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### Tackling the problems of the spinfex areas

J. A. Mallett

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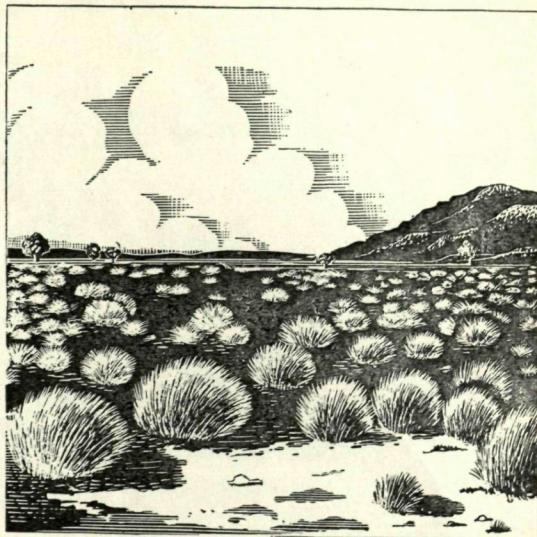
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# TACKLING THE PROBLEMS OF THE SPINIFEX AREAS

## North-West Field Day Strikes A New Note

By J. A. MALLET



**T**O one who is almost in the "veteran" class as a field day visitor, there is a certain sameness about agricultural field days which is perhaps unavoidable. It was a refreshing change therefore to wing my way some 800 miles northward recently to attend a field day of a type that is probably unique in Australia.

It was a pastoral field day held in the spinifex areas of our North-West—at Abydos Station about 100 miles inland from Port Hedland to be more precise—and it was a gathering with an atmosphere all its own.

Instead of neatly-defined paddocks and pasture plots, a sea of sage-green spinifex topped by waving yellow seed-heads extended to the horizon, broken here and there by quaint rock formations and ranges of hump-backed hills.

Instead of the sleek sedans that accent the affluence of present-day farmers, there were trail-battered trucks, jeeps and Land Rovers that had bucked their way to Abydos over anything up to 200 miles of spine-jarring tracks.

In this land where the "next door neighbour" might be anything from 40 to 80 miles away many of the station men had spent a night on the track en route to the field day. When the day's activities were ended they unrolled their "swags" in the Abydos shearing shed and snatched a few hours' sleep before taking the trail again at first light on the following morning.

There was a cheery informality about the whole show—a light-hearted picnic atmosphere with old friends swapping the latest news and a vigorous giving and taking of good-humoured raillery—yet beneath it all was the keen interest which had brought these men many miles to learn more about matters which deeply concerned them.

A specially-chartered aircraft had touched down on the station airstrip on the previous day, having flown from Perth, over 800 miles to the southward. It carried five prominent members of the Pastoralists' Association of Western Australia (Inc.)—the president (Mr. R. F. Adamson), the secretary (Mr. H. R. C. Adkins), and Messrs. F. J. Robinson, E. H. B. Lefroy and P. B. Lefroy—as well as the Deputy-Director of Agriculture (Mr. I. Thomas), the Commissioner for Soil Conservation (Mr. G. H. Burvill) and the author.

Other visitors to the field day included Professor W. S. Phillips, Professor of Botany at the University of Arizona—who is at present in Australia as a Fullbright Fellowship appointee—and a Senior Agrostologist of the Queensland Department of Agriculture and Stock (Mr. S. Marriott).



