and applying the system of vegetation gradients described earlier.

A soil-vegetation framework has been developed which enabled predictions to be made on the type and severity of deficient mineral elements.

[To be Continued]

Vegetable Varieties For April Plantings

by Officers of Horticulture Branch.

CROP	SUGGESTED VARIETIES*					
	Stanthorpe	Lockyer, Fassifern and Beaudesert	Coastal, South of Gladstone	Central Queensland (Gladstone to Mackay)	Bowen to Townsville	Far North Queensland (Tablelands)
Bean						
Fresh Market	..	..	Redlands Greenleaf Redlands Pioneer Redlands Autumncrop	Redlands Greenleaf Redlands Autumncrop	Redlands Pioneer	Redlands Autumncrop Redlands Pioneer
Broad ..	Early Long Pod	..	Early Long Pod	..	..	..
Beetroot ..	..	Early Wonder Detroit strains	Early Wonder Detroit strains	Early Wonder	Early Wonder Detroit strains	Early Wonder Detroit strains Chieftain Parramatta
Cabbage ..	Sugarloaf types	Ballhead Hybrid Olympic Greygreen Sugarloaf types	Ballhead Hybrid Olympic Greygreen Greengold Sugarloaf types	Ballhead Hybrid Sugarloaf types	Ballhead Hybrid All Seasons Sugarloaf types	Ballhead Hybrid Superette
Capsicum ..	..	..	Yolo Wonder Green Giant Northern Belle	Yolo Wonder Green Giant	Yolo Wonder Green Giant California Wonder	Yolo Wonder California Wonder
Carrot						
Market ..	..	All Seasons Topweight	All Seasons Topweight Chantenay strains	All Seasons Topweight	All Seasons Topweight Western Red	All Seasons Topweight Western Red Chantenay strains
Processing	..	Royal Chantenay Amsterdam Forcing	Royal Chantenay Amsterdam Forcing	..	..	..
Cauliflower ..	..	Snowball Y Snow Gem Phenomenal Sharpes Shorts	Snowball Y Snow Gem Phenomenal Sharpes Shorts	Snowball Y Phenomenal	Snowball Y Phenomenal	Snowball Y

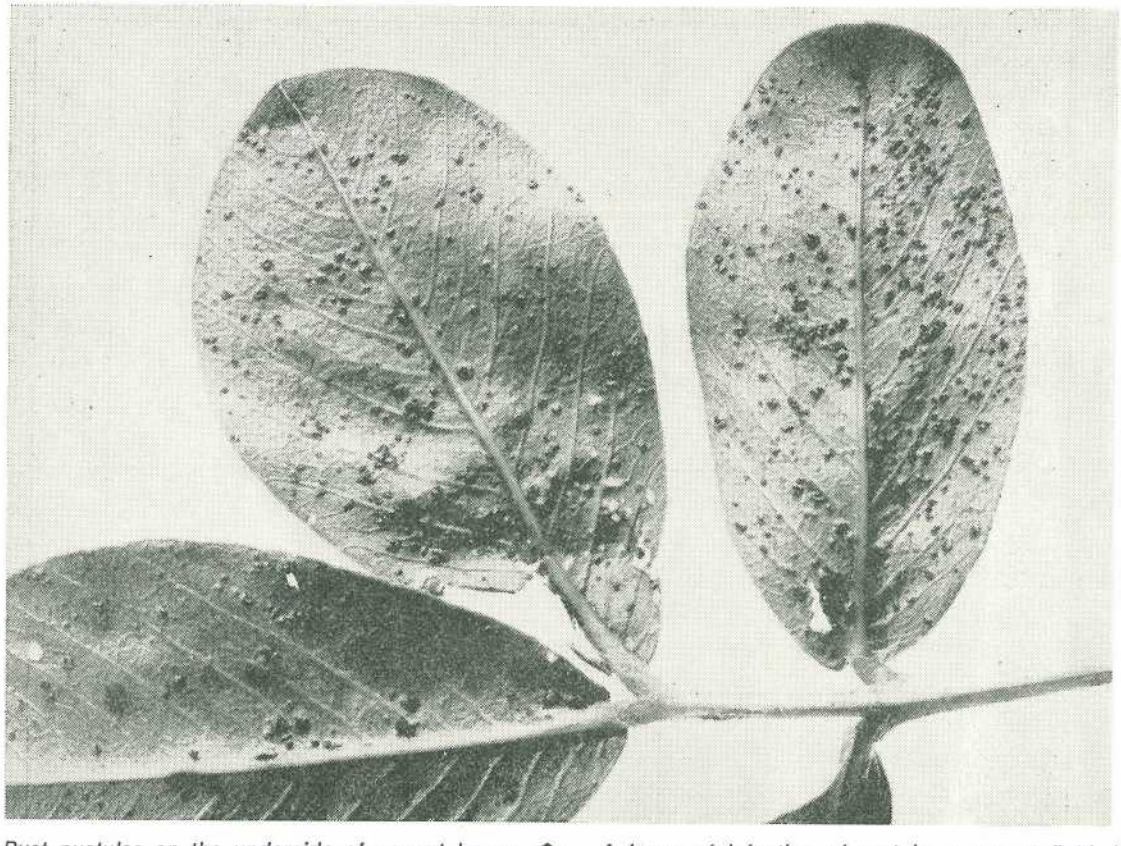
Celery ..	..	..	South Australian White	..	South Australian White	South Australian White
Cucumber ..	..	..	Green Gem Crystal Apple	Green Gem Crystal Apple	Green Gem Polaris Ashley Crystal Apple	Green Gem Polaris
Egg Fruit ..	..	..	Market Supreme Mission Belle	Market Supreme Mission Belle	Market Supreme Long Purple	Market Supreme Long Purple
Garlic ..	..	Garlic	Garlic	..	..	..
Lettuce ..	..	Yatesdale Sunnylake Winterlake	Yatesdale Sunnylake Winterlake	Yatesdale Sunnylake Pennlake	Pennlake Yatesdale	Yatesdale Sunnylake Mignonette
Marrow ..	..	..	Long White Bush	Long White Bush	Long White Bush	Long White Bush
Zucchini ..	..	..	Blackjack Ambassador	Blackjack Ambassador	Blackjack Ambassador	Blackjack Ambassador
Melon						
Rock ..	..	..	..	..	Hales Best Gulfstream Gold Pak	..
Water ..	..	..	..	..	Candy Red Crimson Sweet	..
Parsnip ..	..	..	Hollow Crown	..	..	Hollow Crown
Pea						
Market ..	..	Massey Gem	Massey Gem Fiesta	Massey Gem	Massey Gem Greenfeast	Massey Gem Greenfeast
Pumpkin ..	..	..	Queensland Blue Butternut	Queensland Blue Butternut	Queensland Blue	Queensland Blue Butternut
Rhubarb ..	..	..	Sydney Crimson Local strains	Sydney Crimson	..	Sydney Crimson
Tomato ..	..	..	F1 Hybrids Floradel Indian River Tropic Walter	Floradel Indian River Grosse Lisse strains	Walter C1402	Floradel Indian River Grosse Lisse strains
Turnip ..	Purple Top White Globe	Purple Top White Globe	Purple Top White Globe	Purple Top White Globe	Purple Top White Globe	Purple Top White Globe

* These suggestions are based on the more important commercial varieties.

Peanut Rust on the Atherton

PEANUT growers on the Atherton Tableland became aware of a new disease in their crops during the latter half of the 1972-73 season. It was identified as rust, caused by the fungus *Puccinia arachidis*, which attacks the leaves and stems of the plants.

For many years the distribution of peanut rust had been limited to the Caribbean, southern United States, Central and South America and Mauritius. Recently, it has been reported from Brunei (1971), India (1972) and Papua New Guinea in January 1973.



Rust pustules on the underside of peanut leaves. ◄ *A focus of infection of rust in a peanut field.* ►

Tableland . . .

by R. G. O'BRIEN, Plant Pathologist.

In April 1973, it was seen in Australia for the first time in crops grown in both the Northern Territory and the Atherton Tableland. It is considered that the spores of the fungus were carried to Queensland by wind from diseased crops in Papua New Guinea. The disease was not reported in the main peanut producing area in the South Burnett during the 1973 season.

The symptoms are similar to those of rust diseases of other crops with masses of orange-brown spores produced in pustules. These usually appear first on the lower leaves of the plant but may later occur on all leaves and even the stems. Pustules are more numerous on the under-surfaces of leaves with light green flecks showing through on the upper surfaces.

The tissue surrounding the pustules eventually dies and, if leaves are heavily and uniformly affected, they will curl, become brown and brittle and sometimes fall prematurely from the plant. Areas where plants are severely diseased appear scorched.

Observations in the 1973 season showed that rust first became established at several infection foci scattered through a field. In the early stages, these consisted of a group of plants contained in a patch approximately 1 metre in diameter. The disease then increased in severity on these plants and spread outwards to surrounding plants. It was noticeable that the movement of the disease was more rapid in a downwind direction from the foci.

