

Despised vermin to some of the graziers who live near them, the brumbies, scrubbers, wild pigs, and other livestock running free in Australia—our feral animals—have become part of our folklore. They break down fences, foul waterholes, entice valuable stock away into the bush, and could become a reservoir for disease. Some conservationists claim that they threaten wildlife habitats and ruin wilderness areas. Yet, apart from the tales of bushmen and a few general studies, we know very little about them.

This situation is being remedied though. In the swampy tropical grasslands of the Northern Territory, researchers in the CSIRO Division of Wildlife Research are studying the interactions between buffaloes, pigs, and native birds and animals. And about 2500 km to the south, in the dry rocky slopes of the Flinders Ranges, Dr Bob Henzell of the South Australian Department of Lands is finding out how goats affect fragile semi-arid wilderness areas. Elsewhere, studies are aimed at finding ways of using feral livestock.

Dr Allan Wilson and Dr Graham Harrington, of the CSIRO Division of Land Resources Management, think that goats may be useful in clearing scrubinfested sheeplands on the western plains of New South Wales. They are examining the food habits of wild goats near Ivanhoe and Coolabah, while the Department of Agriculture has a group at the Condobolin Research Station working on the breeding and care of bush goats.

Near Darwin, researchers from the Department of the Northern Territory are studying buffalo-farming. In fact, exporting buffalo meat is already a minor industry in the 'Top End'. They are also examining the productive potential of the timid Bali cattle found running wild on Cobourg Peninsula, about 200 km north-east of Darwin.

Buffaloes

Originally released from the various short-lived settlements on the extreme northern coast during the first half of the

Domestic animals gone bush

Nineteenth Century, buffaloes are now the most obvious form of wildlife on the sub-coastal plains of the Top End. Since the mid 1950s about 140 000 have been slaughtered for meat—about half for human consumption.

Attempts to re-domesticate the wild herds started in 1958, and since then several thousands have been caught and gentled by officers of the Department of the Northern Territory's Animal Industry Branch and several private operators. Buffalo-farming now seems likely to develop into an important industry in the Top End, where the humidity, poor feed, and ticks make European cattle relatively unsuccessful.

Environmentally though, buffaloes have their bad points. Together with pigs and cattle they alter the vegetation of the swampy grasslands and lagoons of the plains. These areas support large numbers of birds, including magpie geese, green pigmy geese, lotus birds, and many kinds of ducks, egrets, and waders. They are also the ultimate drought refuge for many of the water birds of southern Australia, Officers of the CSIRO Division of Wildlife Research think that the changes in habitat brought about by feral animals almost certainly harm the birds. Certainly, many species have declined in recent years.

— The researchers are now surveying the birds as a prelude to a study of the causes of their decline and of the impact of the feral animals on their habitat. Other studies are concentrating on the interactions between buffaloes and pigs on the plains. This work was interrupted by Cyclone Tracy, but has now begun again on a property known as Kapalga, about 200 km east of Darwin.

Health threat

Buffaloes and other feral animals roaming the swamps and plains of northern Australia probably pose a major risk in spreading exotic animal diseases. In this thinly populated area, an outbreak of foot and mouth could continue undetected for some time—certainly long enough for it to spread over huge distances.

Officers of the CSIRO Division of Animal Health believe that wild animals could make the eradication of many exotic diseases extremely difficult. In America, for instance, the rabies virus finds a home in skunks and foxes. Here, foxes, feral cats, and dingoes could serve as a permanent reservoir of infection. With this possibility in mind, Mr Durno Murray and Dr Bill Snowdon, of the CSIRO Division of Animal Health, have mapped the whereabouts of seven of the feral animals in Australia. They have also mapped where introduced wild animals like foxes and deer may be found. Much of the information used came from State Departments of Agriculture and the Department of the Northern Territory.

As the map on page 14 shows, wild pigs are particularly widespread, exten-

Here, foxes, feral cats, and dingoes could serve as a permanent reservoir of infection.

ding from across the Top End down through Queensland and New South Wales. They are often in close contact with farm animals and could easily spread several exotic diseases that affect sheep, cattle, horses, and other domestic animals.