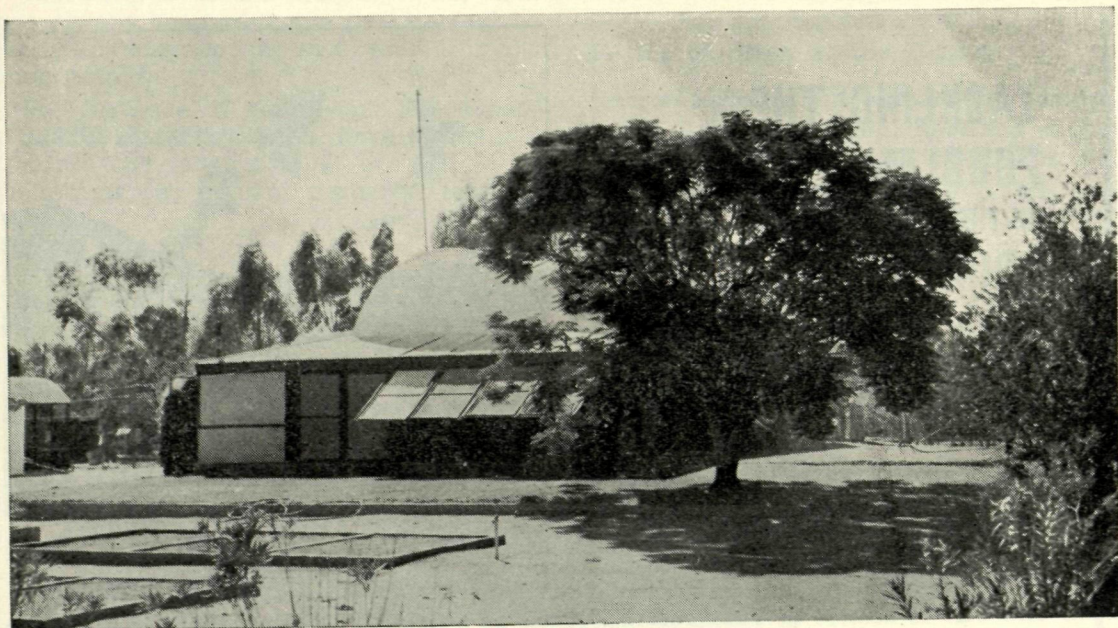


Fig. 1.—Abydos Station homestead. The rounded, eave-less roof and the heavy verandah shutters help to protect the building against cyclone damage.

### A DEPRESSING RECORD

Some indication of the seriousness of the problem of declining carrying capacity in the spinifex zone may be gathered from the record of the Abydos and Woodstock properties, two adjoining stations of 387, 794 and 267,486 acres respectively.

Sheep numbers in 1933 were given as 33,037 and 4,900 lambs. Five years later the corresponding figures were 24,071 and 506. By 1942 the tallies had dropped to 9,821 sheep. The 1944 figures were 7,219 sheep and the properties were abandoned in the following year.

The decline is not confined to these two stations, but is typical—to a greater or lesser degree—of a general decline which took place over a large portion of the spinifex country during that period.

In 1946 Abydos and Woodstock Stations were purchased by the State Government to serve as a research centre at which local problems could be studied with a view to inaugurating remedial measures.

It was obvious from the beginning that many factors had contributed to the decline. Drought years, cyclone damage and hordes of kangaroos—mainly the euros or “hill kangaroos”—had all played their part.

Nearer the coast, a serious soil erosion problem had arisen. In some places the soil had been bared to such an extent that the topsoil had blown away, leaving vast “claypans” up to 25 square miles in area. Rain falling on these bare expanses had evaporated leaving a deposit of salt which added to the difficulties of reclamation.


### RESEARCH PROJECTS

Agricultural Adviser, Hank Suijdendorp who has been in charge of the research work in this area, has outlined the history of the decline in previous articles in the “Journal.”

Briefly, the facts are that in the early utilisation of the spinifex areas the sheep were shepherded in the vicinity of surface waters. As these areas became eaten out, it was the practice to fence new areas of country in which wells were sunk and equipped with windmills and troughs.

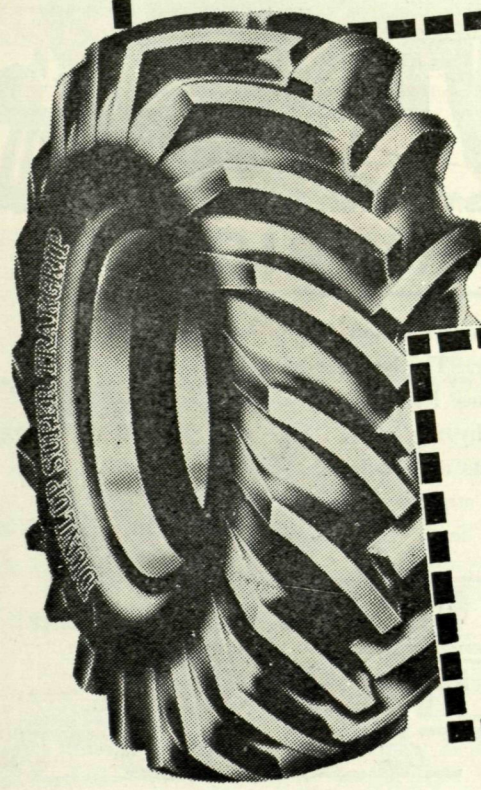
These new areas provided good feed for the ewes, as in addition to the more palatable and nutritious “soft” spinifex species they carried perennial grasses and edible shrubs. Lambing percentages were high on this type of country and the flocks increased in strength.





