The Australian Rangeland Society

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Range Management Newsletter

Official newsletter of the Australian Rangeland Society

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P.O., Deniliquin, N.S.W. 2710

No. 76/3 September 1976

GENERAL MEETING OF THE SOCIETY

Council hopes to hold a meeting of the Society at Broken Hill on July 8, 1977. It is being organised to follow the meeting of the Fowlers Gap Consultative Committee which, it is expected, will take place on July 7th, 1977.

The venue for the meeting will be the W.S. Robinson College at Broken Hill.

The meeting will be in three parts:

1. A business meeting.

2. Two invited papers concerned with the social, economic and administrative milieu of past, present and future pastoralism.

   It is expected that these papers will be each of 30 minutes and will be followed by 15 to 20 minutes of discussion.

3. Submitted papers.

   This section will deal with contributed papers from the membership on any theme consistent with the aims of the Society.

Form of the meeting

Papers will be presented in natural groupings by a reviewer who will be instructed to chair a discussion period dealing with the papers pertinent to his group. If insufficient papers are received authors will be asked to present their papers in person or by proxy arranged by the author.

Length of papers

Papers should not exceed 2,000 words and should be accompanied by clear graphs and tables, where necessary, presented in a form suitable for reproduction in the working papers.

Papers should be submitted no later than February 28, and should be sent to the Hon. Sec. A.L. Payne, Department of Agriculture, Jarrah Road, South Perth, W.A. 6151.

Working papers

Council will collate the papers received and have them available as working papers for the meeting. They will be available to the reviewing chairman one month prior to the meeting.

Publications

The Editorial Committee will be pleased to view papers for the Journal from those who submit them to the meeting. However, publication will be a matter for the Committee to arrange with authors.

Things to do now

Fill in the attached form and return it with a summary of your paper if you intend to present it. The summary need only be two or three sentences, sufficient to enable the Council to allocate papers to the appropriate section for the meeting.

EDITOR'S JOTTINGS

This issue of the Newsletter includes news and comments covering a broad spectrum of the Society's interests. All matters are worthy of your thoughtful attention. Some items call for a specific response. They are: the notice of the Society's meeting in Broken Hill; the note on the 'Rangeland Ecology' course; and comments on 'Professionalism in Range Management' and 'Range Trend for Pastoral Inspectors'. Please feel free to put pen to paper on any aspect of the articles in the Newsletter or any other matters related to the aims and interests of the Society.

Copy for the next issue is required in Deniliquin by 30th November 1976

The first volume of the Journal of the Australian Rangeland Society has now been printed and distributed to members. Any non-members interested in subscribing to the Journal should write to the Business Manager, Australian Rangeland Society, 54 Broome Street, Cottesloe, W.A. 6011.

Individuals writing to join the Society, and individuals and institutions wishing to subscribe to the Newsletter only, should contact Mr. K. M. Howes, Australian Rangeland Society, CSIRO, Private Bag, P.O., Wembley, W.A. 6014.

MEETING AT KALGOORLIE

Alan Payne, Hon. Secretary

As a good number of delegates to the recent Arid Zone Conference were Society members a general meeting of the Society was held at Kalgoorlie on July 14, 1976. About 32 members (and numerous visitors) attended the meeting which was chaired by the President, David Wilcox.

The Treasurer, Malcolm Howes, reported that funds on hand approximated $2,000 of which about $1,000 would be spent on the first edition of the Society's Journal, due out shortly. Planned output for the Journal was 450 copies and demand was expected to result in 100 copies being left for back issues. David Goodall suggested that 450 copies might be insufficient and the Treasurer agreed that the final number for printing would be reviewed.

Talking of the Journal the President expressed gratitude to the Editorial Committee led by Graham Harrington, to the Editor and Treasurer, Malcolm Howes, and to his fellow members on the Editorial Board. He also thanked Graeme Tupper for his efforts with the Newsletter and called for further contributions emphasising once again that there was no editing. Anything pertinent and not libellous would be accepted.

The President asked the Membership and Editorial Committees to report briefly on their activities.

Brendan Lay reported on his activities in soliciting membership in South Australia and recruiting assistance to solicit members in other States. About 17% of S.A. members were pastoralists, which was considerably better than from the other States. Total membership is nearing the 200 mark, which is encouraging.