Another leaf disease known as peanut leaf spot (*Cercospora personata*) also causes premature loss of leaf. This is characterized by small black spots on the leaves and stems and thus is easily distinguished from rust when both diseases occur on the plant. In recent years, significant increases in yield have been obtained on farms where fungicidal spraying has been adopted for leaf spot control.

To control this disease, spraying with fungicides such as benomyl (Benlate*) or fentin hydroxide (Du-ter*) should begin approximately 6 weeks after sowing and continue at fortnightly intervals. The dosages at each fortnightly application should be 0·14 kg a.i./ha (2 oz. a.i./ac.) for benomyl or 0·34 kg a.i./ha (5 oz. a.i./ac.) for fentin hydroxide. Four sprays are usually necessary to give good control of leaf spot.

Unfortunately, benomyl, the most widely used fungicide for leaf spot control, is ineffective for peanut rust control. In the future, new spraying schedules will have to be devised aimed at keeping both diseases in check.

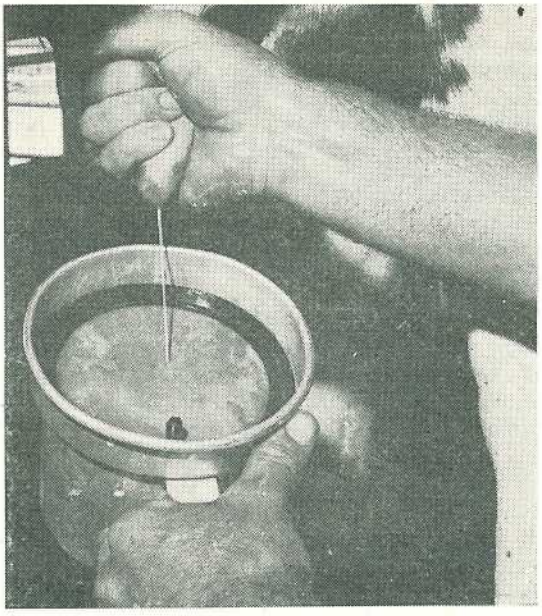
In preliminary trials conducted late in the 1972-73 season, mancozeb was the best of the fungicides screened for rust control. As an interim measure, it is suggested that growers use this fungicide at 1·6 kg a.i./ha (1·5 lb. a.i./ac.) at weekly intervals as soon as rust is sighted in their crops. The fungicide selected for leaf spot control should continue to be used as outlined above. Mixing two pesticides in the same spray can sometimes lead to problems of phytotoxicity. In the preliminary trials, however, mixtures of benomyl plus mancozeb or Du-ter plus mancozeb were not harmful.

The chances of early infection in a crop will be reduced if growers eradicate all volunteer peanut plants on their farms during the period July to December. Since peanut rust can infect peanut plants only, the destruction of unwanted volunteer plants during winter and spring will prevent them acting as carry-over hosts of the disease.

It is possible that rust spores can be carried with peanut seed and serve to introduce the disease to previously clean areas. It is important, therefore, to restrict movement of seed between the Atherton Tableland and southern Queensland.

*Registered trade name.

Mastitis Control



Drawing the first milk into a strip cup to detect clinical mastitis.

MASTITIS is an expensive disease. Drugs for treatment and rejected milk are the visible costs of clinical mastitis but the biggest cost is invisible. This is the loss of production throughout the whole herd through subclinical mastitis.

The difference between clinical and subclinical mastitis must first be established.

Definitions

CLINICAL MASTITIS. Affected cows have one or more of these symptoms—

- Hot quarters or a quarter, red quarter/s, hard quarter/s, swollen quarter/s.
- Abnormal milk produced in lesser quantities.
- Cow sick in herself.

This is the mastitis all farmers know about.

SUBCLINICAL MASTITIS. This is the mastitis that few farmers are aware of. It cannot be detected with the naked eye but is a most important, low-grade infection of the udder that makes less glandular tissue available for milk manufacture. As a result, the cow gives less milk. The Wisconsin Mastitis Test (W.M.T.) scores that you receive will indicate the level of subclinical mastitis within your herd.

Large-scale surveys in the United Kingdom and U.S.A. have clearly demonstrated that herds with high cell counts (and that is what the W.M.T. is an indirect measure of) produce significantly less milk than those with low cell counts. From a more optimistic viewpoint, similar surveys have shown that, when the subclinical mastitis and therefore the cell counts within herds were reduced by the control measures outlined below, herd production figures increased substantially.

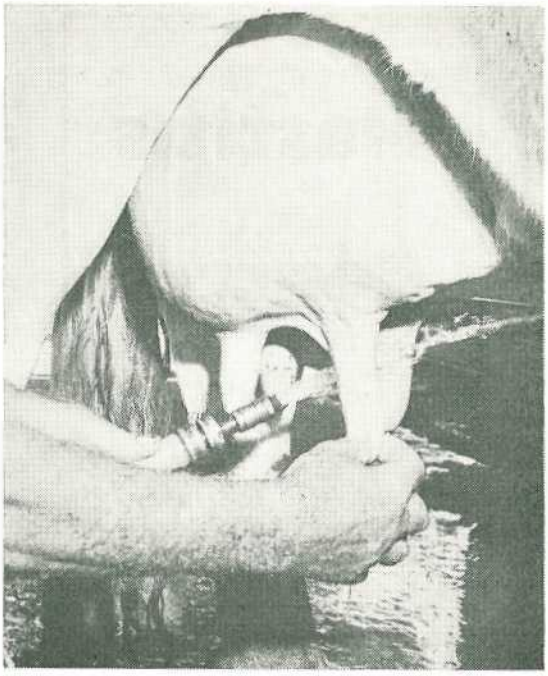
A dairy farmer with subclinical mastitis is advised to adopt basically the same procedures to control it as a farmer with a clinical mastitis problem. This is because both forms of mastitis can be caused by the very same organisms. The difference is that, in subclinical mastitis, the infection is merely of lesser magnitude. The reasons for this are either a lower dosage number of bacteria being involved, a greater immunity of the udder or one or a combination of several other factors.

by W. R. WEBSTER, Veterinary Officer.

There is no great distinction between clinical and subclinical mastitis. What is mild clinical mastitis to one farmer may not be detected by another farmer and so be subclinical mastitis to him, merely causing decreased milk production in the affected quarter.

A useful analogy is that clinical mastitis is the tip of the iceberg that everyone can see; subclinical mastitis is lurking, waiting to rear its ugly head.

A practical example that illustrates this point well is that often, when there is a change of share-farmer on a property, there is 'suddenly' a severe outbreak of mastitis—clinical mastitis. However, before the change, severe subclinical mastitis existed in the herd. All that was needed was a different milking routine or merely a strange person to trigger off extra stress in the herd. This stress converted an unrecognized subclinical mastitis problem into a herd with perhaps 50% of the cows suffering from clinical mastitis.



Udder washing with running water.

CONTROL PROGRAMME

A control programme is summarized below—

1. Milking machine check with correct milking procedure
2. Hygiene
3. Teat dipping
4. Culling chronic cases of mastitis
5. Prompt detection and correct treatment of clinical cases of mastitis
6. Dry cow therapy

Items 1, 2 and 3 all reduce the chances of new infections occurring in the herd, that is, they prevent a quarter that was previously clear of mastitis organisms gaining the infection.

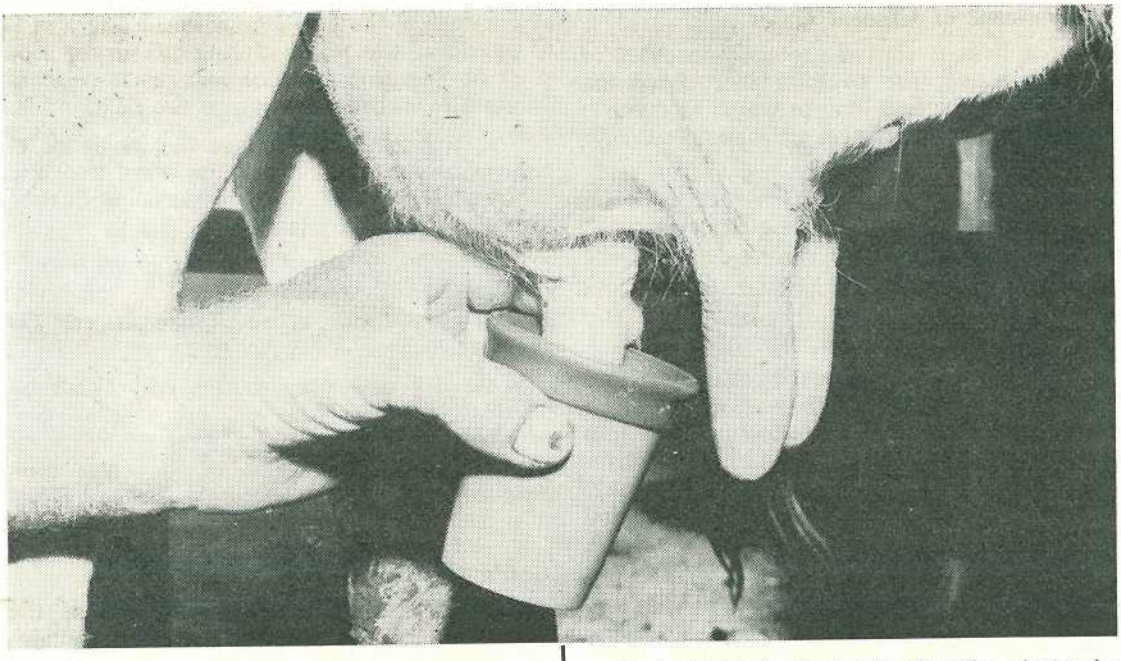
Items 4, 5 and 6 reduce the number of bacteria in the herd environment to a low level so that fewer bacteria are available to cause new infections. Item 5 also reduces the severity of cases of clinical mastitis.

