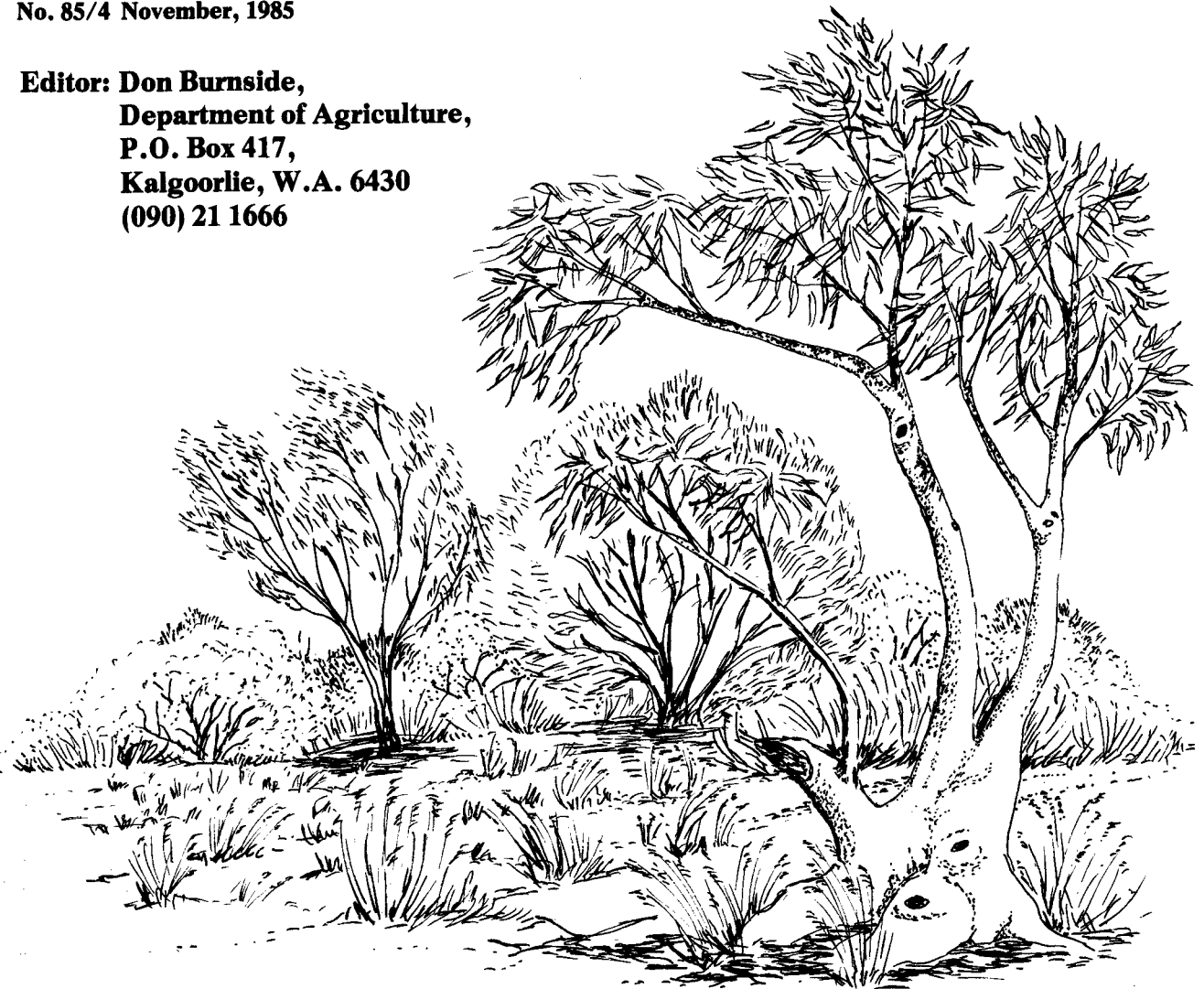


The Australian Rangeland Society
**Range management
Newsletter**

No. 85/4 November, 1985

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Australian Rangeland Society Council 1985

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EDITORIAL

Don Burnside

In many ways, the most significant item in this issue is the form advising that subscriptions for 1986 are now due. There has been confusion in the past about when these needed to be paid, and Subscriptions Secretary Daryl Green has clarified the issue by providing a tear-off slip that you can return with your dues. If you do this now, then the flow of newsletters and journals will continue to reach you without interruption.

To further help in resolving any confusion, we have included an explanation of the cryptic lettering shown on the address labels. This enables readers to determine if they are financial or not!

Wal Whalley has included a note about the 1986 Biennial Conference. Take heed of this event and note it in your diary.

Finally, this being the last issue of the newsletter for 1985, please accept the editor's best wishes for a Happy Christmas and a Rainy, Prosperous New Year.

Remember to include a promise to write a contribution for the newsletter in your list of new year resolutions!!

LETTERS TO THE EDITOR

**From: Wal Whalley
University of New England,
Armidale, N.S.W. 2351.**

I read with interest Tony O'Brien's letter in the last issue of the Newsletter. I found myself in complete agreement with Tony for the first six paragraphs, but then our views diverged by about 180°. When will Australian agronomists and range scientists break away from the "replacement philosophy" that we were all bombarded with during our undergraduate years? The inherent assumption in the last part of Tony's letter is that all Australian forage species are worse than useless and if they have been fortuitously cleared away by poor grazing management, then let us scour the world to find some useful replacements. I believe that this basic assumption cannot be further from the truth.

Most ecologists would agree that Australian herbaceous species evolved under conditions of low grazing and trampling intensity. However, they have now been subjected to nearly two hundred years of grazing by hard-hoofed domestic livestock at varying intensities and with varying management strategies. This has provided ample time for intensive sorting to have occurred both between species and within species. Indeed, there is plenty of evidence that this sorting has taken place and been very effective. Any species or biotypes which have survived through to the time of European settlement and survived the conditions to which they have been subjected since settlement, are superbly adapted to the environment and have been further sorted to withstand grazing pressure.

If one is searching for colonising species for degraded land, whether grasses, legumes or other forbs, then surely the suite of species to search among is those already adapted to the environment. One need not necessarily look among those species which are widespread. It is species which have useful agronomic characteristics in terms of their colonising ability and in terms of their usefulness as forage species which should catch the eye of the range scientist. Even a cursory glance at Geoff Cunningham's book will show that there are ample species to choose from in the dry regions of New South Wales. In the more favoured parts there is even wider scope.

The next step is to select species and biotypes which are easily "domesticated". If one is going to establish extensive areas of any species, whether in the semi-arid, arid or more humid zones, then a ready supply of seed is an absolute necessity. This means that types must be either selected or bred which have seed characteristics suitable for harvesting and sowing by machinery. Ample models are available in the literature to show the sorts of characteristics which one should look for.