Graham Harrington for the Editorial Committee thanked contributors, referees and the editor, and Ray Perry for the use of CSIRO facilities. A number of questions about the "scientific" standard for the Journal arose. Members agreed that a high standard was required but that the Journal should provide scope and provision for those outside what was normally regarded as the scientific field. These factors had been considered and the Journal was aimed at all members. Scientific and operational articles were required. Material of good general standard could come from all disciplines and interests and future contributions should be forwarded to Wal Whalley, University of New England at Armidale, N.S.W.

Members were asked to consider the date and venue of the next scientific meeting. One suggestion was in late March 1977 at about the same time as a proposed Administrators' Conference at Wilpena, South Australia.

During the course of the meeting a question as to the aims of the Society was put. With some little passion the President briefly but successfully, waxed eloquent about the noble aims of the Society. A number of visitors clamoured to join up immediately.

After the meeting a cross-section of Western Australian clarets and ports were paraded for members, friends and visitors to sample. The remainder of the evening was a roaring success.

A NORTHERN SLOPES AND TABLELAND SUB-COMMITTEE OF THE A.R.S.

John A. Taylor, School of Natural Resources, The University of New England

In June and July of this year a circular was sent to a number of individuals, institutions and organizations in the Northern Slopes and Tableland region of N.S.W. announcing the inauguration of the Society, explaining the concept of rangelands and inviting response on the feasibility of forming a local sub-committee of the Society.

The respondents included graziers, research personnel and officers of the Soil Conservation Service, Pastures Protection Board, Forestry Commission, Department of Agriculture and the National Parks and Wildlife Service. To date, one negative and 39 positive replies have been received. The dissenter considered that the Society's objectives were covered by those of A.S.A.P. (Australian Society for Animal Production). Twenty of the positive replies were from persons who either intend to apply for membership or are already members of the Society. The remainder wished to be kept informed of Society activities.

On the basis of this response, the formation of an informal Northern Slopes and Tableland sub-committee would appear justified.

To launch the sub-committee a meeting will be held at 8.00 p.m. on Thursday 2nd September in the Rural Science Lecture Theatre No.2 at the University of New England;

a) to elaborate on the concept of rangelands for new and intending members,
b) to explain the formation of a sub-committee rather than a 'branch',
c) to establish the role of the sub-committee in achieving the Society's objectives,
d) to form a small *ad hoc* steering group to assume some of the responsibilities associated with the management of the sub-committees' affairs,
e) to evoke discussion on some possible topics for future meetings,
f) to consider a proposal that at this stage the only office be that of chairman.

It is proposed that at the end of a meeting a topic for discussion at the next meeting be adopted and an appropriate chairman appointed from within the sub-committee. The chairman would be responsible for developing the topic, organizing speakers etc., and presiding over the business of the next meeting to the stage where a new topic be adopted and another chairman appointed.

Information on all future sub-committee activities will be submitted to the Range Management Newsletter.

'RANGELAND ECOLOGY': A UNIVERSITY COURSE IN RANGELAND SCIENCE

Martin Andrew, Botany Department, University of Adelaide, North Terrace, S.A. 5000.

'Rangeland Ecology', an optional part of Botany III at Adelaide University, was introduced six years ago by Dr. Bob Lange, and has been run by him and his research students. Its underlying aim is to educate students in ecology within the real life context of an arid zone sheep station (Middleback Station, 19 km west of Whyalla, S.A.; Vegetation: shrub steppe of saltbush (*Atriplex vesicaria*), bluebush (*Maireana sedifolia*), with scattered myall (*Acacia sowdenii*) overstorey). The course is run in January, and time is spent both in Adelaide and at the station. The class, consisting of 15-25 local students and a smattering of outsiders, stays in the shearers' quarters as guests of Andrew and Don Nicholson (both A.R.S. members). Their magnificent co-operation has helped make the course a success. A typical course plan is as follows:

Lectures and tutorials backed up with access to a large library of reprints convey both general and specific information, over a wide range of topics. Much use is made of specialist lecturers from outside the Botany Dept., e.g. Jim Vickery from the S.A. Pastoral Board. Ray Perry has lectured on several occasions and in 1975 David Wilcox, Colin Lendon and Max Ross all spoke. Both Andrew and Don Nicolson give a pastoralist's view of station management.