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Fig. 2.—Visitors inspecting one of the experimental paddocks.

Unfortunately, the establishment of watering-points in areas which were normally dry for much of the year, led to a tremendous increase in the kangaroo population and these pests soon outnumbered the sheep.

From about 1920 onward, suitable virgin country became scarce, and the fenced areas, subjected to heavy grazing by sheep and kangaroos began to deteriorate.

The palatable and nutritious perennial plants were not only prevented from seeding, but were eaten down to such an extent that their root reserves were exhausted and the plants died.

Freed from competition, the unpalatable and innutritious plants multiplied rapidly. Paddocks which once carried ample feed for breeding ewes now barely provide a maintenance ration.

### PLANT INTRODUCTION

Replacing the eaten-out plants with others equally nutritious seemed the logical answer to the problem and Buffel grass (*Cenchrus ciliaris* L.) and Birdwood grass (*Cenchrus setigerns* Vahl.) have been introduced into many of the pastoral areas with marked success.



Fig. 3.—Great interest was shown in the growth of native grasses in the management trial. Plants which had not been seen in the area for ten years were re-appearing and multiplying in the experimental paddocks.





Fig. 4.—In the top picture taken just outside the fence in the 12-acre Continuous v. Deferred Grazing Trial, the effects of continuous grazing by kangaroos may be seen. Note the severely eaten-down butts of Curly Spinifex (*Plectrachne* spp.) and Woollybutt grass (*Eragrostis eriopoda*). Below is a picture taken inside the fence showing the development of perennial grasses (*Eragrostis eriopoda* and *Eriachne sulcata*). This plot has carried a sheep to three acres for two years on a rotational system permitting sectional deferment of grazing.

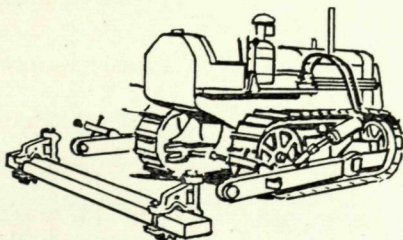


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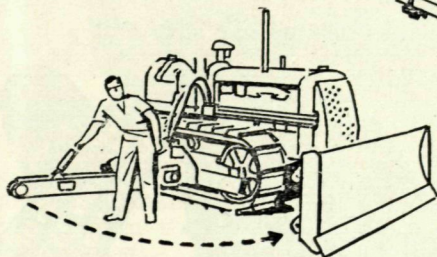
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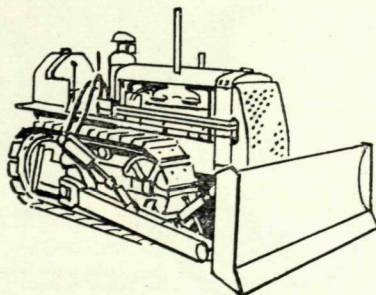
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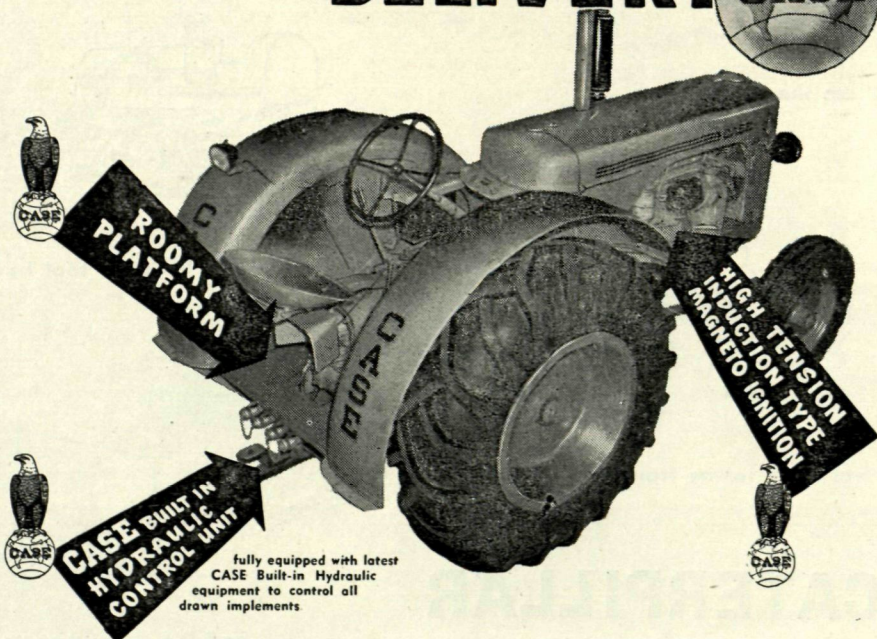
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Fig. 5.—A corner of the 8-acre Management Trial. Curly Spinifex is well-represented inside the enclosure (left) but not outside.