I think it is high time that we stopped looking overseas whenever we need a forage species for a particular situation. We are far more likely to find suitable species among those we know are adapted to our environment. In addition, the dangers inherent in indiscriminate plant introduction like that which Tony is advocating are enormous for Australia. In our region alone we have two bad weeds (*Hyparrhenia hirta* and *Eragrostis curvula*) which were deliberately introduced into this part of the world as part of the plant introduction programmes in the 1950's. I think we can do without having any further weeds on our consciences.

COUNCIL BUSINESS

Who's Who on Council, 1985/86 — Part 2

Subscriptions Secretary: Daryl Green

I was raised on a wheat and sheep property near West Wyalong in the northern Riverina of N.S.W. After attending Yanco Agricultural High School, I continued the agricultural life and obtained a degree in Agriculture Science from New England. In 1973 I was appointed to Cobar with the Soil Conservation Service of N.S.W.

Being surrounded by scrub at Cobar it was natural to move into the investigation of "woody weed" ecology and control. I have been involved in various methods of shrub control; from fire, through goat grazing to total removal by mechanical means. The definitive answer is still elusive. Land survey and mapping, soil erosion control, cropping area development, urban planning, mine rehabilitation and of course, range management and condition assessment all contribute to make the work varied and interesting.

I am married and a daughter was recently added to the household. During my spare time I enjoy reading, gardening and playing sport, particularly Rugby Union.

Please let me know if you are having any troubles with the supply of Journals or Newsletters and I will do my best to rectify the problem.

**Australian Rangeland Society
Biennial Conference, 1986
University of New England,
Armidale, N.S.W.**

The next Biennial Conference will be held from 24th - 27th August, 1986 at the Campus Conference Centre, University of New England, Armidale. Wal Whalley, Greg Lodge and Guy Robinson (with assistance from various sources) are organising the Conference and hope to show you some real New England hospitality. We might even be able to turn on a snowstorm for those from the dry and dusty centre. We will be inviting papers in due course so start bringing off those brilliant breakthroughs for presentation. Also, those from far afield can start feeding up your donkeys for the long trek up to Armidale.

More information later,
Wal Whalley

Travelling Fellowships

Council has still not received any applications for fellowships. As it is now beyond the time limit set for applications this year, Council will leave it for next year.

**Advisory Committee on Science and Technology
— Australian Broadcasting Corporation**

Council received a letter from Professor Ron Brown, who is the chairman of the above committee. The relevant sections of the letter, explaining the committee's role, and calling for feedback from this Society are as follows:

"I would like to make contact between members of your Society and a Committee which I believe should be of interest to them, namely the Advisory Committee on Science and Technology to the Australian Broadcasting Corporation. I am currently Chairman of this Committee. The Committee is, in essence, a group offering advice to the A.B.C. in matters related to science and technology, particularly the programmes on radio and television that fall in this area. We are also seen as a link between the Corporation and the scientific community. In order to fulfil this role we are anxious to have some feed-back as to audience reaction to various scientific and technology programs. We particularly wish to obtain feed-back from members of your Society and would be ready to pass on any comments that we receive in writing or by telephone. Programmes on A.B.C. radio at present are Technology Report, The Science Show, Ockham's Razor, Science Bookshop, Science Review, Science Talkback, Warmboot and on television the new program Quantum.

At present it seems that the A.B.C. tends to receive letters or telephone calls from just a few particularly active listeners or viewers and so the responses may not represent a good cross section of audience attitudes. I am most anxious to encourage members of the scientific community to communicate with the Committee so that we can digest the opinions and comments and pass on such information. Naturally some people might prefer to communicate directly with the A.B.C. and we would not wish to inhibit this in any way, but apart from acting as a communications channel my Committee is anxious to inform itself of community views so that it can function still more efficiently as an Advisory Committee.

I should be grateful for any publicity that you can give this matter with your members. For general information the current membership of the Advisory Committee is attached."

The members of this Advisory Committee are:

- Professor Ron Brown
Professor of Chemistry
Monash University
- Dr. Owen Carter
Deputy Principal
Hawkesbury Agricultural College,
Richmond, New South Wales, 2753
- Dr. Keith Farrer
Scientific Consultant
40 Glen Ebor Avenue,
Blackburn, Victoria.
- Ms. Wendy Parsons
Science Journalist,
C.S.I.R.O. Division of Forest Research
P.O. Box 4008,
Queen Victoria Terrace.
Parkes, A.C.T. 2600.
- Dr. Diana Bell
Research Fellow in Anthropology
Research School of Social Science,
Australian National University, Canberra.
- Dr. Stuart McDonald
Snr. Lecturer in Science Policy
Department of Economics,
University of Queensland.
St. Lucia, Queensland, 4067.

New Members

- Mr. P. C. Anderson
"Huonville" Station, Via Broken Hill, N.S.W. 2880
- Mr. H. C. Bright
"Kimberly" Station, Broken Hill, N.S.W. 2880
- Mr. Chester Crossing
"Burta" Station, Via Cockburn, S.A. 5440
- Mr. Mark Crozier
"Cuthero" Station, Via Wentworth, N.S.W. 2648
- Mr. G. B. Cullenward
"Coan Downs", Mt. Hope, N.S.W. 2881

Mr. B. P. Cullinan
"Waukeroo" Station, Via Wentworth, N.S.W. 2648

Mr. Warwick G. Date
P.O. Box 286, Cobar, N.S.W. 2835

Mr. R. S. B. Greene
C.S.I.R.O., Deniliquin, N.S.W. 2710

Mr. Peter D. Houston
7 Kennaway Street, Tusmore, S.A. 5065

Mr. James Y. Jackson
502 Wyman Street, Broken Hill, N.S.W. 2880

Mr. R. O. Y. Jackson
"Cawkers Well" Station, Via Wilcannia, N.S.W. 2836

Dr. Gordon King
Dept. Agron. & Hort. Sc., University of Sydney,
Sydney, N.S.W. 2006

Dr. J. A. Ludwig
C.S.I.R.O., Deniliquin, N.S.W. 2710

Mr. G. R. Moore
P.O. Box 211, Cobar, N.S.W. 2835

J. H. & T. P. Morrissey
"Thundelarra" Station, Via Wubin, W.A. 6612

Mr. Mark Oliver
Dept. Primary Production, P.O. Box 2134, Alice
Springs, N.T. 5750

Mr. John A. Quilty
10 Turner Street, Warnbro, W.A. 6169

Ms. E. Quinlan
15 Baltic Street, Fairlight, N.S.W. 2094

Mr. Dugald Smith
"Tebin", Quilpie, Qld. 4480

Mr. H. F. Suddes
Dept. Agriculture, P.O. Box 531, Bourke, N.S.W. 2840

Mr. Ken Walker
Rehabilitation Officer, Box 655, Newman, W.A. 6753

Mr. Anthony G. White
"Wonnaminta" Station, Broken Hill, N.S.W. 2880

Ms. Carole Ann O'Dwyer
18 Yorna Road, Kalamunda, W.A. 6076

FROM AROUND THE TRAPS

Broken Hill Branch News

Geoff Woods
Department of Agriculture
Broken Hill

A well attended Annual General Meeting saw some new blood elected to the committee and heard Mr. D. Pearson, Western Lands Commissioner explain some of the proposed changes in the legislation dealing with the Western Division of N.S.W.