Wild pigs are already under suspicion as carriers of a kind of tuberculosis that infects cattle. Since 1969 animal health authorities in all States have been working together in a national campaign to eradicate tuberculosis in cattle. While the campaign has been highly successful on dairy farms and small beef properties in southern Australia, the disease still exists in the huge cattle herds of outback South Australia, Queensland, and the Northern Territory.

The tactics of the eradication teams are laborious, but fairly simple in principle. At mustering time they test each animal and then slaughter the ones that carry the disease. The owner is compensated by Australian and State governments for the stock he loses. Yet, all this effort will be wasted if the cattle mix with tuberculosis-infected pigs when they are sent back to their paddocks. Clearly, it is important to know what are the chances of re-infection from wild pigs.

In the Northern Territory, officers of the Division of Wildlife Research have been helping tuberculosis researchers Dr Leigh Corner and Mrs Catherine Pearson, of the Division of Animal Health, find what sort of infections wild pigs carry. One of the Wildlife Research projects-which also involved officers of the Department of the Northern Territory-was to test intensive shooting as a control method. The pigs shot in this trial were examined by the Animal Health team for signs of tuberculosis. Of more than 700 carcasses studied between 1973 and 1975, about half showed signs of tuberculosis-like infections—a very worrying result.

Professor McKnight has warned that these estimates are only a rough guide. Actual numbers vary widely with seasonal conditions.



However, there are many kinds of germs that resemble those causing tuberculosis in cattle. Dr Corner and Mrs Pearson with Dr A. W. Lepper, also of the Division, have had to carry out a whole series of tests to find what sorts of germs occur in pigs and whether any of them can be transferred to cattle.

Some of this diagnosis was very specialized and samples were sent to the United States for further analysis in laboratories there.

The project is not yet complete. Results so far indicate that, while the pigs certainly do carry it, the tuberculosis germ that infects cattle is less common among them than was originally feared. But we still don't know the true role of the pig in spreading the disease among healthy stock. The New South Wales researchers have not found tuberculosis in the wild pigs they are studying.





A wild buffalo wallowing in a northern swamp.

Unpopular pigs

Whatever their role in cattle disease, pigs are probably the most thoroughly disliked of our feral livestock. People's attitudes towards wild pigs were studied in a survey conducted by Professor Tom McKnight of the University of California. He is a geographer who has had a special interest in feral livestock for more than 20 years. In 1966 and again in 1971 he surveyed almost 4000 individuals graziers, policemen, missionaries, shire clerks, vermin control officers, and many others who are familiar with rural Australia, particularly the outback.

Wild pigs are already under suspicion as carriers of a kind of tuberculosis that infects cattle.

Respondents accused pigs of killing sheep, ruining crops, damaging fences, fouling waterholes, destroying small native animals and ground-nesting birds, and rooting up soil (thereby accelerating erosion and causing a safety hazard to horse-riders).

Professor McKnight notes that several of those answering his questionnaire told of hours sitting in trees waiting for porcine passions to subside. He also notes that documented data on the wounding of people by pigs is virtually non-existent. Nevertheless, since 'bold Tommy Payne' of the folk song lost his trousers to a wild boar, stories of the savagery of wild pigs have livened up many a session at the bar or around a campfire.

Firm evidence for lamb predation is almost as hard to find. In general, according to Mr Bernard Fennessy of the Division of Wildlife Research, the role



Australian buffaloes awaiting shipment to Venezuela.

of predators in livestock losses in Australia is probably considerably over-rated. Since 1971, officers of the New South Wales Department of Agriculture have been studying wild pigs to get a true picture of their economic impact on rural industry, and to find the most effective ways of controlling them.

Mr Jack Giles, now in the New South Wales National Parks and Wildlife Service, started the project by studying the basic ecology and biology of these animals near Hungerford and in the Macquarie Marshes.

How pigs live

Mr Giles and more recently Mr Jim Hone of the Department have shown that the pigs of north central New South Wales tend to prefer green feed to other foods. Patient observation and tagging has shown that they live in family groups of 6-8, even when the population is quite dense. In favoured haunts such as the Macquarie Marshes—where pigs have plenty of food, good shelter from the sun, and are rarely troubled by shooters it's possible to find 60-80 per square km.

