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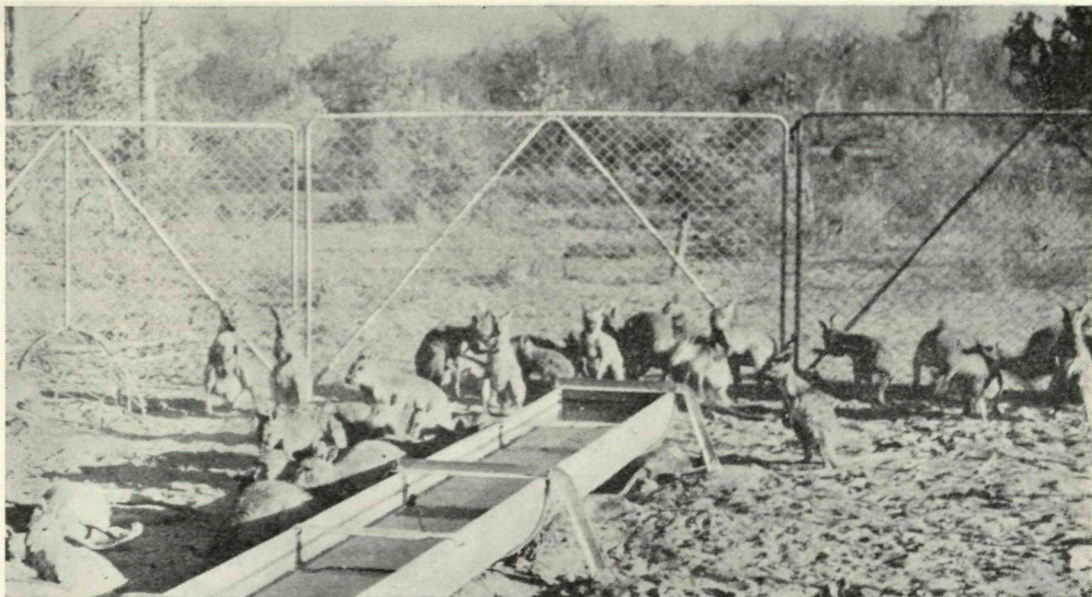


Fig. 1.—Wallabies in a trapping yard

# THE KIMBERLEY WALLABY MENACE

## Water Poisoning Experiments 1955-7

By C. D. GOODING, B.Sc. (Agric.), Research Officer, and  
J. L. LONG, M.D.A., Research Technician

**S**INCE 1952, the Agriculture Protection Board has been investigating means of controlling the Kimberley Wallaby or Sandy Wallaby (*Macropus agilis*). Much work has been done on the use of solid bran and pollard baits containing strychnine, but it has been shown that these can only be used along the well watered alluvial "frontage" country, during periods of comparative drought, when feed is practically non-existent. It was at this stage that our attention was turned to water poisoning in an effort to bring some annual relief to the pastoralists in the area.

The problem of the Sandy Wallaby in the West Kimberley region resolved itself into two clear-cut phases. The well-watered alluvial country cannot be handled by water poisoning but the drier "pindan" country (in most places) can. In this area, stock (and the wallabies) have to rely on man-made waters, in the form of bores and mills for the greater bulk of their supplies of water. It thus appeared obvious that in this region water poisoning offered the greatest possibilities as a means of control. It was with this

knowledge that initial experiments were started in September, 1955.

### BASIC INFORMATION

The first step was to gather basic information such as the amount of water consumed by each wallaby and the amount of each of the poisons required to kill. After this knowledge was obtained, poisoning tests could be undertaken and such facts as the time required to poison out a mill could be ascertained.





Fig. 2.—Portion of a large area dug up by wallabies in search of ribbon-grass roots. The complete destruction of plant cover may lead to soil erosion

### Water Consumption Tests.

In the initial stages, observation of the wallabies whilst drinking showed that they sometimes drank several times over a period of an hour or more. They would often drink, then hop back a little way from the trough only to return later for a further drink. If they were disturbed during these periods of browsing near the trough they may hop away altogether. It became apparent that we must measure the quantity of water consumed at their first drink from the trough, if we were

to be sure of obtaining a kill. This we termed the "volume consumed at first drink" and was the figure used in all future work on water poisoning. Whilst recording these figures the animals were also weighed and sexed and the data is listed below in Table I.

The smallest amount consumed in any one case was 10 fluid oz., there being only four records of less than 1 pint. The largest amount consumed in one drink was 62.6 fluid oz. (just over 3 pints). (A further weight check showed that 106

Table I.