At Middleback various field exercises are undertaken involving both group and individual effort. Local examples are used to demonstrate ecological principles. Such include regeneration, vegetation dynamics, and cross fence comparisons. Various projects are undertaken on a class basis. In 1975 these included:

_____ large scale aerial photo-interpretation/ground truth comparison
_____ classification and ready identification of the local plant taxa
_____ a survey of a sheep-grazed paddock, where data on sheep tracks, dung, vegetation and soils were collected in order to study the interaction within the paddock ecosystem
_____ a short-term sheep grazing experiment designed to study the factors limiting dietary intake (fatigue, palatability, digestibility). We think there is merit in Botany students having to erect fences and handle station wethers!

In addition each person chose a personal project and was given a couple of days to complete the field work. Topics ranged from the biology of mistletoes to insect activity around a myall tree.

On return to Adelaide, the students analyse the data from the field trip in between attending lectures, reading, and doing other exercises (e.g. analysis of plant cuticles in dung). In 1975 the reports of the paddock survey, grazing experiment and individual project were passed up for assessment.

The course has proved very popular, both because of its inherent interest, and the informal way in which it is run. This encourages much social interaction and the ésprit de corps generated is something to be experienced. Because of the fond memories of Middleback Station thus formed, I have been furnished with a supply of willing and voluntary field assistants (a side benefit probably unique to a teaching institution!)

The course will be run in January 1977. Should there be any people interested in being involved, Bob Lange and I would like to hear from them.

THE SECOND MEETING ON CASE STUDIES OF THE UNITED NATIONS ECOLOGICAL PROGRAMME

In October 1975 Allan Wilson of the CSIRO Division of Land Resources Management, Deniliquin, took part in a meeting on case studies held at the UNEP (United Nations Ecological Programme) Liaison Office, Geneva, Switzerland.

Briefly, this meeting brought together the UN people concerned with organizing the United Nations Conference on Desertification, to be held in Nairobi in August - September 1977, and scientists and consultants from various countries

who were to take part in case study preparation. These case studies together with four general studies known as 'component reviews' (climate and deserts; ecological change; demographic, social and behavioural aspects; desert technology) will form background papers to the Conference.

'Desertification' is what we would call degradation of the semi-arid and arid resource, whether by man's activities or climate, or a mix of the two. The countries that were responsible for moving the General Assembly Resolution 3337 (XXIX) 'International co-operation to combat desertification' are not interested in the desert areas so much as the areas now being made desert-like. In other words they want an idea of the rate of degradation and of the factors causing the rate-change.

UN is funding six case studies. These are in Tunisia and Chile (winter rainfall zones) and Niger and India (summer rainfall). Dr. Mann of CAZRI is the project director for the Indian study. Iraqi and Pakistani case studies are in water logged and saline soils.

Studies offered by various governments include one by the United States with Harold Heady as project director, one in Israel, one in Iran, one in China, two in the USSR and one in Australia. The Gascoyne Catchment (Basin) was selected as meeting the criteria and with the collaboration of the Department of Agriculture and help from the Department of Lands and Surveys in Western Australia under the sponsorship of the Commonwealth Department of Environment, Housing and Community Development the Australian case study came into being. The project is carried out in practice by Owen Williams of LRM, Canberra, with Hank Suijdendorp of the Department of Agriculture, Carnarvon, and the basis of the study is 'A Report on the Condition of the Gascoyne Catchment' by D. G. Wilcox and E. A. McKinnon (1972). A considerable amount of additional material on climate, sociology and economics has been collected from a number of interested people and the case study should be able to cover the contents list which was approved by Allan Wilson and those attending the October meeting.

In July, Owen Williams went to Geneva to take part in a working group on the actual case-studies. Some of the studies are complete except for writing up, a number are still in progress, and the status of some is unknown. The meeting developed into a succession of progress reports.

The finished reports should lead to recommendations for future work (not necessarily research work) suitable for inclusion in the Plan of Action which will be presented to the Conference. The reports should also give particular attention to the time-trend in climatic change, ecological change, demographic and social change, change in technology and their interaction.

It was clear that few scientists were willing to use time-trends, possibly because of absence of firm data. It was equally clear that the political representatives of affected countries will demand such time-trends. This demand is the same one that Australian rangeland scientists are being confronted with.

It is very unlikely that the Conference will agree to fund an international research programme to determine 'trend'.

There may be a further meeting on the case-studies after the reports are received by UNEP and before the proposed regional study groups meet. These latter meetings are to be held in a number of the affected countries and their comments are awaited with interest.