Election of the office bearers and committee resulted as follows:-

President	- Jake Bartholomaeus
Vice President	- Ian MacDonald
Secretary	- Geoff Woods
Treasurer	- Bill Tatnell
Committee	- Tom Cullinan, Kym Smith, Rick Taylor, Anne O'Connor, Charlie Carter.

The committee is due to meet shortly to begin preparations for next years functions.

SEMINARS AND FIELD DAYS

The Society has been active in the Broken Hill and West Gascoyne areas, organising and promoting seminars and field days on subjects of rangeland interest. In the last issue of Range Management Newsletter, most of the papers from a field day concerning the **Use of Goats for Shrub Control**, organised by the Broken Hill branch were included. One of the papers missed the muster and Daryl Green's paper is included here.

The West Gascoyne branch held a seminar on **Kangaroos in Rangelands** on August 23, 1985. The seminar was well attended and many pastoralists commented that the airing of facts and opinions was long overdue and well worthwhile. Peter Curry kindly agreed to review the seminar and his informative report is included in this issue.

The Effect of Goat Grazing on Vegetation

Daryl Green,
District Soil Conservationist,
Cobar, N.S.W.

The involvement of the Soil Conservation Service in the effect of goat grazing on the vegetation stems from two factors. The first is that the Service recognises the increasing growth of woody weeds as a form of rangeland degradation. The proliferation of woody weeds leads to the depletion of ground cover and this can lead to soil erosion problems from overland flow of water. Wind erosion can occur where channeling of windflow around clumps of shrubs takes place. The reduced grazing capacity of shrub invaded lands also puts more pressure on other areas. This can result in their decline in productivity, with eventual soil erosion problems. The other aspect of interest is to monitor the effects of the goats to ensure that their grazing activities do not lead to rangeland degradation and soil erosion.

The first point to note is that goats are similar to sheep and cattle in that they can live on a diet of accessible plant material, therefore if accessible plant material is limited then these species will be in competition with each other. Now while saying that; it is also true that differences between the species habits, abilities and tastes can result in them utilising different

types of plant material. The second point to understand is that any species of animal that utilises plant material can cause overgrazing, with subsequent soil erosion. This has occurred in various parts of the world. The combination of domestic stock and rabbits resulted in severe overgrazing of much of Australia's rangelands. In recent years, with significant rabbit control and rapid stock transport this problem has been considerably reduced. This is leading up to the often held idea that goats cause deserts. While this can be true, many desert areas support goats now, only because they are the only commercial animal that will survive after other stock have severely depleted the plant resources.

The point of this preamble is to reinforce that:

— Goats will compete to a varying extent with other stock and:

— Management of **vegetation** is essential whether running goats, sheep, cattle or a combination of them.

Now to what goats actually do to the vegetation.

They will not eat everything, they will have preferences and definite dislikes. They do eat a wide range of vegetation and will adapt readily between species if one becomes scarce or unpalatable. They generally prefer green vegetation to dry, therefore they will turn to shrub browsing when ground vegetation becomes dry and/or rank. Goats will generally consume some browse, if it is available, even if herbaceous species are readily available.

Preferences and dislikes occur with the browse species. Work that has been carried out shows that goats will not consistently eat certain species regardless of pressure. Unfortunately turpentine (*Eremophila sturtii*) falls into this category. Goats will readily browse rosewood (*Heterodendrum oleifolium*), mulga (*Acacia aneura*), emu bush (*Eremophila longifolia*) and narrow leaf hopbush (*Dodonaea attenuata*) and wilga (*Geijera parviflora*). Goats have a capricious nature and this is often exhibited by their attacking an unpalatable shrub for no obvious reason, they will break down branches, strip off leaves, bark etc. This may kill odd plants but for problem species such as turpentine the action has little effect on the total population. Goats will eat bark off trees and shrubs. Often this occurs when insufficient other food is available and is a sign that the goats are stressed, however when there is lush feed, and very little browse available, goats may seek out bark to maintain a high fibre content in their diet.

From observations and studies I have made there is no doubt that goats can be used to control narrow leaf hopbush. It may also be possible to make money out of goats while they are doing this. The decision that needs to be made at the start of the programme is whether or not the operation is for the removal of hopbush or for a goat producing enterprise. If goat production is the aim then it is definitely desirable that the browse is not eaten out - it will need to be managed so that it is retained as the standing "haystack" for goats during dry times. If removal of hopbush is the aim of the exercise then this must be carried out in such a way that pasture species do not suffer any long term degradation. There is no doubt that grazing by goats at heavy rates can seriously damage country, as can severe overgrazing by any stock.

Another aspect of goat grazing to be considered refers to species other than the target one. There is concern that unpalatable species will increase under goat grazing. Our results are not yet long term enough to determine whether this is true or not. There is every reason to believe that unpalatable species will continue to increase, but at a faster rate or not is unknown. The effect of goat grazing on a desirable tree or shrub species needs also to be considered. Long term protection to seedlings of these species may be needed to ensure their survival. While sheep will graze these species as well, actual grazing height differences between sheep and goats means that establishing plants need to be protected from goat grazing for a much greater time.

Summary

Monitoring of the effects of goat grazing on various types of country is being carried out by the Soil Conservation Service. The longest period of records is only six years so results are still inconclusive.

Indications at this stage include:

— Mulga is heavily utilised by goats but is not easily killed.

— Narrow leaf hopbush is heavily utilised and relatively easily destroyed by continuous browsing.

— "Blitz" grazing of land will denude it of browse and ground species, but not unpalatable species.

— Regulated grazing will result in utilisation of browse and maintenance of ground cover.

— Where a dense overstorey of shrub is reduced by goat grazing a response from ground species can be expected.

— Removal of palatable shrubs by goats may give unpalatable species a competitive advantage, therefore alternative shrub treatments must also be considered.