1. Milking Machine Check

Mastitis-causing organisms will always be present in small numbers in the cow shed. Incorrect milking machine adjustment will increase the chances of these bacteria causing mastitis.

A milking machine that is not properly adjusted or is too small for the number of cows being milked at any time can aggravate the mastitis situation on a farm. A poor-functioning machine will damage the udder and teats. The opening of the teat (the teat sphincter) is most susceptible to damage. If it is damaged, it no longer provides a seal, and the entry of mastitis-causing organisms into the teat and thence to the udder occurs far more readily. Glandular tissue of the udder also is often damaged, making it less able to protect itself against any invading bacteria that enter through the teat sphincter.

Few milking machines require no adjustment. Many have major defects. Dairy Field Services officers will test your machine free of



Teat dipping immediately after the cluster has been removed.

charge. We recommend that machines should be tested annually. This is a vital first step in the control of mastitis.

2. Hygiene

The single word hygiene glibly sums up a vast number of factors that can all be contributing to your mastitis problem, or one seemingly trivial factor can make all the difference. It is impossible to list all the hygiene factors that can be involved in the mastitis problems in your herd. Again, your Dairy Adviser will be able to advise you on hygiene matters after a visit at milking time.

A most important factor worth mentioning is udder washing. Buckets and cloths are **out,** running water is **in.**

3. Teat Dipping

Dipping cows' teats in a special teat dip formulation immediately after the clusters are removed will disinfect the end of the teat. This will markedly reduce the passage of bacteria through the teat sphincter during the critical period immediately after milking. This is when the undamaged teat sphincter is not completely closed and the chances of bacterial contamination into the teat are highest.

Only formulations specifically produced for teat dipping should be used. Other products used for utensil sterilization, with the same active chemicals but differing bases, can cause severe chapping of the teats if substituted.

4. Culling

Culling is of greatest significance where clinical mastitis is the problem. A cow that persistently has mastitis produces little milk and is a source of large numbers of bacteria that can spread to the rest of the herd.

Such cows should be culled. They are uneconomic to keep and increase the chances of mastitis occurring in the rest of the herd. Infected cows that are not bad enough to be culled should be identified and segregated from the rest of the herd at milking time. They should then be milked last.

5. Treatment of Clinical Cases

If treatment is started promptly in cases of clinical mastitis, the bacteria that cause the disease will have less time in which to damage the udder and the chances of a complete cure will improve.

Early detection of the disease depends on examining the foremilk of all quarters at each milking.

Infected quarters should be treated with an appropriate antibiotic for at least 3 days and for 24 hours after the last sign of mastitis.

Stripping out the quarters thoroughly before using intramammary drugs will allow much better penetration of the antibiotics deep into the udder tissue where the bacteria are active.

To achieve effective treatment, sufficiently high levels of antibiotics must be maintained deep in the udder for at least 72 hours. A consistently high level of antibiotic deep in the udder will result if one uses a preparation designed to be administered every 24 hours rather than relying on one treatment alone when mastitis is first detected.

Generally, when mastitis is first detected, the udder is swollen and only a proportion of the antibiotic reaches the site of the infection. When using the three-shot treatment, the second and third doses of antibiotic penetrate into the udder better than the first infusion.

Penicillin is used effectively on many farms to treat cows showing symptoms of mastitis. Other farmers need to use a combination of penicillin and streptomycin. On farms where these more commonly used preparations are ineffective, milk samples from affected quarters should be sent to the laboratory for antibiotic sensitivity tests to determine the most suitable drugs.

Many farmers do not clean and dry the ends of cows' teats before they insert the intramammary drugs. Failure to clean and dry the teat ends can result in more bacteria entering the udder. This may render the treatment ineffective, or even cause a more severe form of mastitis.

6. Dry Cow Therapy

An integral part of mastitis control programmes is dry cow therapy. This involves inserting long-acting antibiotics in all quarters at the end of the cow's lactation. The aim is to 'sterilize' the udder during the dry period so that there is a minimum carry-over of bacteria from one lactation to the next.

This treatment will reduce the incidence of clinical mastitis in the next lactation and also subclinical mastitis that reduces production throughout the next lactation.

The antibiotic for dry cow therapy should be selected with a knowledge of the sensitivity of the organisms causing mastitis on the property.

Some dry cow preparations cost about $4 to treat a cow. However, others may cost only one-third of this. The cost must be equated against the value of the extra milk produced in the next lactation.

Antibiotics in Milk

All dairy farmers must be aware of the importance of not sending any milk containing antibiotics to the factories. They should strictly observe the withdrawal period printed on the package containing the antibiotic preparation. Particular attention must be paid to cows treated with dry cow therapy.

Antibiotics, especially penicillin, in milk can produce severe allergic reactions in some people. Milk containing even a minute amount of penicillin can produce as severe a reaction as when the person is given a penicillin injection. This is one of the reasons for the withdrawal period. In addition, antibiotics in milk can harm manufacturing processing.

In Queensland, the maximum amount of penicillin permitted in antibiotic tubes for treating lactating cows is 100 000 international units. A dye marker must be included to prevent farmers from accidentally sending milk from recently treated cows.

The cost of mastitis can be crippling. Losses of milk and affected cows, drugs used for treatment, cows culled prematurely because of mastitis and low milk yield and deaths are all costs that can be identified easily. However, the loss of milk production from subclinical mastitis represents a greater loss of earnings to the farmer.

Mastitis can be controlled by diligent application of the principles outlined above.

Poultry Farm Automation Beats Costs

by DAVID K. WHEATLEY, Information Branch.

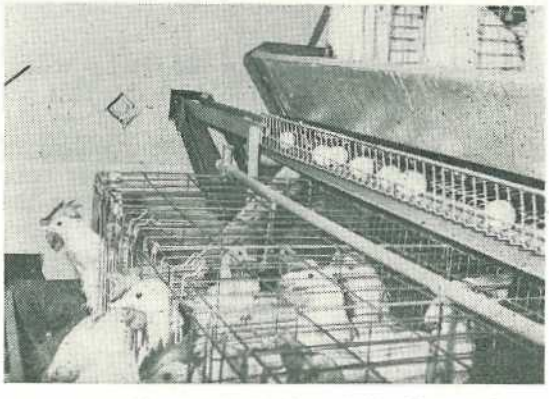
FOR Queensland poultryman, Mr. Dolph Benfer, of Mt. Cotton, mechanization is helping to solve the problem of getting the maximum number of eggs per pound of feed.

The result of this mechanization programme is a modern poultry set-up. Mr. Benfer has combined a high rise pullet replacement shed with a high rise layer shed to give him maximum production from his flock.

The layer shed, which is 268 ft. long, features both automatic feeding and automatic egg collection. The shed houses 20 600 birds and produces an average of 14 000 eggs a day.

The length of the shed plays an important part in the economic operation of the equipment, particularly in the automatic egg collection. Mr. Benfer estimated that, for a shed less than 200 ft. long, the cost of putting in the conveyor belt system and special collection tables would not be warranted.

The laying shed also features a step-tiered, automatic cage plant. This allows all services such as feeding, egg collection and watering to be provided automatically and has all the birds facing the operator as he walks along the passageways.



Poultryman Mr. Dolph Benfer, of Mt. Cotton, keeps a watchful eye on his layers housed in a shed which features both automatic feeding and automatic egg collection.

The packing shed is one of the few places where the eggs are handled by farm staff. Egg collection is simply a matter of flipping a switch.

The cage compartment size, 12 in. by 21 in., allows four birds to be kept in each compartment. Eggs roll beneath the cages onto a conveyor belt. When the operators are ready to collect the eggs, it is simply a matter of flipping a switch and all the eggs are delivered to a sorting table in the packing room.

Feeding

Feeding is also done automatically and this equipment is run six times a day with cross augers operating twice a day to feed the birds. Mr. Benfer said that the automatic feeding system gives higher production, together with cleaner eggs.

Another major feature of the shed is that it is set about 8 ft. above the ground. This not only allows adequate ventilation to keep the birds cool, but it eliminates the problem of manure disposal. It is a simple matter once a year to run a front end loader under the shed and get rid of all the manure. This, too, results in a considerable saving of time and labour costs.

Mr. Benfer has included in the layer shed an egg grading system which can grade up to 6 000 eggs an hour.

He estimates that the cost of his laying shed worked out at approximately $3.50 per bird at the time of installation, in early 1973. This cost included the egg grading, refrigeration, electrical installation, packing and cooling complexes, as well as housing for the birds.