#### WATER CONSUMPTION AT FIRST DRINK.

Sex	No.	Average Weight in pounds	Average Amount Consumed
Males ....	12	24.75 lb.	45.4 fl. oz.
Females ....	13	15.80 lb.	27.8 fl. oz.
		Overall average ....	36.2 oz.



males averaged 24 lb. and 100 females averaged 16 lb. giving an overall average of roughly 20 lb.) Thus enough poison to kill a 20 lb. animal must be incorporated in each 36 fluid oz. of water if one is to work on averages. However, as a margin of safety is necessary we decided to work on 1 pint as the volume of water containing a lethal dosage.

### Lethal Dosages of the Poisons Arsenic and "1080."

From previous work on baiting it was known that a dose of 0.2 mgms. of "1080"

In this test five standard containers were sunk into the ground at the usual watering place of the wallabies, until the lips were flush with the surface. The animals had a free choice as to which container they used. The quantity of each solution consumed was measured at regular intervals and their positions rotated.

The figure for the water (control) was then taken as 100 per cent. and the others expressed as percentages of that figure. During this test numerous wallabies were seen to move from trough to trough sampling the water.

Table II.

PERCENTAGE OF  $As_2O_5$  SOLUTIONS CONSUMED.  
(Compared with Water.)

	Water	Arsenic Pentoxide per 100 gallons			
		6 oz.	12 oz.	24 oz.	48 oz.
Quantity of each mixture consumed	% 100	% 73.3	% 85.4	% 38.0	% 21.0

per pound body weight was lethal to these animals. Similar work was then carried out with arsenic pentoxide (a water soluble arsenic salt)—giving a figure of 7.5 mgms. per pound body weight. This meant that for a 20 lb. wallaby we would need 4.0 mgms. of "1080" or 150 mgms. of arsenic pentoxide. Both of these poisons are rather slow in their action. This is a factor that some pastoralists consider disadvantageous since one has no check on the numbers of animals poisoned, or for that matter on the effectiveness of the poison. It was decided in an effort to obviate this factor, to try various increases in concentration until more animals were found dead near the trough, thus illustrating the effectiveness of the poisoning.

### Palatability of the Poisoned Solutions.

This then introduced the next factor of palatability (or repellency) of the more concentrated solutions. More repellency was expected with arsenic pentoxide than with the comparatively tasteless "1080," so a verification test was run using this poison—see Table II.

### Individual Consumption.

A further check was taken on the effectiveness of these concentrations as poisoning agents, using arsenic pentoxide. Wallabies were allowed to drink one at a time at these five containers. After drinking they were shot and weighed. After measuring the volume of solution consumed it was possible to calculate whether death would have ensued. The results are summarised in Table III.

It would therefore appear that 6 oz. per 100 gallons requires too large a volume of solution to make sure of death under these conditions. Solutions of 24 oz. and 48 oz. per 100 gals. seem to have some repellency. (This is borne out in previous table). It was then decided that 12 oz. per 100 gals. was the most suitable of these concentrations for water poisoning Sandy Wallabies under these conditions.

As a check to see if other soluble arsenic salts were as palatable as the pentoxide a simple test was performed in which sodium arsenite and the pentoxide, at similar concentrations, were exposed to the wallabies' free choice. For every 100 parts of arsenic



Table III.

## MORTALITY FRACTION WITH VARIOUS CONCENTRATIONS OF ARSENIC PENTOXIDE.

Concentration As <sub>2</sub> O <sub>5</sub> per 100 gals. ....	6 oz.	12 oz.	24 oz.	48 oz.
No. killed/No. drinking ....	3/5	5/5	5/5	2/2
No. licking only, then moving to other container ....	....	....	3	3

pentoxide, 86 parts of sodium arsenite was consumed. Besides this, arsenic pentoxide contains 65.2 per cent. arsenic, whilst sodium arsenite contains only 57.6 per cent. It was thus concluded that 12 oz. of arsenic pentoxide per 100 gallons of water was the best concentration of an arsenical poison that we had investigated for the water poisoning of Kimberley Wallabies.

**Strychnine.**

The water at one experimental mill was poisoned with strychnine. Results appeared to be good but it was found difficult to eliminate the bitter taste associ-

ated with this poison. It was considered that arsenic pentoxide and "1080" showed greater promise.

**"1080."**

Previous work in connection with baiting had shown that the lethal dose of "1080" for these wallabies was 0.2 mgms. per lb. or 4.0 mgms. for an average 20 lb. animal. As this poison is reported to be tasteless it was not thought necessary to conduct any palatability tests. Field tests were instituted to gather such information as the time required to poison the greater bulk of all wallabies watering at a mill.

Table IV.

