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Australia's Northern beef industry

by G. MASSEY-GREENE

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AUSTRALIA is a major beef exporter, second only to Argentine in the world beef trade. In the year ended June, 1970, 50 per cent of all beef produced in Australia (an estimated 1,011,700 tons) was exported. Of total exports of beef and veal in the year ended June, 1970, 73 per cent went to the USA, mainly as boneless manufacturing meat. Most of the meat produced in the northern cattle regions covered by this paper is ideally suited to this trade.

Most of these northern cattle stations have little opportunity to diversify into other products. If they are not to remain completely dependent on the manufacturing beef export market, they must devise new management methods which will allow them to produce cattle suitable for other markets.

The physiography of the north is basically one of moderate relief with the altitude never exceeding 2,000 ft., except in isolated parts of the North and West Kimberley area of Western Australia, and mountains, hills and plateaux in the eastern sections of the Leichhardt and Gilbert Rivers area of Queensland. The relief varies from extremely rugged and in places inaccessible sandstone tablelands and highly dissected plateaux, to extensive coastal and inland plains and flood plains of considerable magnitude. It is a harsh land with some spectacular scenery.

The climate pattern is simple—mean annual rainfall decreases quite rapidly from north to south. Most rain falls between November and April. By far the largest portion of the total area has an estimated or known agricultural growing period too short for dryland agriculture. Throughout the year mean temperatures are high, many areas often having a daily maximum of over 100°F. for at least four months. Diurnal ranges are low on the coastal regions and increase further inland.

Soils vary considerably, but generally are highly leached and infertile, with very low phosphate levels. Some quite extensive areas of useful levee soils and self-mulching, deep cracking, black or brown clay soils exist. Much of the land is covered by *Eucalyptus* spp. woodlands of varying density, depending on rainfall and soil type. In the wetter areas, the trees may be 60 to 80ft. high and canopies may almost touch, while height and density drop considerably in the drier regions, finally giving way to a predomi-

nantly spinifex population. Many of the trees and shrubs are grazed by stock. Extensive treeless plains of cracking clay soils are a notable feature (e.g. Barkly Tablelands).

The ground flora populations have evolved under a regime of long annual droughts and regular burning. Many of the more rapidly growing and persistent grass varieties have extremely low nutritive values except for very short periods. The same grasses are serious competitors with introduced species.

The preceding section set the scene for a description of the Australian northern cattle industry up to the mid sixties.

J. H. Kelly (1), who has a thorough knowledge of the cattle industry, wrote in his book "Struggle for the North":—

The history of a century of occupancy of the cattle lands of the remote regions of northern Australia is largely one of primitive animal husbandry; of inefficient, low-investment production on low rental, inadequately improved leaseholds; of an outmoded open-range system of cattle grazing in some parts . . ."

Many physical, social and economic restraints have operated in the past to slow the rate of development of northern cattle stations. Some, such as communications, the disease known as pleuro pneumonia, and beef prices, have changed radically in recent years. A few of the restraints such as the annual wet season (the 'wet') will always exist; others such as fertility diseases, parasites and isolation from services such as medical and educational centres will only change slowly.

There were exceptions to Kelly's description, but until the post-war period few stations changed their management methods or increased the rate of capital investment. Even now many stations are still operating where management decisions have a minimum effect on calf and breeder survival rates, and on age and number of animals turned off annually.

Base levels

Investments other than buildings on many leases still consist of a bullock paddock, several horse paddocks and some control fences. Few leases in the Northern Territory or Kimberleys have a com-

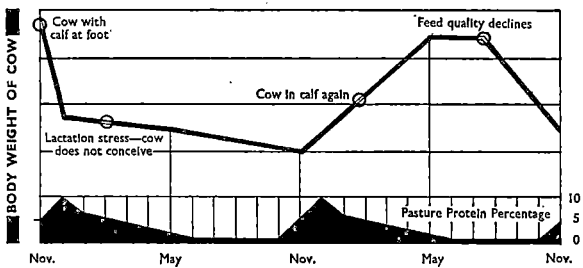
plete boundary fence. There may be two drafting yards and a larger number of "bronco" or branding yards.