Wild pig in central western New South Wales.



They do live in drier country, though, and can be found along watercourses in sparsely wooded areas and eucalypt forest. Some groups live in mountainous areas, and wild pigs are seen in Kosciusko National Park.

Mr Hone considers that they are most likely to come out onto farmland in dry conditions when their natural food vanishes. Then they turn to irrigated crops like sorghum, wheat, maize, sunflowers, and, along the coast, sugar cane. Crop damage near Moree has been valued at more than \$20 000 on a few individual properties. Pigs also grub for roots and earthworms, and will eat beetles, grasshoppers, frogs, and mice as well as the carcasses of sheep, cattle, and kangaroos.

The team has found that pigs do take lambs, but it is hard to assess the real impact of this predation. It's possible that in many cases the lambs were weak and sickly and would have died anyway. Also, unlike foxes and ravens, pigs usually totally devour their victims and leave little or no evidence of their activities, although Mr Giles has seen them attacking lambs and savaging adult sheep.

Certainly they sometimes cause major losses, and several properties on the far western flood-plains abandoned attempts to breed or keep sheep between 1969 and 1975. In one trial at Goodooga, N.S.W., carried out by Mr John Plant of the Sheep Fertility Service of the New South Wales Department of Agriculture, the use of electric fences to exclude wild pigs from a paddock of lambing ewes lifted lamb numbers at marking time by about 40%.

Droughts slash pig numbers, but these tough beasts have few enemies other than Man and, with sows producing up to two litters of 5-6 piglets a year, the mobs build up again very rapidly. Mr Giles cites cases where they have main-

A pig-shooter and his kill. Even heavy shooting hasn't cut numbers.



Camels, once an important means of transport in the outback, were first used in Australia by Burke and Wills (depicted here in Charles Nicholas' painting of their ill-fated expedition).

Camels in the Flinders Ranges, S.A.



tained their numbers despite heavy shooting campaigns that have killed one-third to half of the estimated population each year. His studies have shown that their breeding potential is so high that to lower pig numbers in a district for more than one year it would be necessary to kill at least 70% of the population.

The Department's future research program will include trials with electric fences and improved baiting and trapping systems, together with other methods of containing or destroying the pests. The aim is not just to cut farmers' losses, but also to develop ways of protecting livestock against exotic diseases that pigs may acquire in the future. The team has found that they are not wideranging creatures and tagged pigs are rarely found more than 6–10 km from where they were first caught.

Hard times

Like pigs, most feral livestock only seem to become serious pests in certain seasons. Thus, in the dry years of the late 1960s newspapers regularly carried stories of brumby, donkey, and camel invasions and damage on the grazing properties of the inland.

These three animals—once valued beasts of burden—are fairly widespread in the outback and are usually shot on sight. They manage to survive by staying well out of Man's way. Donkeys are probably an exception. In some areas notably the Kimberleys in Western Australia and the Victoria River district of the Northern Territory—they have been a major pest for 20 years or more.





Some outback stations still use camels to pull supply waggons to mustering camps.

Station-owners complain of them competing for feed and damaging pastures. Professor McKnight records that in the mid 1920s an estimated 100 000 donkeys roamed the Kimberleys, with possibly another 150 000 in the Northern Territory. Since then organized shooting has lowered numbers considerably, although he estimates that there may still be as many as 100 000 donkeys in these two areas. Smaller numbers live in northern South Australia and western Queensland.

Once, large teams of donkeys hauled supplies into remote mining and pastoral



settlements. With the advent of motor transport most were simply turned loose to fend for themselves. These hardy beasts tolerate the dry hot conditions of the outback quite well. Also, they are immune to Kimberley disease—a fatal affliction of horses, caused by poisonous plants, that is common in parts of the Top End.

It is generally believed that nowadays wild donkeys are being shot faster than they can reproduce. Professor McKnight predicts that they will steadily disappear from all but the most remote areas. Most of the people answering his survey foresaw virtual extinction for them. Recently the pet-food industry has become interested in the donkeys of the north-west.

A similar fate probably awaits Australia's wild horses, although extermination may be more gradual. They are more numerous and widespread than donkeys. Most live in the remote north, but some are often seen in the mountains of eastern Australia—one mob in the Australian Capital Territory roams within 20 km of Canberra's suburbs, while others have been reported quite close to Brisbane.