Expansion

This new modern set-up is typical of the Benfer family's approach to the industry. Since 1933 they have built their poultry farming venture into one of the largest privately owned enterprises in Australia.

The first cages were installed about 1946 and expansion continued until 1960 when Mr. Benfer constructed a laying shed which housed 38 600 birds. At that time it was the largest layer shed in Queensland.

This was followed by the installation at Labrador of another 20 000 birds in cages. In 1967 both farms were equipped with automatic feeders. This new fully automatic layer shed replaces the farm at Labrador which has just been sold.

Although automation makes for reduced cost, Mr. Benfer emphasized that this can only come about with good management.

New Zealand Cattle Tick

THE *Haemaphysalis* genus of cattle tick, commonly known as the New Zealand cattle tick, has been included in the list of diseases under the Stock Act, the Minister for Primary Industries (Hon. V. B. Sullivan, M.L.A.) announced recently.

He said this had become necessary because of the upsurge of N.Z. cattle ticks in north-eastern New South Wales and detection of them on stock introduced into Queensland.

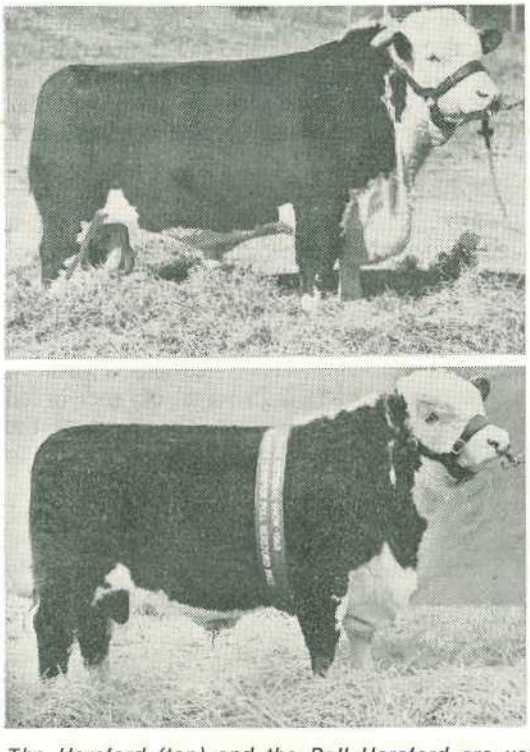
'These ticks are very difficult to control,' the Minister said.

'They also pose problems with the requirement that cattle in tick-infested areas of Queensland be free of cattle tick before movement.

'Their presence on stock presented for clearing to clean country results in the stock being held for additional treatments until they are tick-free.'

Mr. Sullivan added that declaration of the two most common species of *Haemaphysalis* as diseases would obviate these problems as the same movement conditions could be applied to them as to the cattle tick.

Beef Cattle Breeds—2



The Hereford (top) and the Poll Hereford are used in most parts of Queensland, but their numbers are more concentrated in the southern half.

by J. J. DALY, Beef Cattle Husbandry Branch.

BRITISH BREEDS

As a generalization, the more popular British breeds in Australia tend to be smaller and have more subcutaneous fat than other European breeds. Mature weight is influenced by the environment and, under our paddock conditions, British breed bulls have mature weights varying from 1 200 to 1 500 lb. (550 to 700 kg) with cows averaging 900 to 1 200 lb. (400 to 550 kg) liveweight.

Because of our historical connection with England, it was inevitable that the early development of the cattle industry should depend largely on locally-adapted British breeds. British stud stock were freely imported until quarantine regulations banned the importation of livestock in 1958.

This ban was imposed to protect Australia from various diseases and parasites that could otherwise have gained entry. The ban tended to promote the selection of animals more suited to our environment, and strains of British breeds adapted to widely differing environments have been developed.

Hereford

ORIGIN. Herefords originated in Herefordshire in England. The early development of the breed is obscure, but a painting by Paul Potter (1625–1654) shows a white-faced red-bodied cow resembling the earlier Hereford. The purebred beef strain was not established until the early 1700s. Early Hereford cattle had varied colours and patterns ranging from red with a white head to grey and light grey.

DEVELOPMENT IN AUSTRALIA. The first importation into Australia took place when the Cressy Company imported a bull and two cows into Hobart in 1826. Herefords did not reach the mainland until 1827, when Mr. G. Wyndham brought Herefords to Dalwood, New South Wales. The first breeder of Herefords in Queensland was Mr. J. F. MacDougall, of "Rosalie Plains", who introduced them in 1864.

Other introductions soon followed and the breed gained popularity in the eastern coastal and hinterland areas of Queensland. At present, Herefords are found in most parts of

Queensland but their numbers are more concentrated in the southern half. Queensland has more than 200 registered stud breeders of Herefords.

BREED CHARACTERISTICS. The Hereford colour is distinctive. The body colour varies from a medium to a rich red with a white face. The white colour is also found on the underline, flank, crest, switch, breast and below the knees and hocks. White colouring at the back of the crops, high in the flank or too high in the legs is objectionable. Likewise dark or smutty noses are frowned upon by breeders.

The Hereford is rather rectangular in form, deep bodied, thick fleshed and possesses good constitution and vigour. The breed is particularly noted for its foraging which accounts for its popularity in range and hilly country.

In Queensland, selection within the environment has developed a sleek-coated animal of good size that is more adapted to a tropical environment. The good constitution and easy keeping quality of the breed make it well suited to the intensive and more extensive areas. Although the cows are sometimes criticised for low milk production, they give ample milk to produce a good calf. Herefords have high fertility and good growth rates.

The Hereford has been used extensively in crossbreeding programmes, and has been crossed with the Brahman to produce the Braford which is gaining popularity, particularly in tropical areas where ticks are a problem.

Poll Hereford

ORIGIN. The Poll Hereford was developed from the Hereford. Warren Gammon, of Iowa, U.S.A., circularized the membership of the American Hereford Breeders' Association with the aim of locating naturally Polled Hereford cattle that normally arise from time to time in Hereford herds. From this he succeeded in bringing together a foundation herd of 11 Polled animals that were registered in the American Hereford Record. From this beginning, the present Poll Hereford breed has been developed.

DEVELOPMENT IN AUSTRALIA. The first Poll Herefords came to Australia from the U.S.A. in 1920 when Henry Beak and Sons and G. H. Horne introduced the breed into Queensland. The first shipments were followed by larger shipments and the breed expanded rapidly in Queensland and the southern States. In Queensland the Poll Hereford, like the Hereford, can be found in most parts, but appears to be concentrated in the southern coastal and hinterland areas. The breed society has a Queensland membership comparable with that of Herefords, about 200

BREED CHARACTERISTICS. The poll character is dominant and, since horned cattle have been used to develop the breed, there is little difference between polled and horned breeds. The Poll Hereford exhibits the same characteristic colour markings as the Hereford.

It is a good forager, has good constitution and vigour and is exposed to the same criticism of low milk production. The Poll Hereford has high fertility and good growth rates and has done well in Queensland carcass competitions.

Shorthorn

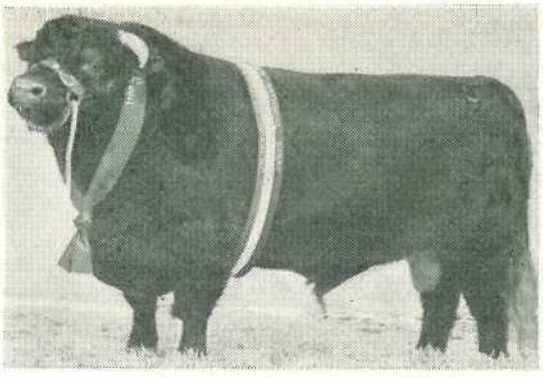
ORIGIN. The Shorthorn is one of the oldest of the beef cattle breeds and the first breed of cattle to have a breed association.

This breed originated in North-east England in the counties of Northumberland, Durham, York and Lincoln. It is called Shorthorn because the earlier improvers of the breed shortened, through selection, the horn of the original Longhorn cattle that were native to the district.

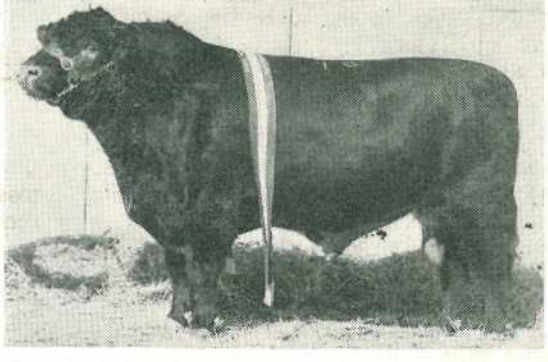
It is not known what breeds or types of cattle were used in the early development of the Shorthorn, but it is probable that the early invaders of England brought cattle which were crossed with the native stock.

As a result of Robert Bakewell's success in improving the Longhorn, the Colling Brothers together with Cruikshank and others applied the same breeding methods to improve the Shorthorns and were responsible for its early development.