Mustering "camps" commence some time in April and move around the lease either mustering into yards or trapping at waterholes until some time in October, unless a drought is current. All calves and cleanskin females are branded and returned to the cow herd, running permanently with bulls. Fat bullocks and unwanted bulls are removed to meatworks, mostly by road train, or to a bullock paddock. Sale animals range in age from about four years to nine plus years.

Reproductive efficiency of northern herds is extremely poor in most cases and breeder mortality rates very high; turn-off percentages are low, with a few exceptions, being most unsatisfactory in the unimproved high rainfall areas and best on the smaller, well managed leases in Queensland.

Intercalving intervals in the north are long by southern standards. They vary between districts, and are seldom below 15 months and often in excess of 18 months. Figure 1 illustrates the reasons for this unsatisfactory situation. In some areas reproductive diseases (brucellosis and vibriosis) seriously affect reproductive rates.

FIGURE 1
THE COW

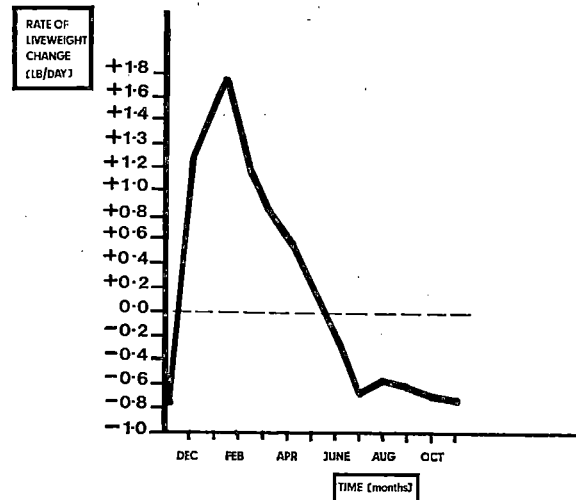


Relation between nutrition bodyweight and conception.

Native pastures have marked changes in nutrient values—crude protein values tend to be inadequate for about seven months of the year (see Figure 1). Adequate energy is available at all times, but after opening rains in October to November, intake falls. Cattle tend to gain weight from about early December until some time in May. They then lose weight gradually until about mid-October when rapid weight losses commence. The maximum rate of weight loss measured at Katherine was 0.79 lb./day (Figure 2).

Turn-off ages vary enormously, but there is a trend towards lower turn-off ages being reported to ourselves and other research workers. However, many "bush" cattle are older than five years and the majority of male cattle going to meatworks are at least four years old. On most leases, steers have a net annual live-weight gain after one year of age

FIGURE 2



Mean rate of change in liveweight of cattle grazing native pasture.

of about 100lb. It is difficult to market cattle at 500lb. dressed weight before 4½ years without some form of supplementation, except in the more favoured areas.

Management and Labour

Remoteness, difficult climatic conditions, lack of social amenities and the general disinclination of many absentee owners to sink much capital into improvements, have all combined to present problems in obtaining and holding capable managers, technicians and senior stockmen. Until the introduction of award wages for aboriginal stockmen, the majority of stations maintained quite a large number of aboriginal families from which they drew most of their stockmen. With few exceptions, managers and other staff were poorly paid. In recent years, competition from increased mining and mineral prospecting and full employment in the cities has made it harder to obtain competent white staff. In the case of aboriginal staff, their political and social attitudes are changing, rapidly altering their relationship with the stations.

The capital structure of stations

Even in the early 1960s when prices for fat cattle were improving, gross annual average capital investment excluding livestock, was only about \$30,000, but the change from the old pattern of extreme caution was commencing.