Unfortunately these grasses require soils that are more fertile than much of the spinifex plain, although they do well on the alluvial soils bordering the water-courses.

A perennial plant known as kapok bush (*Aerua tomentosa*) which appears to have been accidentally introduced into the North-West, seems to hold definite promise.

The small black seeds of this plant are embedded in fluffy white balls of a kapok-like substance which appears to have been used as a filling for mattresses and pillows by the crews of pearling luggers, and more recently by Australian aborigines. The plant is indigenous to Java, Sumatra and other islands north of Australia. It also grows in India and Afghanistan so could possibly have been introduced in camel fodder or the packing of camel-saddles.

The crude protein content of kapok bush foliage is as high as 26 per cent. and the plant is apparently relished by both sheep and cattle.

The seeds are hard, and difficult to germinate but work on the best methods of establishment is in progress. To date, the best results have been achieved by dropping the seeds into spinifex clumps which are later burnt.

### ACCENT ON MANAGEMENT

With plant introduction work limited by the low fertility of much of the soil—deficiencies in nitrogen, phosphorus and potash are common—the best chance of successful rehabilitation appeared to be in bringing back the plants which had been eaten out in the past years.

Over many centuries, these had been evolved by natural selection so that they were well fitted for survival in this particular environment, and a series of management trials were instituted to ascertain how they could best be re-established in the plant population.

Visitors to the field day inspected the following trials:

#### Succession and Regeneration Trial B20.

A paddock was made sheep-proof in 1951 and sheep were excluded. The sheep-proof fence did not keep out the kangaroos and it was found that continuous grazing by the marsupial pests resulted in palatable herbage such as Curly Spinifex (*Plectrachne Schinzii*) being eaten down so severely that it was prevented from seeding and building up root reserves.

The unpalatable species such as Woolly Spinifex (*Triodia lanigera*) and *Acacia*



*translucens* seeded freely in the absence of competition and soon comprised the bulk of the plant population.

A small area in this paddock was made vermin-proof and in this enclosure the *Plechtrachne* soon dominated the plant population.

#### Succession and Regeneration Trial A20.

On a different type of country a vermin-proof paddock was erected in November, 1951, but, despite the protection, the unpalatable Woolly Spinifex has dominated the area.

A few native grasses (*Eriachne* species) made their appearance but appear to be declining. Such poor soils apparently cannot be expected to provide more than meagre pickings at any time. Seeding with kapok bush and native grasses did not produce worthwhile results.

#### Management Trial (Woodstock Ram Paddock).

In this trial, which was designed to determine the yields and composition of typical spinifex country under different treatments four 8-acre vermin-proof plots were left ungrazed and four others grazed

intermittently at a rate equivalent to one sheep to four acres. The stocking was carried out when the seeds of the grasses and plants had matured.

Rather surprisingly, the stand of native grasses was improving more rapidly on the stocked plots than on those kept unstocked. Grasses and shrubs which had not been seen in the area for upwards of ten years were re-appearing and multiplying.

Burning of the spinifex followed by heavy grazing gave promising results in these trials.

#### Continuous v. Deferred-Rotational Grazing.

This trial attracted much attention. A 12-acre plot was vermin-proof fenced and four sheep have been running in this area for two years. The sheep were in good condition but there was a definite decline in the quality of the herbage—a gradual eating-out of the grasses and shrubs, including the better spinifex species, and a corresponding increase in the less desirable types of vegetation.

Alongside the 12-acre plot, in identical country, another 12 acres had been enclosed and divided into 12 one-acre blocks.