Seminar - West Gascoyne Branch Kangaroos In Rangelands

Peter Curry
Department of Agriculture
South Perth, 6151

For those who had patiently planned and re-planned this seminar held at the Carnarvon Yacht Club the throng of registrants who crowded into the hall on the morning of 23rd August, 1985 was sweet reward. For the first time, front runners in the kangaroo debate had been roped in from Paris, Perth, Canberra and Kununurra, to present their findings or arguments to a forum dominated by pastoralists.

Under Brian Wake's Chairmanship, Phil Lockyer, M.L.C. gave a lengthy opening address. (having been persuaded to do so by John Morrissey) quoting from Voltaire. The programme of major presentations began with MALCOLM FORBES of the Australian National Parks and Wildlife Service who addressed the question 'How many kangaroos are there in our rangelands?'

Malcolm outlined the development of aerial survey techniques and the methods now used to obtain the

best possible estimates of kangaroo numbers over very wide areas of the continent. It is now possible for two trained observers to make highly repeatable counts over transects of one square kilometre, using correction factors for "sightability" in different areas. Absolute figures are really only conservation estimates; it is the trends that are most important. Surveys in 1980-82 revealed populations totalling about 19 million for the four large species (red, eastern grey, western grey and euro or wallaroo). A smaller scale survey in 1984 gave estimates of about 10.7 million, which for various reasons was considered to be an under-estimate by perhaps four million. In Western Australia, densities of grey kangaroos are low, at 1-2 per square kilometre compared with 10-20 per square kilometre in New South Wales and Queensland. Even so, western 'roos are thought to have increased considerably between 1981 and 1984, at about 16 percent annually for western greys and 25 percent annually for reds.

Malcolm emphasised that these numbers reflect much higher population levels being enjoyed by kangaroos now than in pre-settlement times before pastoral development. Such effects are seen vividly when comparing densities across the 'dog fence' in the east: they are ten times greater on the inside of the fence beyond the dingoes. Malcolm also touched upon the potential impact of losing the export market to Europe where a total ban is currently being lobbied at the European Parliament. A representative of the Parliament's Environment Committee has been invited here to see the situation at first hand. Currently, 76 percent of kangaroo exports go to Europe.

TONY OLIVER from the Western Australian Agriculture Protection Board then brought people up to date on aspects of his long-term research on the red kangaroo in W.A. In '**New Perspectives on the Red Kangaroo**,' Tony spoke of the historical accounts we have as baseline material, such as John Forrest's notes on local abundances of kangaroos, which correlate well with the very limited former distribution of permanent waters.

Research on the Fortescue River revealed that dingoes selectively prey on very young and old kangaroos. Age-sampling (by dentition) reveals gaps in the age distribution of kangaroo populations, and these gaps relate to drought periods when reproductive rates are low. Investigations of dispersal patterns by marking the animals with neck collars, showed that most 'roos remained around their area of capture, up to 6 years after marking. Sub-adults moved rather more, dispersing in random directions. Under drought, some adults moved (mainly S & SE) but most 'stayed around'

By radio tracking some adults, Tony found that most adult breeders possessed small almost mutually exclusive home ranges, well away from station improvements and spanning two or more types of soil and vegetation. Recent rainfall and seasonal conditions dictate which of the plant communities they will spend most time in. General movements from one community in which they are very visible, to another in which they are not, can give false impressions of population change or migration.

Most 'migrations' reported as such are accounted for by local movements. Populations show regional variations and adaptations, which have implications for management purposes. Tony's final salvo of data showed that shooters who select adult males do nothing to decrease female fecundity.

GEORGE GARDINER of the Western Australian Department of Agriculture then gave an account of '**Kangaroos and Range Condition**' or, more specifically, how he set about answering a question "Do Kangaroos affect the rate at which rangeland can recover when spelled?"

George summarised findings from ten years of study into shrubs and perennial grasses at Yeelirrie in the semi-arid mulga lands of W.A., where the station had been de-stocked when the lease was transferred to Western Mining Corporation in 1972. Exclosures were fenced off in 1973, to exclude any grazing by kangaroos, populations of which were otherwise present and not interfered with. The following years fell into three distinct climatic periods (I suspect divine intervention here - PJC): Three 'wet' years, followed by four 'dry' years and then three 'average' years. George outlined the patterns of mortality and recruitment for various species during these periods both inside the exclosures and 'out' with the native herbivore populations. He tested these results against specific hypotheses about changes in the populations. This showed several interesting and important things about the ways in which the grazing and browsing of kangaroos affected the perennial plants. These included findings that (a) species that could be classed as desirables for sheep grazing increased during the wet period but did so considerably faster inside the exclosures than outside. (b) the desirables continued to increase during the dry years inside the exclosures, and (c) following the dry years they increased much more than the grazed plant populations did during the 'near average' or 'normal' seasons more recently.

George and Tony Oliver then put this demonstration of kangaroos' ability to check, or to cause actual declines in populations of desirable perennials together with other knowledge of the capacity of individual watering points to maintain kangaroo populations over a wide area. The implication is that spelling paddocks can enable depleted perennial populations to recover, but only where kangaroo grazing pressure is sufficiently low. This is best achieved by spelling and closing off waters over a whole section of a station. Spelling a single paddock is likely to be less effective because it is always liable to 'invasion' by kangaroos from surrounding paddocks.

KEIRAN McNAMARA of the Western Australian Department of Conservation and Land Management spoke about management principles and practices under the heading '**Management and Conservation of Kangaroos in Rangelands**'. Keiran explained how State government controls operate throughout the industry, defining objectives, deciding on quotas and regulating shooting by the carcass tagging procedure and compulsory shooter's returns. The management programme aims to conserve populations of kangaroos

across their natural range while at the same time containing their adverse effects on primary production. The policies and practices of kangaroo management in Western Australia will continue to be the responsibility of the Minister for Conservation and Land Management, with advice from the Kangaroo Management Advisory Committee.

The Council of Native Conservation Ministers (CONCOM) recently endorsed a 'Code of practice for the humane shooting of kangaroos'. This is available as a booklet distributed by ANPWS. Its recommendations are currently being considered by the state authorities. Keiran distributed copies of the code among the audience. To quote from the code itself,

"The Code is divided into three sections covering the method of shooting, despatch of injured kangaroos and pouch young and shooting for scientific purposes, and has three schedules specifying firearms, ammunition and points of aim. In each section an introduction provides background to the conditions which must be adhered to by all persons shooting kangaroos?"