Most of the old owners did not choose, or could not invest cash surpluses or borrow, to improve their leases. The reasons are diverse and interrelated, but the majority were convinced that turn-off and profits were so controlled by climatic variations that

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expenditure on any but the most essential improvements showed small gain for considerable risk. An almost complete lack of research findings in this field meant that risks of failure were higher than they might normally be. It is easy to criticise these owners, but one should look at the task.

Low carrying capacity over most of the areas in question means huge paddocks. Carrying capacity varies between and within areas but even holdings deemed by Kelly (1) to be of "efficient productive size" would be about 1,000 to 1,300 square miles in the poorer areas and between 400 and 800 sq. miles in the better country. In the Kimberleys, a paddock of 100 square miles is not considered large. To fence it would cost a minimum of \$16,000 but more likely \$18,000 to \$20,000. Water costs vary between regions, but a fair average for a fully equipped bore with mill, steel or earth tanks and troughs would be about \$8,000.

Nothing is small in this northern country except man. Mobs of cattle are large, therefore yards must be large. A decision to build access roads means many miles to maintain. A decision to double the number of watering points not only means a large input of new capital but a very sizeable increase in annual depreciation. A radio phone has an annual rental of about \$400.

The days of cheap labour and sub-standard housing are gone. A manager's house could quite easily cost \$30,000 and other staff houses between \$15,000 and \$25,000, depending on location. Accommodation standards for aborigines are also improving.

In the high rainfall zone, where it is necessary to improve pastures or supplement heavily, costs associated with raising the productivity of the breeding herd to satisfactory levels and maintaining it at these improved levels are much greater than in the drier regions.

Factors causing changes in management methods and leading to increased investment in the stations

Prices received for fat cattle at the major northern meat-works were low until the late 1950s, when the USA suddenly emerged as a major importer of Australian beef. Prices were further stimulated by the opening of export meatworks in Darwin and Katherine in the Northern Territory in the early 1960s.

In 1969 the Commonwealth Government, together with the State Governments of Queensland and Western Australia, commenced an extensive road building scheme, known as the Beef Road programme. This has greatly eased transport problems in the north.

Then, late in 1967, the land tenure laws were liberalised. One or more of these three factors, together with the highly favourable tax concessions available to farmers in northern regions, provided

sufficient incentive for some leaseholders to commence large development plans, and for others to buy out existing leaseholders who had been "locked in". Demand caused land prices to rise slowly at first but more rapidly over the last four to five years. This has set in a whole series of ownership changes.

In a survey recently conducted by the firm of John Lysaght (Australia) Ltd. and ANZ Banking Group, of a sample of 37 properties in the Northern Territory and the Kimberley area of Western Australia, 73.9 per cent had changed hands since 1950; 56.7 per cent since 1966; 33.3 per cent since 1968; and even 21.6 per cent since 1969. Corporations purchasing more than one lease (up to 17) have become more important and oversea owners have increased, being predominantly American.

Some huge land aggregations have resulted.

The new systems and owners

Many of the new owners in the 1950s and early 1960s were opportunists. They saw the price of beef rising through the demand for lean meat from America and the advent of new or improved export meatworks which would welcome large quantities of the type of meat produced from typical northern cattle, particularly "mickey" or "scrub" bulls. Many stations had run down badly during the war and had large, uncontrolled herds with a high proportion of "mickey" bulls and "bush" or "cleanskin" cattle. This operation was simple. One bought a place with a lot of cattle on it and concentrated on yarding and bull-catching. Often the proceeds from cattle sales over two or three years exceeded the purchase price and as land prices continued to rise, the properties were resold, often with a handsome capital gain.

As the American meat market continued to expand, prices rose and the general outlook for the northern cattle industry became more favourable. Also, research results covering some fodder crops, but more particularly the tropical legume Townsville stylo (*Stylosanthes humilis*) were given considerable press publicity.