Tailoring the Gascoyne material in such a way as to contribute to diverse situations in other countries as well as to other Australian States seemed formidable at first, but the social and economic drives which lead to use, over-use and deterioration are remarkably similar. In the final analysis, types of land tenure and of culture count for little - they may influence the rate and area desertified, but the time over which this occurs can be a decade, century or millenium and there are plenty of unused millenia in arid and semi-arid regions.

COMMENT

PROFESSIONALISM IN RANGE MANAGEMENT

From: Brian Roberts, Chairman, School of Applied Science, Darling Downs Institute of Advanced Education, Toowoomba, Q.

The formation of the A.R.S. has filled a long-felt need and most of us now look forward to the growth of our vigorous young organisation which brings not only a meaningful framework of activities to bear on real problems in natural grazing lands but also brings a new sense of identity and rapport to those of us working in this sphere. Many of our members who have had the opportunity to study Rangeland Science in other countries are aware of the Range Scientists' identity, tradition and professionalism elsewhere. By professionalism I don't mean a sectional academic group, but rather a broad spectrum of applied scientists, administrators and producers who recognize the need for sound management of animals and plants as the foundation of maintained production from extensive pastoral systems.

We of the A.R.S. can boast a wealth of diverse experience in a number of specialized areas of scientific research. We should make the most of this, but we should also be aware of our present primary deficiency - namely a lack of studies and thus of data on managed range. As James Thurber says "Let us not look back in anger or forward in fear, but around us in awareness". We have a lot of leeway to make up and it seems to me that the A.R.S. would do well to consider action on three fronts in each State at this stage of our development.

1. Examine ways and means of collecting documentation and evaluating existing available knowledge on the management of the important rangeland types as accumulated by producers, advisors and others by experience.

2. Set up a framework for the spheres of Range Research requiring scientific investigation in each State and assigning priorities to these as a basis for sequented planning and co-operation between workers in various regions facing similar problems of approach, technique and evaluation.

3. Make a well-informed approach to teaching institutions with a view to their offering relevant undergraduate and postgraduate courses in applied Range Management to meet the needs of Australia's extensive grazing lands. Just as Ecology only gained respectability when it could convince outsiders of its relevance to problem-solving in the human sphere, so Rangeland Science (by whatever name) needs to gain acceptance as an up and coming reality in natural resource and environmental management, worthy of major subject status and recognisable as an entity deserving of recognition by government in the planning of posts and manpower.

Perhaps we could have more discussion of these concepts through the Newsletter.

RANGE TREND FOR PASTORAL INSPECTORS

From: Graham Harrington, CSIRO Division of Land Resources Management, Deniliquin, N.S.W., 2710.

Jim Vickery's thoughtful Guest Editorial in the first number of our Journal, emphasises the need for improved rangeland resource management skills in Australia and a versatile legislation that will enable Departments of Lands to ensure such skills are put into practice. (As was learnt at the Arid Zone Research Conference, the ultimate weapon of eviction for mismanagement is so rarely used in any State that it is not influential; if eviction were common the loss of confidence amongst graziers and their financiers could be disastrous.)

If Departments of Lands are serious in their desire to see the rangelands of their States wisely managed, it is inarguable that they need a technique for assessing the TREND of the health of that land.

If common agreement was reached on nothing else at the Arid Zone Research Conference, we all agreed that the human eye and memory were poor tools for assessing the long term changes in the soil and vegetation of a paddock or property because of the masking effect that derived from immediate rainfall or management events. It is impossible to detect a 20 per cent improvement in the vegetation over a 10 year period when seasonal variation may be of the order of 100 or 200 per cent in the vegetation characteristics being measured.

The human memory is not only a poor tool in this context, it would also not stand up to examination in a Lands Court if it came to a dispute. However, do not let us dwell too heavily on the coercion that Departments might wish to apply to lessees but rather acknowledge the fact that a successful management strategy will only come from the pastoral inspectors and graziers co-operating in the use of what skills are available, with the grazier supplying his superior local knowledge and the inspector his wider experience.

BUT WE NEED TO BE ABLE TO ASSESS TREND!

I would suggest to the various scientists who are working on this problem that enough is now known to get the skeleton of nationwide rangeland assessment structure laid down.

I would suggest to the various Departments of Lands that they should start installing monitoring sites in their most sensitive areas.