The other part of Keiran's talk centred on the changing status of four species of macropods across Australia. While the 'big four' have flourished and are generally considered to require management, no less than thirteen other smaller species have become endangered or extinct since settlement. The main factors in their demise appear to have been (not necessarily in this order):

- Destruction or alteration of habitats
- stocking and the changes brought about by grazing animals
- changes in the frequency and use of fires i.e. the cessation of Aboriginal burning practices.
- other introduced animals (foxes, rabbits, cats etc.)

There are no instances of a macropod's demise being solely attributable to shooting, although possibly this was a factor in the presumed extinction of the Toorlache Wallaby.

MIKE YOUNG of C.S.I.R.O. Division of Wildlife and Rangelands Research (Deniliquin) had hardly had time to say "ca va" from his newly seconded desk at the OECD in Paris before being whisked back to present his synthesis of '**Kangaroos and Economics**'. Mike opened with a perspective of possible stances that governments could take over their attitude towards the kangaroo industry. There was a continuum from the position that it was immoral to shoot kangaroos, through allowing shooting for damage mitigation to allowing an industry constrained by conservation issues, to at the extreme of support, encouraging the development of a sustainable industry with as few controls as possible.

Mike's analysis of the industry in N.S.W. revealed that average net income to a shooter was only \$1.16 per kangaroo. The shooters themselves are a cross-section of ordinary rural workers and farmers, most of whom shoot kangaroos to supplement their incomes. Only a small proportion of shooters make enough money to live well from shooting without taking up other employment, at least seasonally. Net incomes from shooting average \$9,361 per shooter.

Pastoralists have their income reduced by kangaroos in several ways. Their stock have less forage, they lose management opportunities, fences get damaged,

shooting can incur net costs. Numbers that can be harvested per year over any area before populations become reduced will vary accordingly to population density, seasonal conditions and so on. Mike mentioned various technical restrictions and quotas imposed by state agencies. While so far the kangaroo industry has operated on a basis of low profitability per head, it would take a price rise of 400 percent to spring the kangaroo meat industry into a new era, with 'kangaroo ranging' as a major form of economic land use.

Alternatives to kangaroo shooting industries in their various forms make little economic sense. Shooting (without carcass utilisation) by government agencies would be likely to cost about \$9 per kangaroo. Without provisions for sale, landholders would continue to shoot, culling mainly young does. In some instances, shooting and poisoning could cause periodical near-eradication over some areas. If shooting were banned altogether, illegal control procedures could, whether intentionally or not, bring about local eradication.

MIKE McGRATH from the Western Australian Conservation Council then gave '**A Conservation Perspective**'. Mike had the unenviable task of standing alone to summarise the various positions held by conservation groups and to defend the ground taken up by the Conservation Council.

Their policy entails opposition to the kangaroo products industry, rather than the killing of kangaroos. Mike argued that the Council recognised the conflict between kangaroo populations and agricultural/pastoral pursuits, but that the competition between them was not as widespread or as significant as is widely assumed. Moreover, the kangaroo products industry is not an appropriate mechanism for resolving the conflict and its very nature represents a potential threat to the survival of the populations. Most importantly, a kangaroo products industry is based upon the exploitation of wildlife and is thus unacceptable as a wildlife management tool.

Mike continued with a summary of the values humans ascribe to different groups of animals. Wildlife is made up by the animals we have chosen to leave alone. The kangaroo products industry is now the largest commercial kill in the world, so why are surprised that so many people - worldwide oppose it? The Australian people have declared that kangaroos are wildlife and should be protected accordingly. Mike pointed out that these arguments are philosophical but he would make no apology for that. The industry would always be a threat to kangaroo populations, and the pressures would grow if the real value of kangaroo products increased.

Knowledge of kangaroo populations was far from comprehensive and not yet an adequate base for regulation. The extent of illegal shooting was another problem unknown. Mike challenged any of the experts present to guarantee that the industry will not adversely affect the conservation status of any of the populations. Government policies on the export prohibition of various common birds (e.g. galahs) were inconsistent with maintaining a kangaroo industry, being based on an argument that establishing export industries would lead to excessive exploitation!

The Conservation Council does not advocate sacrificing the pastoral industry to maintain the wildlife status of kangaroos. Rather, that more funds should be allocated to investigate the interface of wildlife with domestic stock. To date, the industry has not operated as an effective means by which local concentrations of kangaroos can be controlled and possible environmental damage thus avoided. Where clear evidence of unacceptable levels of conflict is shown between kangaroos and grazing animals or their resources, then provided the regional conservation status is not endangered, a specified cull of kangaroos could be taken by a contract shooter.

TONY OLIVER then read through **TREVOR DALY'S** paper "**Its the kangaroo industry protecting Australian agriculture**" by Greenpeace Australia. Greenpeace had been invited to attend but were unable to do so. In fairness it should be noted that this Seminar was held in only a couple of weeks after the bombing of the 'Rainbow Warrior', so Carnarvon was probably a little down Greenpeace's list of priority engagements. Rather than trying to summarise the whole paper, readers who would like to peruse it in full can obtain copies from A.R.S. West Gascoyne Branch, c/- Department of Agriculture, Carnarvon. One paragraph of Trevor's paper is, I feel, particularly worth quoting in full.

'Greenpeace's policy is that if there is a serious problem with kangaroos on any one property, then the need for control should be verified as genuine and dealt with, if at all possible by the use of non-lethal methods. If lethal methods must be used, then they should be humane with no commercialisation involved'.

JIM DALY, retired pastoralist, then took the lectern to describe how entrenched 1950's attitudes favouring exterminating kangaroos evolved through discussion. Pastoralists' requests finally resulted in the establishment of the Western Australian Red Kangaroo Management Advisory Committee.

In 1966 Jim took on Errabiddy Station (94,000 ha) in the Upper Gascoyne. Although in fairly good order it was quickly apparent to Jim that wool production on this property would make little progress carrying the numbers of kangaroos that it did. Jim began controlling kangaroos and took off 10,500 animals over a 15 month period. Some 30,000 kangaroos were shot there over 12 years. When the paddocks were relieved of these pressures, grazing productivity righted itself, wool production rose and remained well up on previous clips. When Jim left Errabiddy, red kangaroos were still common throughout the property.

BRUCE TEEDE of the Kangaroo Shooters' Association then put the case that any animals killed should be utilised. Greenpeace's publicity campaign had a temporary unsteady effect on the market of skins, which had otherwise been steady. Before the market for skins was established, shooters took half carcasses, leaving the 'tops' in the bush. The domestic demand for pet meat is declining. Bruce felt that the compulsory dye-branding of carcasses will counteract any potential increases in human consumption because

it spoils any visual attractiveness to meat buyers.