Productivity per acre and per beast in the high rainfall areas can be changed drastically, from say 10 beasts per square mile to 100 per square mile, while small scale research results have attained even greater increases. Steers weighing 500lb. can be turned off at 2½ years. (Norman (2), and Norman and Stewart (3) have discussed the place of Townsville stylo in northern Australia, and its potential for increasing beef production, in some detail). This led to the belief that the north was one of the last of the frontier lands offering huge areas suitable for development. With a few exceptions, the new owners moved in with a maximum amount of

enthusiasm and a minimum of physical and financial analysis.

Demand for leases intensified as three types of investors became interested:—

- (i) Speculators for capital gain.
- (ii) Large companies attracted by the healthy outlook for beef, the potential for increasing output, the scale of operations, the favourable taxation benefits and the almost certain capital gains.
- (iii) Individual investors with large resources interested for the same reasons as the companies, particularly Americans, some of whom were also attracted by the aura of the last frontier.

Two very grandiose schemes, one based on grain sorghum and one on rice production, gave the north vastly increased world-wide publicity.

Meanwhile a few of the older and more efficient leaseholders were experiencing increasing profits, and the Beef Roads were playing an increasingly important role in servicing some of the more remote areas. Together with some of the more enlightened new investors, these leaseholders have set out to change their management methods with a view to lowering the age of turn-off while increasing the percentage turn-off.

This can be done by making the following basic improvements:

- (i) Controlling cattle with fencing (boundary and sub-divisions).
- (ii) Improving feed utilisation by increasing water points.
- (iii) Increasing the number of working yards and dips.
- (iv) Building access roads to yards.
- (v) In higher rainfall areas, introducing improved pastures and using fertilisers.
- (vi) Introducing better bulls and in some areas *Bos indicus* bulls, and by destroying "mickey" bulls.

These improvements make it possible to adopt improved management methods such as weaning calves, separating sexes after weaning, separating first and second calvers from other breeds, dipping to control ticks, control of fertility diseases, supplementary feeding of breeders (particularly heifers during annual stress periods) and the use of aircraft to improve mustering efficiency of "bush" cattle.

Townsville stylo is a relatively easy plant to establish. After burning the native vegetation, it can be sown on ash by aerial seeding, using 1 to 2 cwt. of superphosphate and 6lb. of seed per acre. However, with a herd of say 12,000 beasts, there

is not much point in sowing down paddocks of less than about 1,000 acres.

It will cost about \$11,000 to establish 1,000 acres of Townsville stylo if a share of water, fencing, firebreak, airstrip and yard costs are included, all of which are necessary for full utilisation of the premium feed produced. Once established, maintenance dressings of superphosphate are required. The rate varies, but a fair average would be 0.5 cwt./acre per year, which will cost about \$2.10 per acre or \$21.00 per beast per year if the stocking rate is 1 beast to 10 acres.

It can be seen that a decision to move from an underdeveloped, uncontrolled situation to one where all cattle are under control, and resources are fully used, is one which requires huge, lumpy inputs of capital.

If a development programme is begun, it must be completed. There is virtually no half-way mark at which anything like a satisfactory production response is to be obtained from the new inputs. This applies particularly where pasture improvement is practised. Each discrete area must be fully developed. In a paper published in 1970, G. T. McLintock (4) of the Bureau of Agricultural Economics estimated that in the higher rainfall regions, close to Darwin, a satisfactory return from a block of between 18,000 and 24,000 acres could not be obtained without a capital investment in excess of \$350,000 and a starting equity of \$150,000. It would be higher now.

Achievements

Let us now look at what is being done by some of the more progressive leaseholders, who have undertaken improvement programmes.

One of these is a company holding a number of leases in the northern cattle country. The development of only one will be discussed. This lease was purchased in 1960. It was in a very run-down condition with little effective fencing. Cattle numbers were quite high (estimated at 65,000) but most were out of control and there were literally thousands of bulls to say nothing of wild donkeys (30,000 shot between 1960 and 1967).

The aims of the development programme were basically:

- (i) to increase number of cattle turned off.
- (ii) to bring cattle to a marketable condition at an earlier age.