DEVELOPMENT IN AUSTRALIA. While Shorthorn stock could have been introduced into the New South Wales colony in the late eighteenth century, the first purebred stock were not introduced until 1800 when a Devon bull and a few Shorthorn cows were landed and grazed on Cumberland Park, Parramatta.



Historically, the Shorthorn is the oldest cattle breed in Queensland. It is still used almost exclusively in the extensive grazing areas of the north and west.



The Poll Shorthorn is a hornless version of the parent breed.

The next attempt to introduce purebred Shorthorns was made by the Archer family of Tasmania in 1822 but unfortunately all the cattle died at sea. Potter McQueen of "Segenhoe", Scone, was one of the earliest pure breed importers, bringing in stock in 1825.

Other importations followed and, with natural increase, the Shorthorn became the leading beef breed in the great pastoral areas of western Queensland, the Northern Territory and the Kimberleys towards the end of the nineteenth century. These areas are still strongholds of the Shorthorn.

In Queensland, the first introduction of purebred stock was made from New South Wales in 1842 by Mr. John Deuchar, of "Glengallan" Stud.

BREED CHARACTERISTICS. The breed has a wide range in colour varying from roans and red to white, with red the predominant colour. The skin should be pigmented and a smutty nose or a dark nose is objectionable. The horns are rather short and incurving. The breed is normally regarded as one of the larger British breeds but fads in the stud industry have limited this expression.

Shorthorns have a good temperament and this has promoted the almost exclusive use of the Shorthorn in the extensive grazing areas of the north and west. In these areas, cattle are handled infrequently and temperament is an important trait.

Shorthorns have high fertility, good mothering ability and high growth rates. Compared with other British breeds, Shorthorns excel in milk production and this has made the Shorthorn useful in crossbreeding programmes. Only 20 Shorthorn studs exist in Queensland.

Poll Shorthorns

ORIGIN. Poll Shorthorn cattle originated in the U.S.A. in the north central States, chiefly Ohio and Indiana. In these, some breeders of Shorthorn cattle kept and bred polled offspring that appeared in their herds. From these matings, the Poll Shorthorn breed arose.

To increase the number of polled animals, the breeders mated polled cows to horned bulls. The first man to breed polled cattle was Captain Miller who bred double standard cattle, that is, poll stock registered as both Shorthorns and Poll Shorthorn.

DEVELOPMENT IN AUSTRALIA. Mr. D. S. McLarty, Lone Pine, New South Wales, in 1874, began breeding Poll Shorthorn cattle from the occasional polled animals that arose in his herd and may be considered the first breeder of Poll Shorthorns in Australia. Between the two World Wars, the Poll Shorthorn increased in popularity and today appears numerically stronger than the parent breed in herd book registrations. There are approximately 100 Poll Shorthorn studs in Queensland.

BREED CHARACTERISTICS. The Poll Shorthorn is very similar in type to the Shorthorn except for being hornless. Great strides are being made in improving the breed and the best specimens of both breeds are comparable.

Angus

ORIGIN. The native home of the Angus is in northern Scotland in the counties of Aberdeen, Kincardine and Angus. The area in which they originated is rolling to rough and not particularly fertile. It has a cool climate for most of the year.

The origin of the Angus breed is speculative, some claim that the breed is a sport from an earlier black horned breed of Scotland; others say that it arose from the polled cattle of Britain.

Two breeders, Hugh Watson and William McCombie, were largely responsible for the major development of the breed in Aberdeenshire about 150 years ago. Some claim that its development is based on cattle from Buchan and Angus with some mixture of Shorthorn, Ayrshire and Galloway blood.

DEVELOPMENT IN AUSTRALIA. The first Angus cattle were imported into Tasmania in 1822 or 1823. Subsequent importations were made to the mainland. In Queensland, the first importations were made by E. E. Dalrymple in 1840, who took Angus to the Darling Downs. These were soon dispersed. The distinction for establishing the breed in Queensland goes to William Hogart who established a a stud "Balgownie", Pittsworth, in 1882.

This breed is more popular in the southern States and expansion in Queensland has been fairly restricted and limited mainly to a few locations in southern Queensland. There are about 60 studs in the State.

BREED CHARACTERISTICS. Angus cattle are distinguished from other breeds by their black colour, comparatively smooth coat and polledness. A moderate amount of white on the underline, behind the navel is permitted. As a rule, Angus are smaller than other British breeds and mature earlier. Because of their compactness and closeness to the ground, there is a tendency to underestimate their weight.

The body of the Angus may be described as cylindrical, compact and well muscled, and yielding a good quality carcass with a high dressing percentage.

They are good foragers and seem to be able to endure both warm and cold climates. However, because of their early maturity, they are better suited to the more favourable, temperate environments. Their temperament also tends to restrict their use to the more intensive areas.

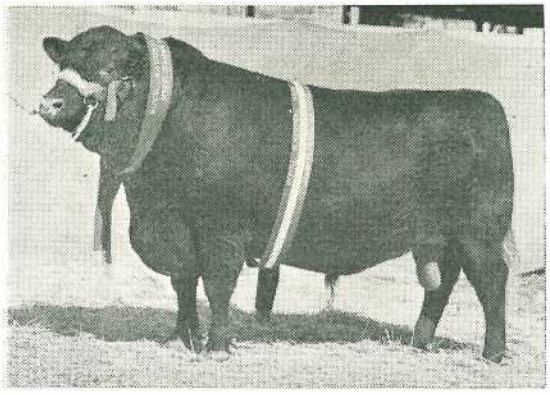
Angus

Because of their prepotency in stamping the solid colour and polled characteristics, Angus are used extensively in crossbreeding programmes. They have been crossed with the Braham to produce the Brangus which has some popularity in the Queensland tropics.

Red Poll

ORIGIN. The Red Poll breed of dual purpose cattle had its origin in the counties of Norfolk and Suffolk in the eastern middle-coastal area of England. The breed arose early in the nineteenth century as a result of crossing horned Norfolk with Polled Suffolk cattle. The Norfolk were noted for their good fleshing qualities and the Suffolk were bred for milk. Little is known of the origin of the Norfolk or Suffolk cattle.

DEVELOPMENT IN AUSTRALIA. There is some evidence that Red Polls were imported into Victoria in the 1880s by J. H. Graves. The first importation of pedigree stock did not take place till 1891 when Messrs. A. Chirnside and Son of "Werribee Park", Victoria, made importations. Later importations were made into N.S.W. and, in Queensland, the first pedigree stock were imported by E. G. McConnell, of "Marshlands", Wondai, in 1905.



Red Poll

The number of Red Poll cattle in Queensland is fairly limited. There are some 35 studs, mostly limited to south-eastern Queensland.

BREED CHARACTERISTICS. As the name implies, this breed is red and polled. The colour varies from light red to dark red with the darker colour preferred. Some white is permissible on the underline. The breed is considered as being a fair size and rectangular in shape. Cows are capable of producing comparatively large quantities of milk and raise well-grown calves.

As with other dual purpose breeds, the Red Poll has not the uniformity of type that exists in strictly beef or dairy breeds. This is because of the variation in ideals of both breeders and judges.

Murray Grey

ORIGIN. The Murray Grey breed was developed in Australia by Mr. K. Sutherland on his property "Thologolong", Wodonga, Victoria, through mating an extremely light roan Shorthorn cow to an Angus bull. This cow produced a grey calf and all subsequent crossbreed calves produced by this cow were dun grey in colour.

Over the next 40 years, the Sutherland family mated Angus and the "grey" cattle and the grey colour predominated. Because of this, two grey bulls were retained to establish a new breed but the plan was later abandoned.

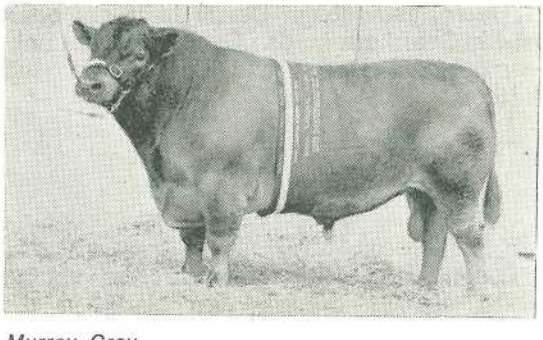
The Gadd Brothers, of "Mt. Alford", Victoria, had noted an occasional grey arise in their herd of Angus and were impressed by the performance of these cattle. They bought one grey bull from "Thologolong" and one of the brothers, Mervin Gadd, embarked on a grading up programme using grey bulls on Angus females.

DEVELOPMENT IN AUSTRALIA. The popularity of the Murray Grey has continued to increase. Assisted by the expansion in the beef industry, the popularity of the breed has extended into most States and overseas. At present, the breed is more numerous in the southern States but representation in Queensland is increasing. There are some 18 studs here.

BREED CHARACTERISTICS. The Murray Grey is a polled breed, silver grey, grey or dark grey in colour and somewhat similar in appearance to the Angus. They are good foragers and have been particularly successful in carcass competitions. The body tends to be cylindrical in shape and well muscled, yielding good quality carcasses with high dressing percentages.