The kangaroo industry has, in effect, already saved the kangaroo from any threat of extinction, but it is feeling embattled from the pressures brought to bear by interest groups. If the industry died out, pastoralists would have to bear the cost of controlling kangaroos.

NEIL HOGSTROM of the Agriculture Protection Board summed up what had been a very full day's proceedings and everyone went off to refresh themselves.

I came away from what had been an enormously successful distillation of knowledge and views with a few notes that, as you will all have gathered by now, do little justice to the contributors. For that I apologise but all through the day I couldn't stop wondering where the debate was leading us. On the positive side of things the research base on which to make management decisions has borne quite a lot of fruit in recent years. That uncontrolled grazing by kangaroos does degrade the productive base for pastoralism has been demonstrated, but it took years of research to do so. Clearly, there is ground on which negotiations can proceed between the conservation movement and the producers, in that where actual or potential damage to the resources base can be demonstrated, the need for control is recognised by both parties.

On the other hand as things stand I doubt that we have any hope of redressing the balance of propaganda apparently being spread, professionally and efficiently, by Greenpeace in Europe and the U.S.A. The West Gascoyne branch asked Greenpeace if we could screen a copy of 'Goodbye Joey' or the newer release, but to no avail.

FEATURES

Caterpillars and Saltbush at Kars

Tom Hughes
"Kars" Station
via Broken Hill, N.S.W.

I consider Euroa paddock, which is about 8,000 acres to be some of the best country on Kars; extremely flat and open, with hardly any timber.

It was predominantly saltbush (*Atriplex vesicaria*) when I came in 1972 and for four years was stocked with approximately 100 cows and calves during some very wet years.

In 1977 we had a slight drought and by that time had moved back into sheep which were conservatively stocked at between 700 to 1000 in total, including lambs, in this paddock. This rate was continued through the good average rainfall years 1978, 1979, 1980 and 1981. In the winter of 1981 we had the wettest period since 1974 with approximately 5 inches for May, June and July.

By spring of 1981 this paddock was spread with a terrific covering of saltbush mixed with grasses and herbage, when the grubs and caterpillars suddenly appeared.

These grubs are about one inch long, light-brown to white in colour when removed from their cocoon of sticks. They secrete a strong glue and then proceed to join small pieces of stick about 10mm long into their bodies resembling a miniature porcupine. Thus armed, they are camouflaged and entirely safe from birds and other predators, and they proceeded to eat every leaf off the saltbush. I estimate that from October to December 1981 they entirely defoliated 80 percent or the equivalent of good acres of the best saltbush on Kars.

They couldn't migrate in any direction as they were surrounded by entirely different country; bluebush timber; Stephen's Creek flats and some spear grass country which was the original Kars 'Horse Paddock'. So having eaten and ruined the saltbush, they hibernated into the holes on every fence and strainer post around the paddock and are still there today. They are effectively collecting dust and dirt around themselves and will eventually rust out all the wires.

Following this, in 1982 we had the worst drought since 1945 and the paddock had to be restocked and the sheep fed off what little remained of the saltbush.

With the breaking of the drought in 1983 and a wet year in 1984, the bush has probably recovered to 30-40 percent of its original state. Many of the bushes are just alive with approximately 20-30 percent cover but with a lot of dead sticks on them.

So that is how things are at present, with the stick grubs sitting in the fence posts presumably waiting for the bush to recover for them to have another go.

The final message from this is that if a conservationist had seen this paddock during the 1982 drought, he would have sworn that the country had been flogged out by sheep, whereas in fact just the opposite has occurred!

Eds note: These caterpillars have not been restricted to Kars Station. They have also been involved in the death of large tracts of saltbush on the Riverine Plain between Hay and Ivanhoe and on properties south of Broken Hill. Perhaps others who are as observant as Tom may care to tell us of their experience.

(Further Editor's note: This article by Tom first appeared in the West Darling Soil Notes and is reprinted here as an item of general interest).

Trough versus Tank Salinity in the Carnarvon Basin

**Nick Casson
Bunbury, W.A.**

During the year 1984 a unique opportunity to survey tank and trough salinities in the Carnarvon Basin of Western Australia presented itself. The survey was under the auspices of the Western Australian Rangeland Monitoring System (WARMS); a scheme which is concerned with monitoring the rangelands of the state with a view to making improvements to short and long term management practices. Under this scheme monitoring site placement is dependant on the salinity of the nearest drinking water and thus a large number of watering points were visited.

The reasons for taking the two salinity measurements throughout the survey was to determine whether there was a difference between paired troughs and tanks. Hence the presence or absence of such a difference could be assessed in relation to cleaning practices and their possible consequences.

Methods

Water salinities were determined at watering points appropriate to WARMS sites of twelve stations in the Carnarvon Basin. Three replicate samples were taken from the tank and trough at each point (in the field, tank salinities closely resembled their respective bores). The salinity meter used was a Rimco calibrated for parts per million (NaCl ± 1 per cent error).

Results

There was a clear difference between the salinities of tanks and troughs. The average for the troughs (808ppm) was 34 percent more saline than that for the tanks (604ppm).

Discussion

The finding that trough salinities are higher than those of associated tanks has direct bearing on cleaning. For it confirms that this is a necessary practice. It is necessary for two reasons which are related to sheep physiology and grazing behaviour. Firstly it is established that in sheep salinities of greater than 2 percent cause kidney damage and lower production (1). It is also known that the distances which sheep will travel to fodder are reduced by higher water salinities (2). Hence the area of paddock being used is decreased. Both are undesirable to management.

The long term management of each paddock may be affected by the salinity at each watering point. This is because the placement of each WARMS monitoring site will be affected by water salinity fluctuations. For instance a site based on a false high waterpoint salinity might be placed too close to that water and monitor signs of excessive grazing; despite grazing actually being spread further afield. The true existing paddock condition would not be monitored as a result.

It is clear that the means of reducing trough salinities (such as regular cleaning and building troughs with less surface to volume) are in the short and long term interests of all managers of rangelands.

References

- (1) W.A.D.A. Farmnote #3/82 (Agdex 400/582) "Livestock and water salinity".
- (2) Rural Research (C.S.I.R.O.) March 1976 pp5-8 "When sheep drink salty water".

(Editor's note: In case you're wondering, WARMS stands for Western Australian Range Monitoring System).