Of course we will find that the techniques used will prove inefficient, of course mistakes will be made. But once pastoral inspectors and graziers have started operating monitoring sites and monitoring techniques THEY WILL BE ABLE TO CONTRIBUTE TO THEIR IMPROVEMENT.

It is unlikely that scientists will find a ready market for their assessment techniques if they offer a "finished product" and haven't included the customers in the development phase.

WHAT TECHNIQUES CAN BE USED RIGHT NOW?

Techniques will vary with the vegetation type but I would suggest that a marked site, that can be returned to at intervals, is an essential. Such sites would be placed in important vegetation types (range sites) either on a property or on a paddock basis. Other inescapables would be site photographs (already recommended by Brendan Lay in S.A.) and some form of measurement of the perennial vegetation. Such techniques are already in use in W.A. but not yet by the pastoral inspectors.

We can wrangle for ever as to where to place such a site in a paddock, whether to take the photograph from the air, a stepladder or on the ground and which plants and plant parameters to measure. But for heavens sake let's get some sites installed IN CONJUNCTION with the graziers and pastoral inspectors and conduct the subtle and unsubtle arguments AFTERWARDS when everyone has had some experience.

But the initiative must come from the Departments of Lands. Do they want the tool? Are they prepared to redirect their inspectors' efforts from valuing improvements to resource management? Will they approach their local scientists for advice in site selection and installation?

The scientists are wasting their time if the administrative body is disinterested in or ignorant of the work they are doing. Will the Departments of Lands use this Newsletter to tell us what they think on this crucial issue. Please? Many of us met for the first time at the Arid Zone Research Conference. We exchanged ideas. Let's keep the momentum going through this Society.

A SOUTH AFRICAN FARMER'S METHOD OF ASSESSING RANGELAND CONDITION

From: David Wilcox, Rangeland Management Branch, Department of Agriculture, W.A.

A feature of veld management which impressed me on my recent visit to South Africa was the deep identification which farmers have with their farmlands and with the pastures which they support. I could have, of course, been taken only to the better farmers when I visited the Republic earlier this year, but each that I visited impressed me with the depth of his knowledge about the state or condition of his veld or rangeland.

The guides that these farmers used for determining condition were not production figures or kilos of beef, but dealt with the plants which made up the pasture the stock lived on.

I visited Ekko Vietor, a farmer in South West Africa in the southern Kalahari, who ran Karakul sheep. He had an impressive knowledge of the plants on his grazing block. He could identify over 40 different grasses and he knew the story which each of them told as far as condition was concerned. He knew that a preponderance of one or another meant that the veld was going downhill, or that when others were grazed to a certain degree he should shift his animals since any further grazing would lead to a lowering of the condition of his veld. He had specimens of all these plants mounted and identified and adorning the walls of his office where they could be readily referred to if necessary.

Ekko Vietor kept a paddock record of the vegetation condition on his farm so that he knew what his management was doing to the resource upon which his livelihood depended. He had developed, with some help, a system of recordings which provided him with a constant check on the trend in condition of his veld. It was quite a simple method involving the use of scoring devices for such pasture attributes as plant composition and disturbed ground. If the records showed that his paddocks were deteriorating he changed his management practices by altering his stock numbers or by changing the rotation pattern. He also used to estimate the amount of fodder in each paddock at the end of the growing season.

The farm was in a rainfall belt which received about 150 mm (6 inches) summer rainfall anually. In some years rainfall was as low as 75 mm (3 inches). The interesting thing was that his production did not plunge during these periods as one might expect, but continued at only a slightly lower level. He attributed this stability to the broad base of good perennial plants he had established and maintained on his farm, even though it was in a notoriously difficult area.

I don't want to suggest that proper rotational grazing systems are the only answer for Australian rangelands or that proper stocking rates alone will achieve better rangeland use. The thing that I learnt was that Ekko recognised the complex nature of the country he was living in and that his success depended upon his being able to come to terms with the needs of the various plants which grew on it.

It seems to me that the way to achieve improved production from Australian rangelands is for us to develop a greater understanding of the plants which occur in each rangeland type. We need to know which of them produce more, confer greater stability and are acceptable to animals; when these plants germinate and establish and when they are most susceptible to grazing or overuse. We need to be able to recognise the undesirable species and how many of them we can tolerate before pasture production begins to plunge.

Once we have this type of information we can begin to monitor the changes which occur each year on every property. Using the results of monitoring it should be possible to adjust management practices to suit the needs of the country.