Devon

ORIGIN. The Devon is one of the oldest breeds of cattle in existence. Its origin is prehistoric, but most authorities claim it descended



Murray Grey

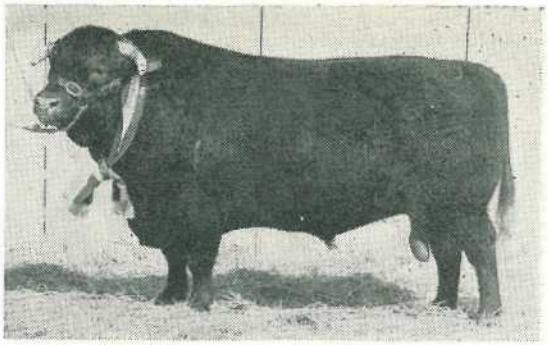
from the original cattle in Britain. The Devon was first selected as a draught animal and it was not until the nineteenth century that breeders began to select for a beef type.

Towards the end of the eighteenth century the Quartly Brothers and Colonel John Davy were responsible for the early development of the beef type as seen today. Two types of Devons were developed in England and, according to their location, called North Devon and South Devon. The Devon as we know it originated from North Devon.

DEVELOPMENT IN AUSTRALIA. The first Devon purebred bull arrived at the Port Jackson colony in 1800 along with a few Shorthorn cows. Subsequently other importations were made into New South Wales and Tasmania. The expansion of this breed has been similar to that of the Shorthorns. Because of its foraging ability, the Devon has been widely used in northern coastal Queensland, and in the Gulf and more arid regions of the State as a cross with Shorthorns.

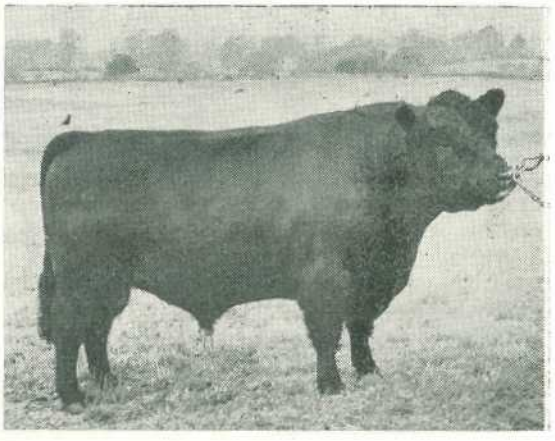
BREED CHARACTERISTICS. Devon cattle are hardy and of good size. They were never selected for the compact conformation that was fashionable with some British breeds in recent years. The body of the Devon is rectangular and wide and deep. It is red in colour with pigmented skin and with medium size horns that curve forward and are tipped with a darker colour. The Devon has good fertility and growth rates, and the cows are considered good milkers.

There are relatively few commercial herds in Queensland though Devon bulls are often used in Shorthorn herds. Queensland has only 12 registered Devon and Poll Devon stud breeders.



Devon

Poll Devon



Galloway

Poll Devon

ORIGIN. As with other breeds, natural polled animals occurred irregularly in the Devon. In 1915, a Californian breeder, Mr. W. E. Gird, purchased poll Devons from all available sources and developed the new breed on "Gird Ranch", Borsell, California.

DEVELOPMENT IN AUSTRALIA. In 1955, Mr. E. Cunningham, of "Strathmore", Collinsville, was the first to introduce the breed into Queensland when he imported two Poll Devon bulls from the U.S.A. At present, there are relatively few Poll Devons in Queensland and only five studs. These properties have embarked on a development project using natural polled breeds to develop a polled Devon.

BREED CHARACTERISTICS. The Poll Devon is similar to the Devon except that it has no horns.

Galloway

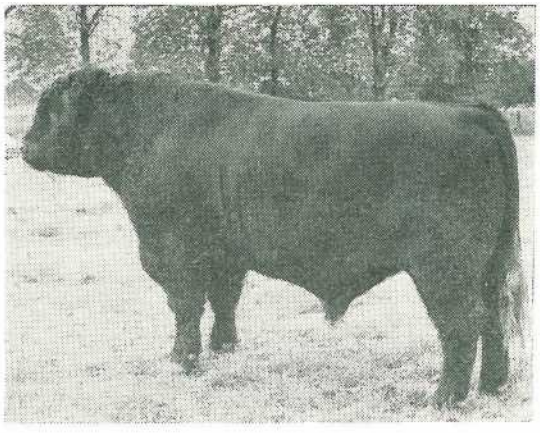
ORIGIN. Before the days of recorded cattle history, the Galloway was raised in south-western Scotland. Of the various theories that have been advanced about its origin, the most probable is that the breed traces back to the cattle that the Norsemen brought when they invaded the coastal districts of Scotland.

Towards the end of the eighteenth century, the Galloway began to be recognized as a breed. It continued for some time as a dual purpose animal before selection emphasized the beef characteristics.

DEVELOPMENT IN AUSTRALIA. Galloways were first introduced into Australia in 1951 when H. W. Kater, of "Swatchfield", Oberon, N.S.W., imported one bull and 12 heifers and the "Wirriulpa" Pastoral Company, of Hernani, N.S.W., imported two bulls and six heifers. In 1955, the Garnock family, of "Bukalong", Bombala, N.S.W., imported a bull and five heifers. These were the only importations made before the 1958 importation ban on ruminants.

During the 1950s and 1960s as numbers increased, the number of studs expanded in New South Wales, Victoria and Tasmania. In 1969, with the opening up of importations from New Zealand, a few more Galloways were brought in from that country.

There are few Galloways in Australia and these tend to be limited to the more temperate zones. However, there are a couple of small studs in southern Queensland.



Lincoln Red

BREED CHARACTERISTICS. The colour is normally solid black, often with a brownish tinge, but the occasional dun-coloured animal is not rejected. The hair is long and curly in winter and quite rough, but this sheds off to a smooth, fine undercoat in the summer. No white markings are permitted on registered animals.

The breed is rather small and strongly polled. It has short legs and, in comparison with the Angus, is flatter-ribbed and longer-bodied. Galloways are good foragers and hardy hill-type cattle. In cold climates they are maintained in the open all year round. They produce carcasses of high quality.

Lincoln Red

ORIGIN. This type of Shorthorn has been segregated in Lincoln county, England, and the surrounding areas for nearly 100 years. The breed can trace its history back for 200 years. It evolved from the improvements of Robert Bakewell and the Colling Brothers in the late eighteenth century and the first herd books were set up in 1895.

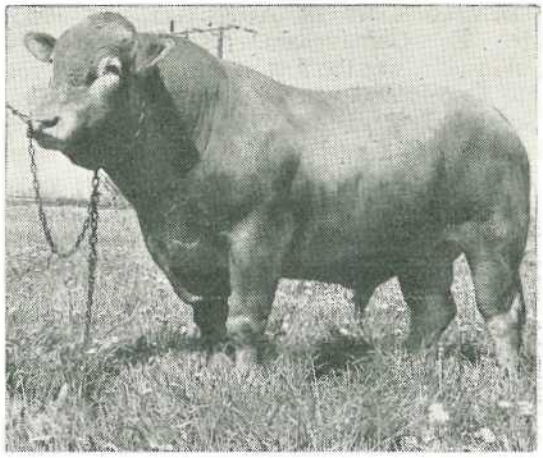
The Lincoln Red Shorthorn Society was established before the turn of the century. This Society later joined the Shorthorn Society and this association persisted until separation in 1960 when a Lincoln Red Society was formed.

DEVELOPMENT IN AUSTRALIA. Lincoln Reds were not imported into Australia before the 1958 ban on ruminant imports. In 1969 and subject to certain requirements designed to keep specific diseases out of Australia, the embargo on semen imports was lifted and semen can now be imported from the United Kingdom, Canada, New Zealand. With the use of semen, mainly from the United Kingdom, representatives of this breed are being developed in grading-up programmes in various states.

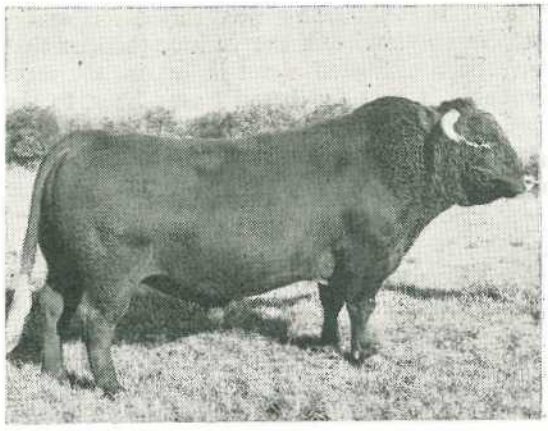
BREED CHARACTERISTICS. The Lincoln Red has a rather bright red colour, is well muscled and often polled. Pollness is said to come from an Angus or Red Poll influence.

Originally, the breed was developed as a dual purpose animal but later more attention was paid to its fleshing quality. It is now considered more of a beef breed but, because of previous emphasis on milk production, cows are good milkers with average lactations around 7 500 lb.