The answers to Professor McKnight's questionnaire revealed that brumbies usually exist in scattered mobs consisting of a stallion and 6–15 mares (unlike donkeys, which form large herds). Young stallions are driven away when they are about 12–18 months old. The mobs are very territorial and stay within an area of 50–150 sq km. Within their territory the horses are selective feeders, and will walk many miles to seek out the best feed.





Breaking in brumbies for stock work in the Northern Territory.

Aboriginal dogger and his camel.



Wild horses have existed in Australia almost as long as European Man. 'Bush horses' were common around Sydney by the 1830s. The process of feralization is simple enough: horses left unattended for some time learn to shift for themselves and, in favourable conditions, reproduce. Before long they are as wild as their ancestors on the Asian Steppes.

Outback stations commonly missed animals in the annual muster, while travelling drovers sometimes lost part of their large 'plant' of stock horses. During the 1930s vast numbers of horses were turned loose by stations that had been providing remounts for the British Armies in India and Egypt.

In the northernmost end of the Northern Territory live some 500 Timor ponies—a relic of the early settlements on the Cobourg Peninsula. Dr Harry Frith, Chief of the CSIRO Division of Wildlife Research, has pointed out that, while they are picturesque, the presence of these slender graceful ponies with their long manes and tails in a major wildlife sanctuary is unfortunate.

Brumbies elsewhere vary in quality. Some are ugly ill-formed beasts with big heads and runty bodies, while others show evidence of good blood lines in their breeding. With proper handling these make hardy intelligent stock horses. On some stations brumbies are regularly trapped in yards built around their watering places, or rounded up using motor-cycles, trucks, or even aircraft. Stockmen break in the best and shoot the rest for pet meat or ship them live to sale-yards and abattoirs.

Dinkum oonts

The last of the draft animals running wild in the outback—the camel—is an object of considerable fascination to many people. Australia is probably the only place in the world where wild camels still exist, although of course, they are all descended from domestic stock imported from India and the Middle East. Oont is an old term for camel that came from British India during last century.

The dry conditions of the inland made their introduction inevitable and, from Burke and Wills on, more and more outback travellers came to use them. Ernest Giles depended entirely on camels during his epic double crossing from South Australia to the Indian Ocean in 1895-96. On one stretch of 520 km during the trek from Port Augusta to Perth, Giles' camels drank only one bucketful of water each in 17 days.

Cats and dogs

Both of our commonest domestic pets live free in the bush. CSIRO Wildlife Research survey parties usually see freeliving cats no matter where their studies are based. One party found them widely distributed in the Kimberleys, and destroyed 70 around their camps in a few weeks. Dr Frith has reported sightings in areas as remote as the Arnhem Land escarpment, the Gibson Desert, and Cape York Peninsula.

Similarly, wild dogs occur in most parts of the country. Of course, the problem with most sightings of both dogs and cats near settled areas is to know whether the animal is really wild or merely a wide-ranging domestic pet. A further difficulty with wild dogs is that of distinguishing between wild dog and dingo.

Some conservationists are concerned that wild cats prey on our small native birds and animals. Because of this concern, Dr Brian Coman and Mr Hans Brunner, of the Victorian Department of Crown Lands and Survey, have studied the diets of free-living cats. They have found that those living in the agricultural districts of western Victoria mainly eat rabbits, mice, and carrion. The two men have analysed the stomach contents of 33 cats from these areas and have found no sign of any native mammals.

However, a study of the stomach contents of 95 cats trapped in the Eastern Highlands showed that, when Tiddles takes to the tall timber, conservationist fears may be justified. These cats relied heavily on native rats, mice, and possums for their food. Birds were found in some stomachs, but were a relatively minor item in the diet.

Unfortunately, control of wild cats is extremely difficult, and is greatly complicated by the value attached to them as household pets. It's true that, as Dr Coman has pointed out, the fact that cats eat native animals does not necessarily mean that they exert a significant effect on the populations.

Actually, feral cats may not threaten the creatures they prey on as much as they do the small native hunters they compete with. It's a basic principle that species with the same needs cannot coexist. Marsupial native cats are now rare



A feral cat with its prey.