It would be a formidable task to begin to gather the information we require from scratch. I'm fairly sure, however, that there is a tremendous body of knowledge about pasture plants in Australia. It exists in the minds of pastoralists, researchers and extension officers. It should be possible to tap it at least on a regional basis and so develop guides to management which would operate in particular advisory districts.

IMPRESSIONS GAINED FROM THE AUSTRALIAN ARID ZONE RESEARCH CONFERENCE KALGOORLIE, JULY 1976

SOME ECONOMIC AND SOCIAL IMPRESSIONS OF THE 4TH ARID ZONE RESEARCH CONFERENCE

Mike Young, CSIRO Division of Land Resources Management, Deniliquin, N.S.W.

The mulga zone of Queensland is very different to the mulga zone of Western Australia. Optimal management strategies for one zone are sub-optimal for another. The conference repeatedly confirmed the point that there is no one management strategy which is best for Australia's arid zone. In many cases it seemed that conclusions reached in one area were inapplicable to another.

The conference was attended by administrators, pastoralists, miners, sociologists, economists and scientists. Missing from the arena were the conservationists and other people concerned with recreation. This unusual mixture of people provided a fertile atmosphere for discussion. The usual jargon which develops among a meeting of scientists or economists was conspicuous by its absence.

The arid zone contains people with multiple and often conflicting interests. John Tonkin (a pastoralist from Kalgoorlie, W.A.) stated "The right to prevent trespass should be reserved to lease-holders so that damage to stock and property can be kept under control". In Western Australia the pastoralist has to contend with tourists, prospectors, miners, sandalwood pullers and administrators. All have the ability to adversely influence his management.

The administrators, who are guided by politicians, revealed different philosophies and policies towards arid zone administration. Queensland is using companies to develop its land and then breaks large company holdings into smaller individual holdings; while South Australia does not actively enforce any subdivision. New South Wales finds that its stations are too small and is subdividing leases as they expire to provide additional units of land; and Western Australia believes that no man should lease more than one million acres. Unfortunately, Northern Territory administrators could not attend the conference and it would be unfair to comment on their policies. Criticism of various policies was frequent, particularly from extension workers. It was startling to see how quickly they rose to their feet and how poorly informed all people were. Undoubtedly land administration attracted the most attention at the conference.

John Childs' review of present management systems was excellent. His approach has been to look to the pastoralists and not to the scientists to find optimal management strategies in south-west Queensland. He found that those producers who only carried stock which they could keep in better than store condition (i.e. those they could comfortably feed) and minimised their costs, did best. Perhaps pastoralists are the best managers of the arid zone. One economist suggested the area should be converted to freehold and left to the pastoralists. In response a pastoralist stated that administrators were needed and usually were appreciated in their attempts to ensure the long term productivity of the land. He felt that administrators are needed to ensure the long term survival of the pastoral industry. As Rod Oliver pointed out the system is fragile and "....any mishandling or mis-stocking at the appropriate seasonal level could bring about a non-productiveness of large areas of grazing lands". The conference assumed that future production is needed from the arid zone by society. It did not venture to decide how much it was prepared to pay to keep it productive.

Jock Anderson presented a paper which was poorly understood by scientists. He showed that there was no evidence of a long term change in productivity and stability of the Western Division of New South Wales caused by economic factors. This does not mean that economic factors may not cause a decline in productivity in the near future.

A decline in productivity, induced in response to economic pressures, would require both pastoralists and livestock to be more resilient than the range which supports them. Declines caused by other factors such as poor perception of the resources' capabilities have shown that in the past livestock are more resilient than range. Don Yates suggested that pastoralists are very resilient and may be capable of causing a change in response to economic conditions.

Bill Holmes showed that as costs increased and wool prices stayed constant the stocking rate at which profits are maximized decreased. Similarly, as wool prices fall, the optimum stocking rate falls. Thus the pastoralist may not be as resilient as the range when low prices prevail. He qualified his conclusion with the observation that the cost price squeeze may force more pastoralists to take risks in anticipation of greater gains in the near future. If Bill's relationships are correct, conservationists who wish to maintain the productivity and stability of the arid zone may have more to fear from high prices which appear to be short term.