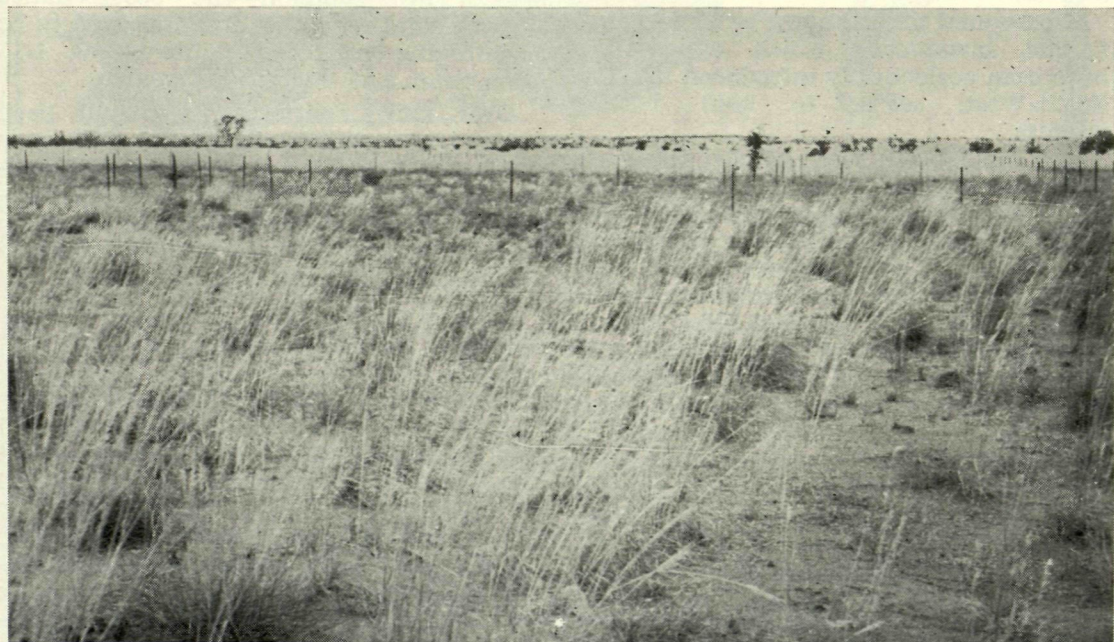
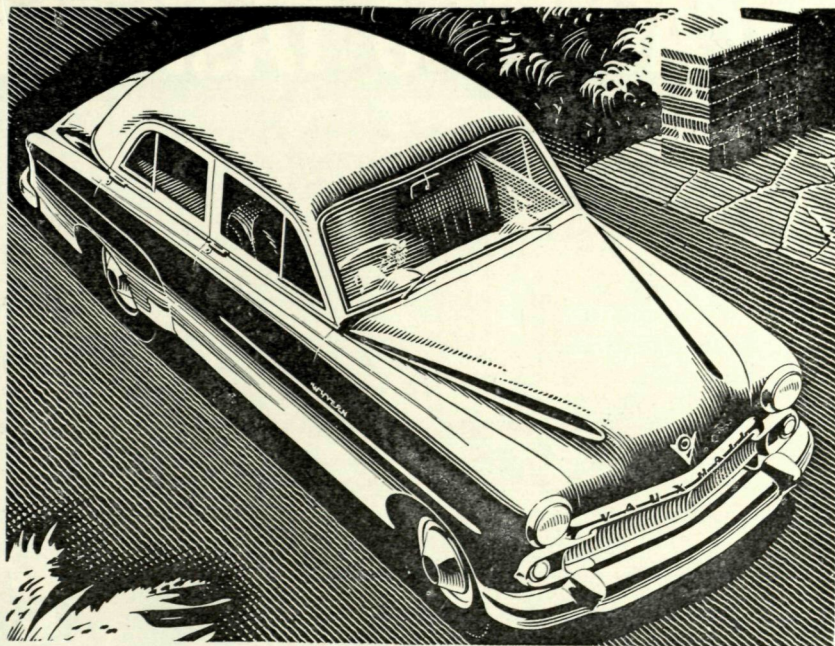


Fig. 6.—Another view of the 8-acre Management Trial showing good growth of Perennial Weeping Grass, a species seldom seen in the region under normal conditions of continuous grazing.