A further difficulty with wild dogs is that of distinguishing between wild dog and dingo.

or extinct throughout large parts of their former range. Zoologists don't know why this has happened, but it's possible that feral cats are involved. Incidentally, in the 1880s many farmers went to a great deal of trouble to accustom cats to living in the bush, hoping they would control rabbits. Yet at the same time native cats, which also eat rabbits, were declared vermin and killed for bounties.

In the case of the dog, it seems that escaped domestic pets have already put the future of the dingo in grave doubt at least in south-eastern Australia. Studies by Dr Alan Newsome of the CSIRO Division of Wildlife Research have shown that about three-quarters of the so-called dingoes in the region are either domestic dogs or dog-dingo hybrids. Mr Laurie Corbett and others in the Division's dingo research group have been developing ways of distinguishing dogs from dingoes on the basis of the shape of the skull and the coat colour.

In Victoria the Dingo Study Foundation, which is concerned with the preservation of Australia's native dog, has put forward a policy of live trapping of wild dogs and release of true dingoes to selectively eliminate hybrids from national park areas.

Apart from their role in the possible extinction of dingoes, dog-dingo hybrids may pose other threats. According to Dr Newsome, hybrid females breed more frequently than true dingoes, which only come into season in the autumn. So the potential growth rate of hybrid packs is higher and may even double that of the pure-breds. Other factors such as disease resistance and the extent to which they form packs—hence the size of the game taken — may also be changing with hybridization. It is likely to be a long time before we know all the effects of blending domestic dogs with dingoes.

- The feral cat problem. B. J. Coman. Victoria's Resources, 1975, 17, 16.
- Food habits of the feral house cat in Victoria. B. J. Coman and H. Brunner. Journal of Wildlife Management, 1972, 36, 848-53.
- The feral cat problem in Victoria. Vermin and Noxious Weeds Destruction Board Pamphlet No. 53, 1975.
- The dingo. A. E. Newsome, B. Green, L. K. Corbett, and L. Best. Australian Meat Research Committee Review, 1973, 14, 1-11.

From the 1870s until the early 1920s, camels carried men and supplies on most of the major construction projects of the inland—the Overland Telegraph, the Transcontinental Railway, the Canning Stock Route, and the various 'dog' and rabbit fences.

By 1925 there were nearly 13 000 camels in Australia, but their usefulness had almost vanished by then. In that year the South Australian government in an attempt to alleviate the havoc created by thousands of wandering beasts—passed the *Camels Destruction Act*. It is still on the statute books and gives landholders the right to shoot untended camels on their runs under certain conditions.

Today, according to Professor McKnight's estimates, about 15 000– 20 000 camels roam the deserts of central Australia. Nobody has yet made a systematic study of these creatures in the bush. They are very wide-ranging and seem to prosper in the driest hottest parts of the continent. Because of this, and despite their large size, camels are very inconspicuous.

They attract attention—and worldwide newspaper headlines—when drought drives them out into settled areas. Mobs of as many as 500 may smash troughs and mills and break down fences. During Today, about 15 000–20 000 camels roam the deserts of central Australia.



The fleece of a cashmere goat from western New South Wales.

the 1961-62 and 1965-66 droughts, more than 1000 camels were shot on the stations surrounding the Simpson Desert. Presumably the same thing will happen again when the centre dries out after the recent run of good seasons.

Most of the time the attacks on camels are sporadic—usually aimed at protecting a particular fence or water point. Dingopoisoners also shoot a few camels, as the



hump fat is an extremely effective bait. Sportsmen take their toll, although the trophy value of a camel is probably not very high.

Dr Frith has pointed out that there is virtually no attempt to control camels in the unsettled country where they are most likely to damage the vegetation and so cause erosion. Others have said that since they can live in these areas they have the potential to turn 'wasteland' into profits—either as pet food or as meat for human consumption.

Valuable vermin

Not all feral animals are pests. Wild cattle or scrubbers—found in the more rugged parts of most extensive pastoral areas—are often an asset. More than one station has been stocked with cleanskins rounded up out of the bush. And the pet-food, horse-hair, and leather trades can provide ways of turning camels, donkeys, brumbies, and pigs into cash. Even wild pigs may be valued as a source of fresh meat, and good-quality boars are occasionally released into the swamps to improve the wild stock.