These aims were to be achieved, not so much by increasing the number of cattle, but by bringing under control the stock already on the station, and then implementing the improved management methods listed previously.

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Between commencement of the improvement programme in 1960, and 1967, the following capital expenditure was made:

Station Management	\$'000
Air field	42
Buildings	237
Roads	33
Plant and vehicles	244
Stock Management	
Water	386
Fencing	338
Yards and dips	90
(66 paddocks, 52 of which are less than 65 sq. miles)	
Other capital expenditure was:	
Livestock	175
Pest eradication	22
	<hr/> 1,567

A further development to be completed in 1971 was as follows:

	No.	Cost (\$)
Bores—equipment only	2	11,000
—drill and equipment	9	98,000
Earth tanks—build and equip	5	40,000
Portable steel yards	3	9,000
Fencing	208 miles (plus holding paddocks)	89,000
Air field	1	2,000
Yard and Dip	1	7,000
Dip	1	1,000
		<hr/> 257,000

Listed below is the anticipated state of development by 1971. At this stage, management will be able to separate and segregate cattle on 75 per cent of the lease.

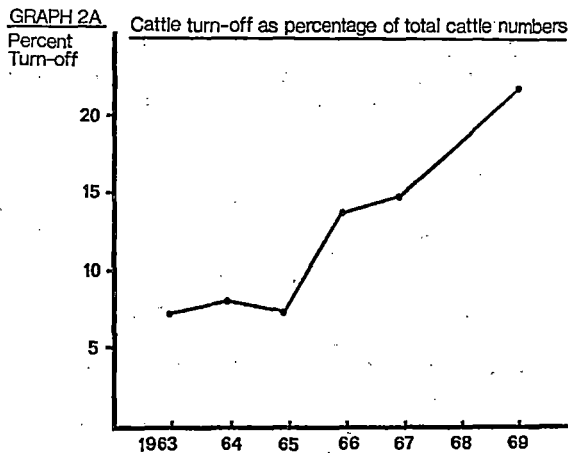
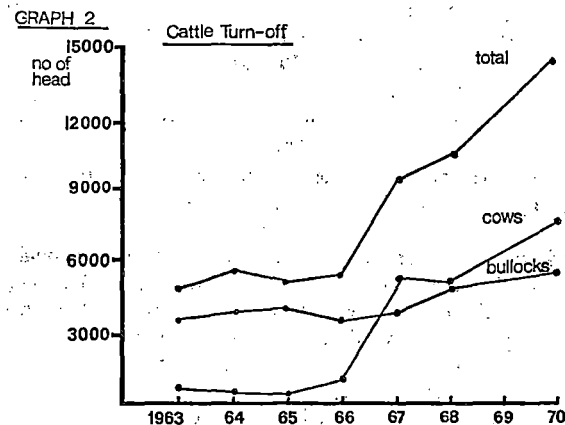
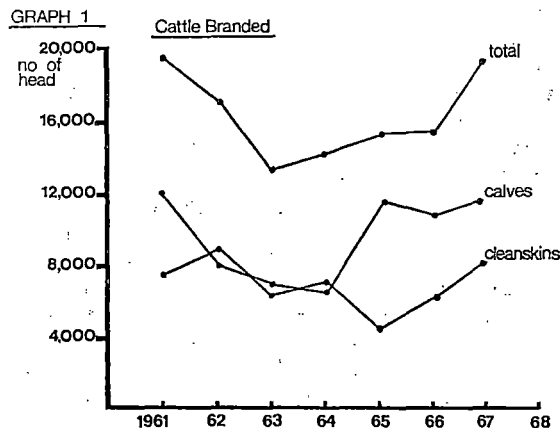
Boundary fencing	300 miles
Internal fencing	750 miles
Paddocks	75
Bores and tanks	57
Drafting yards	28
Bronco yards	48
Dips	6
Graded roads and tracks	1,600 miles

Average capital expenditure per year for the first seven years was \$223,000 and since then has been as follows:

1/5/67 to 30/12/67	1968	1969	1970
\$20,000	\$64,000	\$78,000	\$95,000

Brandings and turn-off

Brandings are shown in Graph 1 and Turn-off in Graph 2.