Cattle Trap Yard Design

Brian Fielder
Brooking Springs Station
Via Fitzroy Crossing

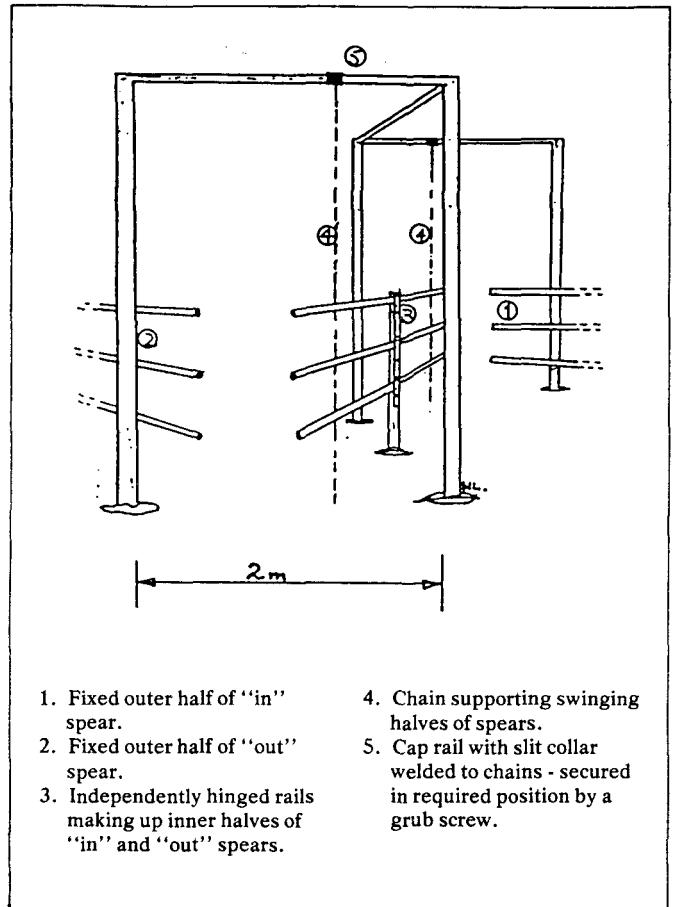
In my experience, a permanently set, two-way bayonet type of trap is the best system for trapping cattle. I have found that one-way traps can take a day or so longer to trap cattle than two-way spear traps. This is because permanently set two-way spears (trapping onto and away from waters) train cattle to always walk through spears to get a drink. Conversely, when one-way spears are suddenly set to trap cattle the animals tend to hang back and seek water elsewhere. I have known cases where older bullocks have died rather than walk through a freshly set one-way set of spears. This seems to happen most where the one-way spears are a long way from the watering point.

Two-way spears (trapping "in" and "out") have been constructed at Brooking Springs and work well. The "in" spears are constructed about 6 meters from the end of the water trough, furthest from the float valve. As cattle tend to commence watering at the float end of a trough (cooler, fresher water) there is a minimum amount of obstruction to more cattle entering the spears.

The design I use is based on cheap sources of steel rather than bush materials and cost around \$3500 for two-way spears, trap yard and a 75ha (185 acre) holding paddock fence. The costs are itemised:-

Traps and Trap Yard

4 x 4.2m old telegraph posts cemented 1.2m in the ground
 20 x 2.2.m old telegraph posts cemented 1.0m in the ground
 60 x 4m x 5cm diam. tubular steel rails @ \$14/4m length
 Weld mesh for trap yard



1. Fixed outer half of "in" spear.
2. Fixed outer half of "out" spear.
3. Independently hinged rails making up inner halves of "in" and "out" spears.
4. Chain supporting swinging halves of spears.
5. Cap rail with slit collar welded to chains - secured in required position by a grub screw.

\$ 68 (inc. labour)
 \$ 320 (inc. labour)
 \$ 840
 \$ 140

 \$1368

Holding Paddock Fence

350 pickets
 Tie wire
 24 coils Barb wire @ \$46
 3 strainer assemblies @ \$6000 (telegraph posts, tubular steel, cement)

\$ 800
 \$ 68
 \$1104

 \$ 180 (inc. labour)
 \$1432

Sub-total \$2800

Labour, tractor fuel, welding rods \$ 700

Total \$3500

(N.B. This does not include the cost of the trough, but does include the cost of the trough head rail. Obviously the cost of a windmill and tank are not included!)

Steel costs have been minimised by using old telegraph posts and relatively cheap Taiwanese tubular steel.

Some may think this design is expensive. However, I feel that the maintenance free advantages of this long-

lasting structure will more than pay for itself over an expected life time of say 20 years. The annual depreciation cost of this type of structure is a fraction of the costs incurred in conventional mustering. I accept that a steel structure would not be suitable for salt affected coastal areas, but is suitable for most Pindan sites. This steel design could be used on River Frontage soils if or where trapping is feasible.

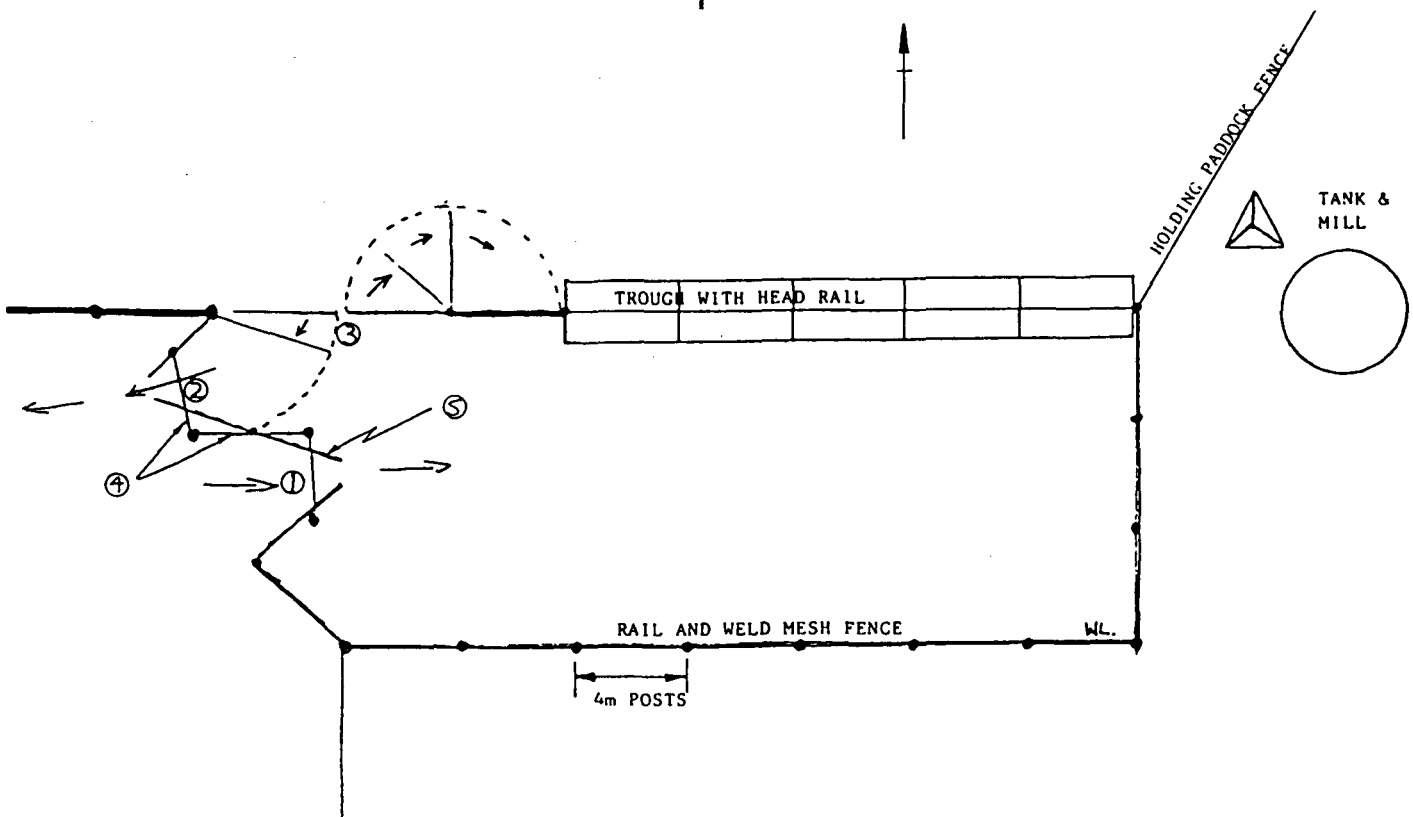
The accompanying diagrams help to explain the design. My spears consist of fixed outer halves, with the inner halves in the "in" and "out" spears individually hinged on a common central steel post. The swinging ends of the three tubular steel spear rails are supported by a chain from an overhead cap rail. The chain is welded to a slip collar of tubular steel which can be slid along the cap rail and secured by a grub screw at the required spear opening. The bottom of the chain is secured to the ground.