There is a small steady trade in camels through Port Adelaide to the United States and even to their native territory, the Middle East.

Not all land-owners dislike the feral livestock on their runs either. Professor McKnight found that some considered brumbies and camels pleasant to have around and would not allow them to be shot. It's possible that if the creatures really do start to become extinct in Australia we will see movements to preserve them spring up. North America has organizations campaigning to save wild horses and donkeys—both introduced animals.

Apart from the aesthetic values attached to feral animals, it seems that some of the so-called pests that have been breeding in the wild are of considerable economic worth.

In South Australia and New South Wales, catching wild goats for sale to meatworks, for export, or for pet-food is a minor industry. New South Wales graziers (mainly from the Central Tablelands) sometimes buy them to control weeds like tussock grass and blackberries. The sale of goat meat and live goats to overseas markets can make this a mildly profitable sideline for them.

Surprising discovery

In 1973 scientists made the most extraordinary discovery about our wild goats—



Dead *Melaleuca* shrubbery—typical of the damage goats can do in arid country.

some produce cashmere. This is a very fine down (about 30% finer than Merino wool) that grows under the coarser hairy outer coat each autumn, and is shed in late winter and early spring. The best grades are worth more than \$7 a kilogram—by way of comparison, fine Merino wool has been selling for about \$3-\$4 a kilogram lately.

Dr Ian Smith of the University of Sydney first noticed the soft down while examining a small flock of goats from western New South Wales. He took a fleece sample from one goat to Mr Wal Clarke of the CSIRO Division of Animal Production, who measured its characteristics. The men were amazed to find that the down was equal to the better grades of cashmere and made up nearly 90% of the total fibre. Many breeds of goats grow downy undercoats, but only those used for cashmere production have more than 50% down in their fleeces.

Samples of the down were sent to two leading cashmere processors in Bradford, England. They valued the dark-coloured samples at \$4 per kg and one firm replied that they would be delighted to take the 'Australian production' if it grew in reasonable quantity.

Colour is particularly important to cashmere production. In a herd from Brewarrina, N.S.W., 74 goats had obvious undercoats. Of these 13% were white—the most valuable shade—and, altogether, nearly 40% were lightcoloured. Dr Helen Newton Turner of the Division's animal breeding research group concluded that there was plenty of scope for breeding light-coloured cashmere-producing flocks from these goats.

That doesn't necessarily mean that a cashmere industry is just around the corner. Each goat produces only about 250 g of the valuable down. In China



These feral goats, being studied at the Division of Animal Production, grow fine cashmere.

In South Australia and New South Wales, catching wild goats for sale to meatworks, for export, or for pet-food is a minor industry.



'Top End' swamps in the Wet—the ultimate drought refuge of many Australian water birds.



Wild goats shot near Bathurst, N.S.W.

and India, the fibres are combed out as they are shed in spring. Several combings are needed to get a good yield. In Iran, the goat is shorn and the coarse hair fibres are picked out of the fleece by hand. Either way the amount of labour needed makes cashmere production quite uneconomic in this country. At Condobolin, N.S.W., Dr Peter Holst and his colleagues in the Department of Agriculture are looking for ways of harvesting cashmere that are less labour-intensive.

Departmental officers like Mr Terry Mitchell, at Bourke, are also interested in the prospects of grazing goats on the dense scrub that has taken over much of the dry western plains and is of little use to sheep.

At the CSIRO Division of Land Resources Management's Deniliquin Laboratory, Dr Allan Wilson and Dr Graham Harrington, of the Division, have followed a different tack, trying to find whether goats can be used to clear shrubland for sheep.

In one 4-year trial near Ivanhoe, they stocked shrub-infested rangeland with tamed wild goats stocked at three times the district average for sheep. The goats stayed in good condition. However, while they did eat browse plants that a flock of sheep in the same trial left alone, mostly the two animals competed for the same grasses and copper burrs. The general folklore that goats 'eat anything' or 'only eat shrubs' seems wide of the mark.