Calf brandings in the early years reflect management prior to purchase, and two poor seasons (1963 and 1964), before many improvements were effected. In 1967 they were still slightly less than in 1961, but in 1970 had risen by 38 per cent on 1961 levels.

Cleanskin brandings were plentiful in the early years because of poor management prior to purchase. These declined until more fencing and aids such as aerial mustering allowed more effective mustering in the more difficult country. Eventually they should decline again to very small numbers.

Turn-off in the early years mainly reflects seasonal conditions four to five years before the animals were marketed. In 1967, the number of cows sold increased greatly, partly because of a management decision to reduce breeder numbers, but also because improved control was now allowing an increased number of aged and cull cows to be marketed, rather than dying on the station. Turn-off in the early years was also reduced by an unknown quantity due to deaths of wild "bush" cattle unused to confinement behind fences.

Originally, it was anticipated that by 1975, cattle numbers would have risen to about 71,500 and that the annual turn-off would have stabilised at about 10,500, of which about 4,500 would be surplus females. Recent developments now make these figures appear conservative.

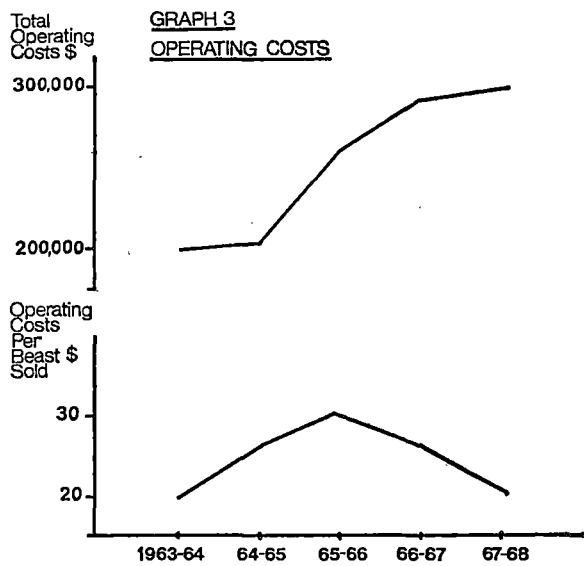
As can be seen, the results of an improvement programme are only slowly reflected in increased calf branding and higher turn-off percentages, even when cattle numbers are adequate from the beginning. It takes considerable time to reach the stage where there is increased protection from droughts, through the provision of more water, and where control is such that weaning can commence, first and second calvers are kept separate, only station selected bulls run with the herds, and some supplementary feeding of selected breeders during the last six to eight weeks of the dry can be practised.

Weaning of calves has only just commenced. This, and the introduction of *Bos indicus* bulls, will take some considerable time to be reflected in higher branding rates and heavier turn-off weights.

Operating costs

These have increased faster than both turn-off and receipts. Major increases have occurred in maintenance and labour, partly for increased livestock handling. The fastest rate of increase occurred in 1965-66 when staff numbers were increased to maintain and obtain value from the new improvements. Although continuing to rise, the rate is now slower as Graph 3 shows.

Since 1968, labour costs have been rising quite sharply, mainly because of new wage levels for



aboriginal stockmen. It seems unlikely that operating expenses per beast sold will decrease greatly unless the improvements initiated in the last few years can significantly reduce labour requirements or increase turn-off.

One possible method of reducing labour costs is the use of aircraft, including helicopters, for mustering and servicing outlying camps, waterpoints, etc. One station using a helicopter has reduced costs by 66 per cent and increased the number of cattle mustered. On another station the labour force will be reduced by half using helicopters.