Station management is complex and viability a very hard thing to determine. Bernard Wonder identified the key factors which affect viability of stations in the Alice Springs area. He found that stations which had the greatest carrying capacity, fewest capital improvements and the least debt were most likely to stay viable. This is long term advice to managers. John Childs investigated short term drought strategies in the Mulga zone of Queensland. He suggested that the optimal drought strategy is one of destocking as soon as stock begin to lose condition.

Don Yates looked at station managers and the pressures placed by society on them. He felt that managerial ability may decrease as isolation increases. Isolation is a big problem, particularly when education is perceived to be essential for one's children. John Childs has found that isolation increased as a result of financial stress and as this occurred wives and children became more involved in property management.

Generally the conference centred around administration and the national interest. Discussion did not arise as to whether the pastoralist should be forced to subsidise the national interest at the expense of his own interests.

FIRE RESEARCH IN THE ARID ZONE - SOME IMPRESSIONS

Ken Hodgkinson, CSIRO Division of Land Resources Management, Deniliquin, N.S.W.

The Editor has asked for my impressions on fire research reported at the recent Australian Arid Zone Research Conference in Kalgoorlie, W.A. I am not sure why I was singled out but it is probably because I am commencing fire research coupled with my need to be prodded for contributions to the Newsletter.

Like other biological issues reported at the Conference, papers on the effects of fire attracted little comment. I take this to indicate that nothing new was presented that would stir vocal cords, but it may also suggest that delegates generally, realised that socio-economic matters currently override biological considerations in range management. This present adverse situation is not the death-knell for future biological research but at the same time selection of research topics will certainly need to be carefully considered in the light of economics.

Fire as a management tool is attractive because of its low cost (as long as it doesn't escape control) relative to alternative options such as reseeding etc. and therefore deserves close scrutiny. There is also the general opinion that use of fire is the only management that shows promise for combating further invasion of inedible shrubs into semi-arid woodlands like those around Cobar, N.S.W.

Six papers were presented that contained the word 'fire' in their titles, and there were several that briefly discussed fire as one of several issues. Dr. Brian Roberts (Darling Downs Institute of Advanced Education) reviewed factors causing change in productivity and stability of the arid zone, but although fire was part of the sub-title of his paper, it was scarcely mentioned. This was somewhat surprising for someone who has spent so long in South Africa, where controlled burning is regularly practised. However, in fairness to Brian I should say that he did have three large subjects to review and clearly something had to be omitted.

All of the contributed papers reported effects of wildfires during the 1974/75 period and only one reported results of a controlled burn. This predominance of opportunistic measurements is typical of the general approach taken to fire research in the Australian arid zone. Although there are difficulties associated with fire research, particularly scarcity of fuel to carry a fire in most years, I was left wondering what *ad hoc* fire research has achieved. Certainly these studies show clearly that very few perennial saltbushes (*Atriplex vesicaria*) survive a fire, but it is difficult to interpret data which report partial and variable survival of a population of a species. The limitation of observations made after a wildfire is that the characteristics of the fire are usually not known. Without this information it is difficult to compare the results of fires

in different locations and to establish a basis for predicting the outcome of a fire. The post-burn conditions are also very important, a point made in the paper by Hyde and Pearce, N.T. Amount of rainfall and stocking density after a burn may have just as much effect on the floristic composition as fire itself.

An issue not mentioned by any contributors is the effect of fire on germination of some species. This may be extremely important in some regions such as around Cobar/Byrock region in N.S.W., where some graziers claim that heavy infestation of shrubs occurred following hot wildfires. Fire may be the means of both killing the majority of unwanted shrubs and inducing the massive birth of a new population of the same.

Recently Dr. Malcolm Gill published an excellent paper entitled "Fire and the Australian Flora - a Review", *Australian Forestry* 38, 1-25 (1975). This is recommended reading for anyone interested in fire. He points out that "knowledge of species' adaptation is necessary if we are to predict species' behaviour under various natural or imposed fire regimes".

In summary, there is a strong case for further and more detailed studies on the effect of fire in the Australian arid zone, to establish where and when controlled burning can be used to raise community production and stability. Kevin Fitzgerald, W.A., in a conference paper, recognised that fire can in some instances be used to advantage but "uncontrolled fires may often bring about undesirable changes in floristic composition". He further suggests that "fire provides a valuable management tool in the hands of an experienced operator". This could be true for some specific areas such as the summer rainfall grasslands of northern Australia, but overall there is insufficient information available for operators to confidently use fire to achieve a predictable outcome.

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I will / will not be presenting a paper.

Abstract _____

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