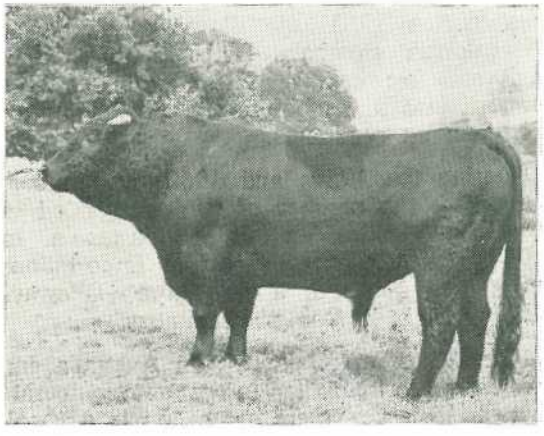
The compact conformation of the beef Shorthorn has been avoided and the Lincoln Red has a good frame with high growth rates.



South Devon



Sussex



Welsh Black

South Devon

ORIGIN. The South Devon breed was developed in the southern parts of Devonshire, England, and although in close proximity to the Devon of northern Devonshire, the two breeds are distinctly different types. Tradition has it that the breed owes some of its size to the influence of Spanish blood introduced from Spanish ships trading at Plymouth Harbour.

DEVELOPMENT IN AUSTRALIA. Representatives of this breed also were not imported before the 1958 ban on ruminant imports. Semen is now being imported into various States.

BREED CHARACTERISTICS. Originally a draught animal, these cattle were selected for both milk production and fleshing qualities during the nineteenth century. They are the largest of the English and Scottish breeds and

mature bulls may weigh more than 1 tonne. They have a solid, bright, yellowish colour that varies in shade and often have a slightly mottled appearance. They are horned but efforts are being made to develop a polled strain.

South Devons are hardy animals with good longevity. Their conformation is rather rangy but well muscled. Individual breeders tend to select for either a milk type or a beef type and, in their home county, some South Devons are kept exclusively for milk.

Modern selection practices have not been applied to this breed to the same extent as to some other British breeds and thus their potential as either a beef, milk or dual purpose type appears high.

They have high growth rates comparable with the best European breeds. This ability is not so surprising when it is considered that it is one of the few British breeds to have been selected for draught purposes. They have no calving difficulties and produce well-grown calves with good carcass quality.

Sussex

ORIGIN. Farmers in Sussex (England) during the first half of the nineteenth century began selecting a beef type animal from the red draught cattle then being used in the area. By 1840, Sussex cattle were well known in the area although an official herd book was not published until 1879.

DEVELOPMENT IN AUSTRALIA. This breed was not represented in Australia before the ban on imports. Semen is now being imported.

BREED CHARACTERISTICS. This breed is an excellent beef type having a long body that is deep, wide and rectangular in shape. It was never developed as a milk animal. The hair colour is a solid medium red, quite bright in appearance with a tail switch that is often white.

Stock has not been bred for the short, compact conformation of some of the other beef breeds and mature animals are among the larger of the British breeds. Although the Sussex is a strongly horned breed, a polled strain, based on the progeny of a red Angus bull, has recently been developed to meet the growing preference of hornless cattle.

Sussex cattle have been exported in sizable numbers to both the U.S.A. and South Africa and the breed seems to be doing well in these countries.

Welsh Black

ORIGIN. Before the days of modern transport, Wales was isolated from England and there was little communication even between north and south Wales. A distinctive type of horned black cattle was developed and it is said to have as its ancestors the cattle the Ancient Britons took with them when they were forced back into the mountains by the invading Saxons.

The cattle raised in northern Wales were considerably smaller than those in the south and separate herd books were established in 1883. The difference in size was the principal distinction between the two types and undoubtedly arose from the differences in the nutritional levels in the two areas. Both types were combined into the one herd book at the turn of the century under the common name of Welsh Black.

DEVELOPMENT IN AUSTRALIA. Representatives of this breed were not imported into Australia before the 1958 ban on imports. Semen is now being imported.

BREED CHARACTERISTICS. Because of the conditions under which it was developed, the breed is particularly sturdy. Since butter was at a premium in isolated Wales, early selection was made on butterfat. Preference was also given to a good draught animal. The breed is slow maturing but calves grow rapidly up to 1 year of age on good feed.

Welsh Black cattle have horns and a solid black colour coat which is quite shaggy in winter. Cows are good milk producers, calve regularly and have good longevity under harsh conditions.

Pictures are by courtesy of *Queensland Country Life*, the British Milk Marketing Board and Universal Livestock Services (Great Britain).

In next month's issue, tropical breeds in Queensland are discussed.

[TO BE CONTINUED]

Wheat and Barley Varieties

Wheat

Timgalen, Gatcher, Gamut, Mendos, Spica, Tarsa, and Hopps are recommended wheat varieties for 1974 plantings. All except Hopps are acceptable by the State Wheat Board for the Prime Hard classification.

The recommendations are based on field experience, trial results, and the probability of disease. The table below outlines varieties recommended for specific areas and times of planting. The main season varieties are listed in order of preference for each region. Varieties marked with an asterisk are susceptible to stem rust.

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by Officers of Agriculture Branch.

Low levels of stem rust were widespread on Tarsa during 1973. Traces were also detected on Gamut. Accordingly, Timgalen and Gatcher are the only fully stem rust resistant varieties available for the 1974 season. However, it is expected that stem rust damage to Gamut should be slight compared with varieties such as Festiguay and Tarsa because of its broader genetic base of resistance and the smaller quantity of inoculum developed in 1973. Gatcher appears less tolerant of stress and nutrient disorders on the plains country of the Darling Downs.

Diversification of varieties planted on a farm or in a region reduces the risk of stem rust damage. In regions where Mendos and Spica are preferred, it should be remembered that both varieties can be attacked by the same strains of rust. It is therefore of little use to diversify by planting part of an area to each. Where a stem rust susceptible variety is grown, diversification is best achieved by growing areas of resistant varieties as well. In the recommendations, Mendos and Spica are listed as alternatives. Unfortunately, there are no suitable rust-resistant substitutes that can replace these varieties in certain drier areas of the wheat belt.

Mendos is still recommended for certain areas because it tends to produce Prime Hard quality grain under difficult conditions. In addition, it is an awnless variety. This is an important character in drier areas. In the event of crop failure, an awnless variety can be fed off without risk of injury to stock.

Spica is retained because its standability and quality are good under difficult conditions in certain regions.

No stem rust resistant mid-season variety is available for the 1974 season. Tarsa is superior to Festiguay in grain quality and in general is at least equivalent in yield. Some crops of Festiguay were severely damaged by stem rust during the 1973 season and growers are strongly advised against further plantings of this variety. Tarsa is also susceptible to stem rust and growers should be aware that it also is likely to be severely

damaged. It is recommended that plantings of mid season varieties be reduced until stem rust resistances become available.

Hopps is recommended as a dual-purpose non-Prime Hard variety. Adult plants of Hopps show reasonable resistance to stem rust.

To achieve maximum varietal potential, fertilizer should be added to paddocks in varying amounts depending on soil quality and previous cropping history. The information given below is basic data only. District extension officers will give specific recommendations on request.

District (Shires)	Planting Date	Variety	Rate (kg/ha)
East Moreton and West Moreton			
Caboolture, Pine Rivers, Albert, Beaudesert, Kilcoy, Esk, Gatton, Laidley, Moreton, Boonah	March–May June–July	Hopps (dual purpose), Timgalen, Gatcher	55 55–70
Near North Coast			
Landsborough, Noosa, Maroochy, Widgee, Tiaro	April–May May–June	Hopps (dual purpose), Timgalen, Gatcher	55
South Burnett			
Kilkivan, Kingaroy, Murgon, Nanango, Wondai, Rosalie–Cooyar only	April May Mid May–Mid June (frost free areas) Mid June–Early August (all areas)	Hopps (dual purpose), Tarsa*, Timgalen, Gatcher, Gamut, Spica*/Mendos*	35 50 30–40 45–70 (late planting)
Burnett			
Biggenden, Gayndah, Mundubbera, Perry, Eidsvold, Monto, Gooburrum, Isis, Kolan, Miriam Vale, Woongarra, Burrum, Woocoo	April–May April–May May–June	Hopps (dual purpose) Tarsa*, Gatcher, Timgalen, Gamut	30–60
Central Queensland			
CENTRAL COAST			
Rockhampton, Wowan, Alton Downs	May–June	Timgalen, Gatcher, Gamut, Spica*	45–50 (heavy clays) 40–45 (light soils)
CALLIDE–DAWSON			
Biloela, Theodore, Moura, Baralaba, Wowan, Brigalow Area I	*Irrigated:* April–June	Timgalen, Gatcher, Gamut (also for hay)	55–70
	Rain-grown: Mid May–Mid June	Gatcher, Timgalen, Gamut, Mendos*/Spica*	30–40 (light soils) 35–50 (heavy soils)
CENTRAL HIGHLANDS			
Emerald, Peak Downs, Springsure, Capella, Clermont	*Rain-grown:* Late April–June	Mendos*/Spica*, Gamut, Gatcher Timgalen,	35–45 (60 cm wet soil) 30–35 (less than 30 cm wet soil)
	Irrigated: May–June	Timgalen, Gatcher	55–70

* These varieties are susceptible to stem rust and may be damaged under conditions favourable for the disease.