Income

Prices for both store and fat cattle have risen substantially between 1963-64 and 1967-68, as is demonstrated below:

	1963-64	1964-65	1965-66	1966-67	1967-68
Average price per beast sold (net) \$	33	35	47	58	63

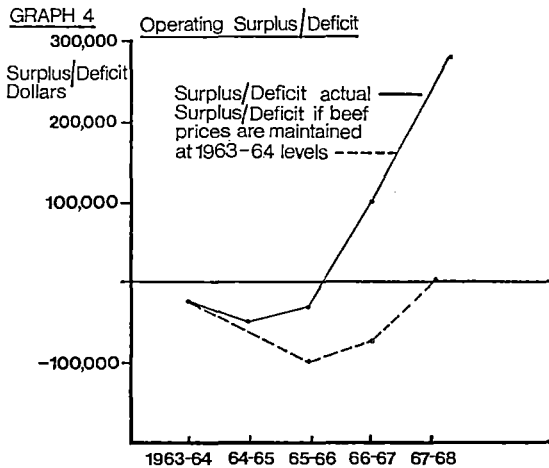
Numbers sold did not rise significantly until 1966-67, when surplus breeders and calves were sold in any quantity for the first time.

The marketing of surplus females is essential. At present beef prices, it is virtually impossible to initiate an improvement programme and generate a cash surplus from the sale of steers only. Also, had not the price of beef risen from \$10/100lb. in 1963-64 to \$16/100lb. in 1967-68, there would have been no cash surplus. The trend in cash flow is indicated in Graph 4.

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The programme above outlines one of the more carefully planned developments in the dry zone. The "steady state" will not be reached until all new management methods have been operating for several years.

The high rainfall areas

A brief description of recent changes in the industry in the high rainfall areas follows. These areas have most of the problems and lack some of the advantages of the dry zone, but they also have special problems—higher timber densities, greater parasite problems, and extreme variability in the nutritive value of the pastures, since pasture protein levels are very low for eight months of the year, during the dry season. For these reasons, properties in the wet areas have been characterised by low cattle populations, with low productivity levels and very few improvements. However, because of the high rainfall, the potential productivity of the wet areas is higher than that of the dry zone. This potential is well demonstrated when Townsville stylo is introduced, leading to large increases in carrying capacity and weight gains per head per year.

Over the past five to six years a number of investors have purchased properties and embarked on extensive development programmes of a progressive nature, based on Townsville stylo pastures, herd control and upgrading. As yet it is too early to assess their profitability, but already certain conclusions can be drawn. Briefly, these are that very large inputs of capital are required for establishment and stocking of the pastures and that annual pasture maintenance costs are such that a very high degree of managerial skill, with a relatively high stocking rate, is required to meet these costs.

A large and rapid pasture development programme increases interest commitments and maintenance costs, particularly in the early years when income is low and rising slowly. Because of this, it

appears that these expensive improved pastures should be used only for those sections of the herd where greatest productivity losses occur, namely weaners and first and second calvers, rather than for mature breeders and/or fattening steers (at current beef prices).

These conclusions are supported by the study by McLintock (4) which was intended to assess the likely profitability of the development of small (about 20,000 acres) "mini-leases" with a capacity of 3,000 to 4,000 head in favoured areas of the 'Top End'—the Katherine, Batchelor and Daly River areas. Although the proposed leases would have been much smaller than most properties in the north, the total capital required to stock and develop a property of 18,000 to 24,000 acres with a herd of 3,000 beasts was estimated to be about \$358,000. Even with a starting equity of \$150,000, the debt repayment period was estimated to be 21 years. Pasture maintenance cost were estimated to be about \$10,000 after full development, which is about 25 per cent of total annual operating costs.

As an example of the scale of some of the development programmes being undertaken by a number of 'Top End' stations, two such schemes between them established 50,800 acres of Townsville stylo between 1967 and 1970, and a further 95,000 acres are planned by 1975.

Land values have risen dramatically in recent years, and it is clear that much of the investment has been of a speculative nature.