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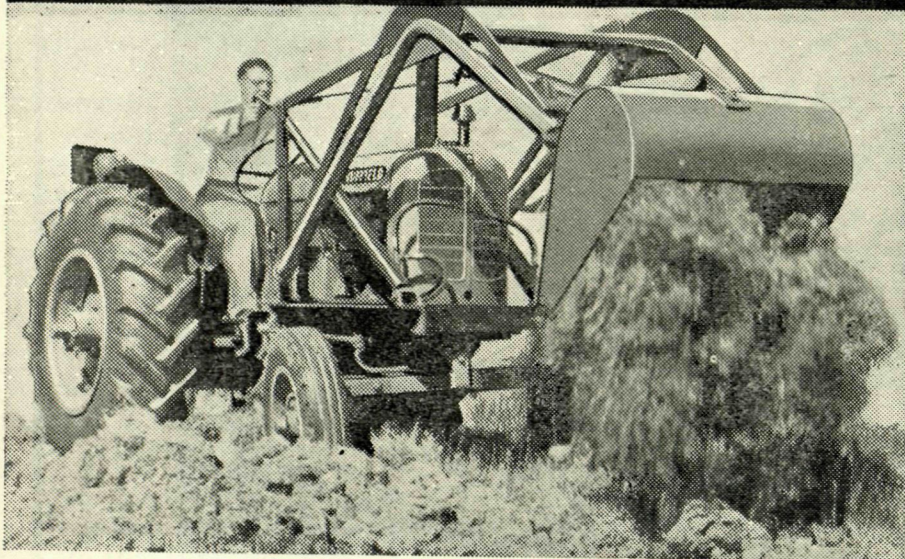
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Fig. 7.—The "China Wall" at Abydos Station. This unusual rock formation is about 35 ft. in height and only 8 to 10 ft. in thickness.

Four sheep were running in this area also, being moved from one one-acre plot to the next every two weeks.

Four of the one-acre plots were submitted to "deferred grazing," a practice which seems to hold the key to much of the regeneration work in this area.

Although this subdivided 12-acre area was carrying the same number of sheep as the adjoining 12-acre plot, the herbage was obviously improving instead of declining. The palatable species were increasing rapidly and the sheep were in excellent condition and were likely to hold their condition better in the ensuing months than their neighbours whose feed was very evidently declining in quality.

#### **"DEFERRED GRAZING"**

This term is one that has been coined to describe a system of management which is becoming increasingly popular, follow-

ing upon the convincing demonstrations at Abydos and Woodstock.

Briefly it consists of removing the sheep from certain paddocks—say one-third of the property—from the time of the first rains, for a period sufficiently long enough to allow the plants to mature. In these areas this is only a period of about eight weeks' duration.

This "spelling" of the area gives the perennial grasses an opportunity to develop fully—to manufacture the necessary crown and root reserves and to set seed.

Following upon the "spelling" period, the area is stocked heavily. There is usually a good bulk of feed at this stage and the heavy stocking ensures that a proportion of the shed seed is trampled into the ground and prevented from being eaten by birds or insects, or being blown or washed away.





Fig. 8.—End view of the "China Wall."

That this system is effective was illustrated in numerous instances of groups of seedlings surrounding the "parent" plants on areas where "deferred grazing" had been practised.

It is suggested that "deferred grazing" should be practised for two successive wet seasons on each area so that the whole of the property would be treated in a six-year period.

Adaptations of the treatment would, of course, have to be made to suit individual conditions but "deferred grazing" is already proving its worth in large-scale trials by interested station managers.

### VERMIN CONTROL

Obviously, there are many areas where the effects of deferred grazing—or indeed any other form of management practice—would be nullified by kangaroos.

Where no surface waters were available, the closing down of mills during the critical period would help. Incidentally it is worth noting here that observations sug-

gest that the local euros are largely creatures of habit. Once they have become accustomed to drinking at a mill, they seldom leave that area and I was told that the closing of a mill often killed many kangaroos although another mill was operating less than two miles away.

However, it is realised that vermin control must inevitably play an important role in the regeneration of the spinifex country and a research officer of the Commonwealth Scientific and Industrial Research Organisation (Wild Life Survey Section) is now stationed at Woodstock in an attempt to find a solution to the problem.

He is Mr. E. Ealey, whose last assignment was a vastly different one—he was in the Antarctic studying seals.

A feature of the Abydos field day was a series of informal talks and discussions on the lawn of the homestead in the evening following the inspection of the field plots.