The gate which opens the holding paddock also shuts off the "out" spear thereby saving on materials. The "out" spear must be next to the holding paddock gate to maximise the smooth flow of cattle through the "in" spear to water and then from water into the holding paddock.

The trap yard around the water trough is 30m x 15m and is built of old telegraph post uprights 4m apart with top rail at 1.2m, bottom rail at 0.3m and weld mesh between. The trough is positioned between the trap yard and the holding paddock so that cattle can water from either side when cattle are being trapped. The trough is fitted with a head rail.

The system works well, helps to minimise mustering costs, and should give trouble free service for many years.

(Editor's note: This article first appeared in the Kimberley Pastoral Memo, and it is reprinted here as I felt it may have wide application.



HOLDING PADDOCK

1. "in" spear.
2. "Out" spear.
3. Gates into Holding Paddock
- one opens flat against fence, while the other closes "Out" spear.
4. Cap rail.
5. Suspended spear rails.

NOTICES

The Winston Churchill Memorial Trust

The Churchill Trust invites applications from Australians, of 18 years and over from all walks of life who wish to be considered for a Churchill Fellowship to undertake, during 1987, an overseas study project that will enhance their usefulness to the Australian community.

No prescribed qualifications are required, merit being the primary test whether based on past achievements or demonstrated ability for future achievement.

Fellowships are awarded annually to those who have already established themselves in their calling. They are not awarded to students or for basic study, nor for the purpose of obtaining higher academic or formal qualifications.

Details may be obtained by sending a self-addressed stamped envelope to:-

The Winston Churchill Memorial Trust
GPO Box 478, ACT 2601

Completed applications forms and reports from three referees must be submitted by Friday, 28th February, 1986.

The Churchill Trust is concerned that people may not realise that fellowships from this organisation are available to all Australians. They have provided the following series of questions and answers.

Truth Revealed About Churchill Fellowships

Q.- The Churchill Trust in Australia is part of an international organisation which was set up to provide opportunity for people with high academic qualifications to study overseas at Universities?

A.- Wrong! The Churchill Trust of Australia is a wholly Australian organisation set up to give opportunity for overseas study to all Australians regardless of academic qualifications.

Q.- Well, even so, The Churchill Trust is an elitist organisation which deals mainly with people who are leaders in their field?

A.- Wrong! The Churchill Trust offers Fellowships to all Australians who have demonstrated ability and show determination to strive for excellence by study or observation overseas.

Q.- May be, but only a few people can afford to go on a Fellowship?

A.- Wrong again! The average Churchill Fellow goes overseas for about three months - fares and tuition fees are paid, and adequate living allowance is provided and family allowances are available in some circumstances. Most employees are so pleased with the honour and opportunity given to their employee that wages are continued in full or in part.

Q.- Well, anyway, I'd never get one.

A.- Right this time - if you do not apply. But if you write to the address shown in the accompanying advertisement asking for an Information Brochure on the Fellowships available in 1987, you could learn about the opportunity of a lifetime.

New reading from CSIRO

What is CSIRO doing to keep Australia ahead of the field in wool-growing and marketing? How is CSIRO planning to meet the threat of exotic plant and animal diseases? What can we do about soil erosion?

These are some of the questions answered in a new series of booklets from CSIRO. Called **CSIRO Research for Australia**, the series shows how Australia's largest research organisation is tackling the major technological problems facing the country.

The first two booklets in the series, on energy and advanced materials, were published recently. The rest will be released at intervals over the next twelve months.

The titles likely to be of most interest to the rural sector are: **Agriculture; Biotechnology; Conservation and the Environment; Eating, Working, Living and Health; Foods; Forests and their Products; Information Technology; International Activities; Land Management; Water; Weather and Climate; Weeds and Pests; and Wool Textile Research.**

Each booklet costs \$7, plus \$1.80 for packing and postage. If you are interested in being advised when particular booklets are published, write to:

**CSIRO Research for Australia,
P.O. Box 4615,
Melbourne, Vic, 3001.**

Second International Symposium on the Nutrition of Herbivores

The Symposium is being organised under the auspices of the Australian Society of Animal Production, by Dr. J. H. Ternouth (Chairman), University of Queensland and Dr. D. J. Minson (Deputy Chairman), CSIRO. The symposium will be held at the University of Queensland, Brisbane, Australia; July 6 - 10, 1987. To obtain further information, or a copy of the first circular, contact:

**The Secretariat
Second International Symposium on the Nutrition of
Herbivores
c/- Department of Animal Production
University of Queensland
ST LUCIA, Queensland 4067
AUSTRALIA
Telephone (07) 377 2088 International 61 7 377 2088
Telex UNIVQLD AA 40315**