Lastly, brief details are presented of an efficient pastoral company whose operations demonstrate the use of spatial strategies in the distribution of a number of properties. This company, formed in 1964, controls 17 stations, all of which are in Queensland. They are located in both wet and dry areas over a wide range of latitude and longitude. Properties have been selected to give a balance between those suited to breeding and those used for fattening, with a slight excess capacity in fattening. Scrub clearing, followed by pasture improvement, has increased stock numbers drastically on a few leases from 1 beast to 35 acres to 1 beast to 8 acres) but on most of the more northern and western leases, stock numbers have been increased and drought security improved mainly by provision of water points, combined with major fencing programmes. The Beef Roads, mentioned earlier, make this spatial strategy quite feasible.

To sum up, if introduction of improved management methods to northern Australian beef properties is contemplated, the following points must be considered:—

1. Very large amounts of capital are required, and a long pay-back period must be expected, even when cattle numbers and starting equity are high.

2. In high rainfall areas, where cattle numbers at commencement are invariably low and some pasture improvement or heavy supplementation is necessary, capital requirements will be higher and pay-back periods longer than in the dry zones, and the need for management skills much greater.
3. As costs, particularly labour and freight costs, continue to increase, single lease owners will find it more and more difficult to implement and maintain development programmes, and at the same time meet their repayment and interest commitments. Corporate organisations able to attract equity capital and controlling a number of leases are better fitted and more likely to mount satisfactory beef development programmes in the north, particularly in the drier areas prone to drought.
4. Finally, it is clear that the beef industry in the north is more heavily dependent on the maintenance or even improvement of current beef prices, than on its ability to improve productivity.

Acknowledgement

Grateful acknowledgement is made for the ready co-operation of station owners and managers, to the management of numerous pastoral companies, and to other persons connected with the cattle industry.

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Glossary of terms used

- Station—a large grazing property or ranch.
 Spinifex—a drought resistant perennial grass.
 Bronco yards—small, inexpensive yards used for operations such as branding of cattle.
 Mustering—gathering together a number of cattle for branding, sale, etc.
 Turn-off of cattle—sale of cattle.
 Bush cattle—cattle which have become wild through being uncontrolled for a number of years.
 Mickey Bulls, Scrub Bulls—unselected bulls which have escaped mustering and castration as calves.
 Cleanskin—an unbranded adult beast.

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NORTHERN BEEF INDUSTRY

DISCUSSION SUMMARY

1. Mr. Massy-Greene expanded on the formal version of his paper with maps of rainfall and topographical features of the Northern Territory of Australia, with slides of different types of country, ranging from the worse (suicidal by European standards) to the best (very poor by European standards).

2. Initial questions evolved around markets. How reliable was the USA? (73 per cent. of total exports).

3. To what extent was a rise in price of beef a measure of the profitability of the Australian northern beef industry?

4. The speaker replied that the US export market was vital for the manufacturing-type beef produced in the North and, though there was an expanding market to the Eastern countries, the percentage of the total to that area was low, and there was some disquiet about the possibility of synthetic fillers being used in that market in the future.

5. Mr. Massy-Greene was questioned as to the

difference in return of capital between the easier areas, which were more subject to sporadic drought, and the higher rainfall but more expensively developed region. Personally, he would prefer to stick to the drought-prone areas.

6. In a question referring to the availability of artesian water, the speaker evidenced a slide of a bore being dug, at which 3,500 gallons of water flowed at 42ft. Mr. Massy-Greene elaborated on his contention that there was no half way to development—it was either a matter of spending the full amount required to seed and maintain the tropical legume, Townsville Stylo, or to fail.

7. The speaker graphically illustrated, in his replies to questions, the large sums involved in improvement and stocking of the North, and the very long pay-off period, but at the same time he described, and produced figures to illustrate, the very large capital sums which had been made in the area since the early 1950s, with no liability for capital gains tax in Australia.

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