The goats did kill many of the shrubs on their plot. At first they neglected the woody weeds, desert cassia (*Cassia eremophila*) and its close relative punty, but later they killed both varieties. Unfortunately, the important weed, turpentine (*Eremophila sturtii*) escaped unscathed.

Dr Harrington obtained similar results from trials at Coolabah, where goats

No matter how interesting they are, the bantengs exist in a major wildlife sanctuary.

eliminated shrubs like hopbush (Dodonea spp.), but again did not touch turpentine.

It seems that, while they did seem to have some advantages in this dry shrubland, goats may have undesirable effects on the vegetation. It's likely that they would prevent useful trees like belah (Casuarina cristata) and rosewood (Heterodendrum oleifolium) regenerating. Because they won't eat it, they could allow turpentine to take over—seedlings that appeared halfway through the trial had grown into 40-cm-high bushes by the end. The team concluded that feral goats may or may not control undesirable scrub, depending on the kinds of plants involved.

Bantengs

The story of the banteng—a species of cattle native to Java, Borneo, Thailand, and Vietnam—is similar to that of the goat in that the pastoral industry may find that re-captured specimens make useful breeding stock. Released from the early settlements of the north coast, the domesticated strain of banteng—called Bali cattle—has multiplied in the swamps and plains of the Cobourg Peninsula. The small timid cattle have not moved



The graph shows how ineffective bonuses are for lasting pest control. Despite the heavy kills in years like 1957-58, many bonuses were paid in later years.



Pure-bred dingoes—we know little of the effects of their inter-breeding with domestic dogs.

beyond this area, although from time to time they have been reported wandering towards the black-soil plains of the Murganella River that divides the Peninsula from Arnhem Land.

They were not recognized as Bali cattle until 1960, and beef breeders have since shown great interest in them. Even in the most severe seasons they remain fat and sleek, and their conformation indicates that they are good beef-producers. The Department of the Northern Territory has a small herd at the Beatrice Hill Experimental Station, 64 km from Darwin (the plan is to try crossing them with other breeds of cattle).

Dr Frith has pointed out that, no matter how interesting they are, the bantengs exist in a major wildlife sanctuary. Like the wild ponies that share Cobourg Peninsula with them, their presence in the area is to be deplored. He has suggested that the best fate for the wild bantengs may be to catch enough for breeding stock and shoot the rest.

This suggestion really demonstrates the paradox the existence of feral animals raises. Australia's landscape evolved without large grazing animals. If we want to preserve parts of it in anything like their natural state, we have to eliminate feral livestock from these areas. Yet some of the feral species may be useful to our pastoral industries—or to science. Others, like the wild horses of the Snowy Mountains, give pleasure to the tourists and bushwalkers lucky enough to see them galloping across the high plains. Even farmers have a slightly schizophrenic attitude to feral animals, abusing them as a pest and a nuisance when their numbers get high, but enjoying the sport and meat they provide at other times.

More about the topic

- Wildlife Conservation.' H. J. Frith. (Angus and Robertson: Sydney 1973.)
 'Friendly Vermin: a Survey of Feral Livestock in Australia.' Tom McKnight. (University of California Press: Berkeley and Los Angeles 1976.)
- The role of wild animals in the spread of exotic diseases in Australia. M. D. Murray and W.A. Snowdon. *Australian* Veterinary Journal, 1976, **52**, 547-54.
- 'The Camel in Australia.'Tom McKnight. (Melbourne University Press: Melbourne 1969.)
- 'They All Ran Wild.' Eric C. Rolls. (Angus and Robertson: Sydney 1969.)
- The ecology of the feral pig in New South Wales. J. R. Giles. Australian Journal of Wildlife Research, 1977, 22 (in press).
- The potential of feral goats in Australia for cashmere production. I. D. Smith, W. H. Clarke, and Helen Newton Turner. Journal of the Australian Institute of Agricultural Science, 1973, 39, 128-31.
- CSIRO Division of Animal Health, Annual Report, 1975, 38-9; 1976 (in press).
- CSIRO Division of Wildlife Research. Biennial Report, 1972-74, 15-17; 1974-75, 14-16.
- Sheep, cattle, and goats. Rural Research No. 92, 1976, 19-21.