Mr. Ealey gave an interesting talk on his current work at which he said that although most pastoralists thought in terms of some disease which would wipe out kangaroos in much the same manner that myxomatosis had wiped out the rabbit, he could not hold out much hope of such a solution at this stage.

Highly specific diseases which would confine their activities to one species of animal were rare, he said, and, although this angle was not being neglected, he thought that poisoning offered the best chances of success at present.

To inaugurate a successful control campaign, it was essential to know all there was to know about the animals concerned. He had already learnt much about the euro by talking with station men and he was anxious to receive all the information they could give him.

Much of the preliminary work at Woodstock had been in evolving techniques which would assist them in learning more about the animals. To obtain live animals for marking, euros were caught in netting funnel traps but they went crazy in the enclosures and often injured themselves.

By treating drinking water with chloral hydrate they were able to put the euros to





Fig. 9.—The Woodstock Station homestead. Originally an hotel on the track from Roebourne to the Tambourah Goldfield, the building now serves as a centre for C.S.I.R.O. Wild Life Survey personnel who are studying the kangaroo problem.

sleep for periods of up to six hours during which they could be ear-tagged or marked with identification numbers.

Ear-tags were fitted with reflector tape in different colours so that the "roos" could be identified at night by flashing a torch towards them.

Electronic devices for counting the number of euros visiting a certain mill and even for automatically spraying dye on kangaroos patronising salt licks were among other techniques mentioned.

Mr. Ealey said that there was much work still in progress but he was hopeful of evolving suitable poisoning methods which would establish an effective measure of control. He thought that poisoned water and poisoned salt licks offered good opportunities for large-scale kangaroo destruction.

### NATIVE PLANTS SAFEST

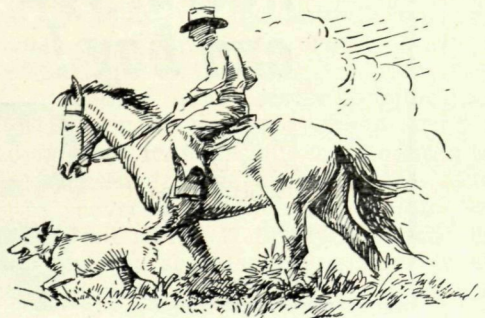
In an interesting talk, Professor Phillips said that he thought that we were adopting a wise course in trying to re-establish the indigenous plants. He said "I think that the U.S.A. has spent far more than any other country in the world in seeking out and introducing plants from abroad—and I think that most of the money was spent in buying trouble."

He urged his listeners to think in terms of "plant husbandry"—the word "husband" meaning "to take care of."

"Always remember," he said, "that it is not the sheep which are Australia's greatest asset, but the plants on which they feed. Guard those plants carefully, because without them you could not have sheep flocks."

Mr. Marriott showed a series of slides of pastoral country in Queensland showing work being done in that State with Buffel and Birdwood grasses.

Mr. Suijdendorp also exhibited a number of slides showing the work at Abydos and Woodstock, after which some keen discussions rounded off a day in which good fellowship and some valuable educational experiences had been happily combined.





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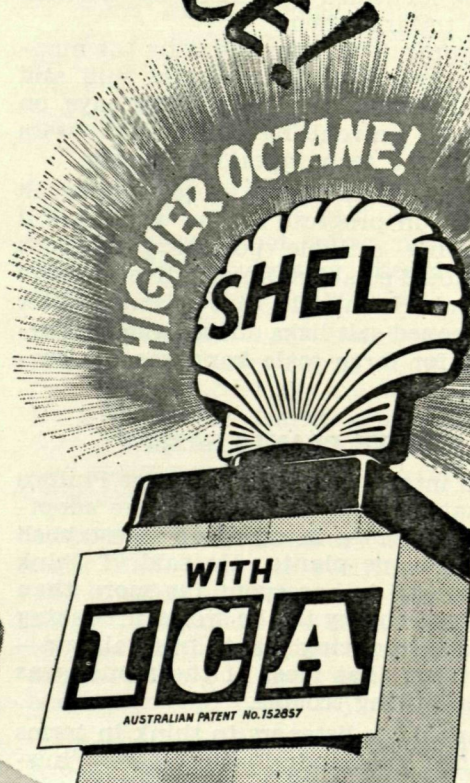
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