District (Shires)	Planting Date	Variety	Rate (kg/ha)
Near South West			
A Murilla, Tara, Taroom	Late April–Mid May	Tarsa*	20–30
	Mid May–June	Gatcher	20–30
		Timgalen	30–35 (July)
		Gamut*	
		Mendos*/Spica*	
B Bendemere, Booringa, Bungil, Waroo	Late April–Mid May	Tarsa*	20–30
	Mid May–June	Mendos*/Spica*	20–30
		Gatcher,	30–35 (July)
		Timgalen	
C Waggamba	*Rain-grown:*		
	May	Tarsa*	20–30
	May–July	Timgalen	20–30
		Gatcher	30–35 (July)
		Mendos*	
		Gamut*	
	Irrigated:		
	Late May–Early July	Timgalen	70
		Gatcher	
D Balonne	*Rain-grown:*		
	May–July	Timgalen	20–30
		Gatcher	30–35 (July)
		Mendos*	
	Irrigated:		
	Late May–Early July	Timgalen	70
		Gatcher	
Darling Downs			
Allora, Cambooya, Chinchilla, Clifton, Crows Nest, Glengallan, Inglewood, Jondaryan, Millmerran, Pittsworth, Rosalie (Downs portion), Rosenthal, Stanthorpe, Wambo	May	Tarsa*,	30–45
	June–July	Timgalen,	30–45
		Gamut*,	(55–70 irrigated)
		Gatcher	

* These varieties are susceptible to stem rust and may be damaged under conditions favourable for the disease.

Barley

Barley is grown in Queensland principally in the Moreton, Burnett, Callide–Dawson and Darling Downs areas for malting, milling, and feed grain and for grazing. About 78 000 ha were grown in 1972-73 and this area yielded an average 1 026 kg/ha.

Clipper is the only barley variety that the Barley Marketing Board will accept for classification as malting or milling grade. Other varieties will be accepted only as feed grain.

When planted for grain, the crop is sown in the period May-July in the major production areas and during March–August when planted for grazing. Seeding rates vary with proposed use of the crop, moisture availability, planting time and variety but are in the vicinity of 30 to 50 kg/ha for grazing crops and 20 to 40 kg/ha for grain crops.

S. G. Reid, Government Printer, Brisbane

Common Blight of French Beans

COMMON BLIGHT (**Xanthomonas phaseoli**) is not a serious disease of winter-grown French beans in Queensland. In summer, however, it has caused severe losses in crops grown in coastal districts.

This disease is considered important in navy beans, which are grown in the summer.

Symptoms

Infections begin on the leaves as small, ang-ular, watersoaked spots. The spots tend to coalesce and this often results in large areas of the leaf becoming necrotic. Bright-yellow margins develop around these necrotic areas. On the stems, dark-green, watersoaked streaks are produced. Pod spots are at first watersoaked, with a yellow ooze developing in the centre. These spots later become sunken and turn reddish-brown.

Although common blight spots on the pods can resemble those of halo blight in the early stages of development, the spots are rarely as greasy as those produced by halo blight. Moreover, the exudate is yellow, while that produced by halo blight is creamy-white.

Spread

The seed is the most common way of carrying the bacteria from one season to the next and of introducing the disease into a new area. The bacterium can be carried internally in the seed or on its surface. Most seed infection occurs as a result of pod infection or contamination of the seed coat by plant debris during harvesting and subsequent handling.

Warm, damp weather favours the disease. Its spread takes place during periods of wind-driven rain and contact with contaminated agricultural implements, insects, animals and people's clothes. Spread can be extremely rapid. Under favourable conditions, small pockets of infection are all that is necessary for extensive outbreaks to occur.

The bacteria can survive for more than a year on infected crop trash. If the trash is not decomposed, it may be a source of the disease for future bean crops.

Control

The most successful way of controlling common blight is to use disease-free seed. A scheme to produce disease-free seed began in 1967 in the Burdekin River valley with the implementation of the Burdekin Bean Seed Quarantine Area. Here, seed production is strictly controlled by the Department of Primary Industries to ensure freedom from seed-borne diseases. Seed from this scheme is now readily available to growers.

Some hygiene measures are also important in controlling common blight. Refuse from infected crops should be ploughed in as soon as harvesting has been completed to ensure rapid and complete decomposition of any diseased plants. Movement of machines and people between diseased and disease-free crop areas should be avoided, especially while crops are wet with rain or dew.

Machinery such as planters and harvesters should be decontaminated after use by cleaning thoroughly and then spraying with a disinfectant solution of 1.5% chlorhexidine and 15% cetrimide (Savlon*), diluted 1 part in 200 parts of water, to which is added 0.1% sodium nitrite.

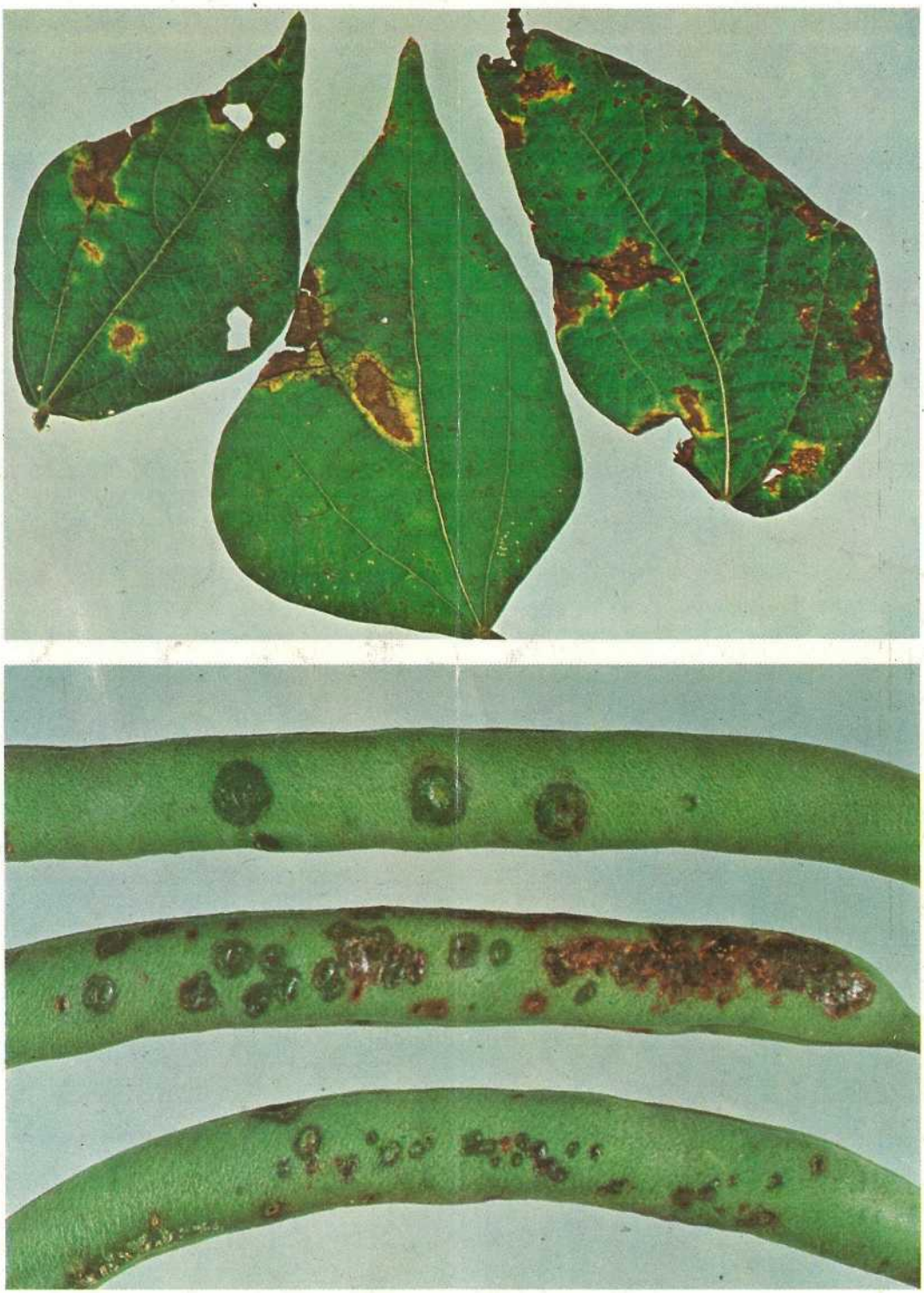
As bacterial blight is widespread in navy bean crops, it is recommended that growers do not combine the cultivation of French beans and navy beans in the one season.

—Plant Pathology Branch

[Further information can be obtained from the nearest Plant Pathology office or by writing to the Director, Plant Pathology Branch, Meiers Road, Indooroopilly, Q., 4068.]

*Registered trade name.

Diseases of French Beans — 2



COMMON BLIGHT. Upper: leaf symptoms. Lower: pod symptoms.