## FIELD POISONINGS.

Mill Name	Concentration "1080" Used	Volume Consumed Each Night (%)					
		1st	2nd	3rd	4th	5th	6th
Boab Dam ....	3 grams/100 gals.	100	100	79.5	67.0	6.0	....
Thompson's Dam ....	5 grams/100 gals.	100	95.5	79.3	61.4	5.0	....
Curtain's ....	10 grams/100 gals.	60.9	31.7	2.4	4.8	4.0	....
Forrest's ....	18 grams/100 gals.	162	150	100	25.0	0	....
Mickie II ....	20 grams/100 gals.	92.3	3.8†	†	†	83.0	6.1
Mickie I ....	40 grams/100 gals.	100*	83.3	16.6	0.3	....	....
Hunter's ....	40 grams/100 gals.	138.6	68.1	0	2.2	0	....
Egan's ....	40 grams/100 gals.	200.0	300.0	500.0	2,200.0	1,200.0	....

## ARSENIC PENTOXIDE.

Mill Name	Concentration Used	Volume Consumed Each Night (%)					
		1st	2nd	3rd	4th	5th	6th
Lelvier's ....	12 oz./100 gals.	160	88.0	11.2	2.0	1.5	....

\* Cattle watered, cleaned out trough.

† Mill Tank overflowed, fresh water available, poisoning recommenced on 5th night.



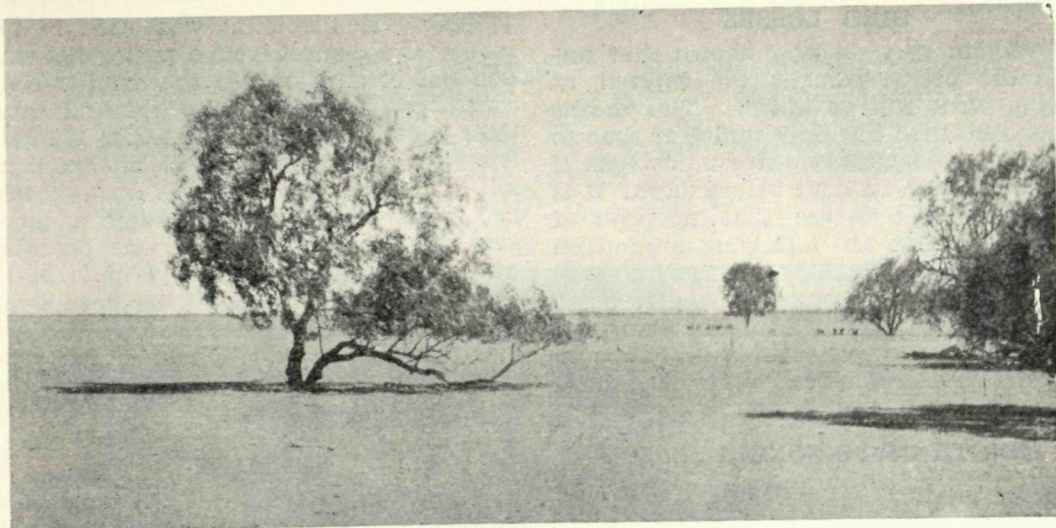


Fig. 3.—Typical Fitzroy River frontage country showing lack of herbage

Table IV shows the results of experimental poisoning of mills using various concentrations of "1080" (and one arsenic pentoxide record).

A record of the amount of water consumed each night was kept for two or three days before poisoning commenced. The results are expressed as percentages of this "free water" consumed.

*Forrest's Mill.*—Note here the effect of poisoning in strange troughing. The consumption of poison on first and second nights was greater than the consumption of unpoisoned water. This is more clearly illustrated at—

*Egan's Mill* where the consumption, although small in quantity, continued to increase until the fourth day of poisoning, before any decrease was noticeable.

If we exclude the unusual factors such as cattle watering, strange troughing or mill breakdowns, it is seen that three to five nights' poisoning was all that was necessary to reduce the numbers of these pests watering at each of the mills and dams tested to a very low level.

There are several facts which are important in the application of these results, which have not yet been discussed. These include:—

- (a) The exclusion of stock.
- (b) The effects on native fauna.
- (c) The length of poisoning season.

### EXCLUSION OF STOCK

Up to the moment there is nothing new to report in this field. The methods of stock exclusion that can be used are merely fencing and the provision of new troughs. The removal of poisoned water each morning will also be necessary if the existing trough is being used, and stock are in the paddock.

Where one mill waters more than one trough it should only be necessary to poison one trough at each mill. The other troughs, however, will have to be drained each night and filled with fresh water again next morning. If four paddocks are served by each mill the mustering of stock from every fourth paddock should allow nearly a complete station poisoning. In this way the poisoned water need not be removed each morning but merely covered to eliminate bird or other fauna losses during daylight hours. Dams present a major difficulty. These must be fenced with strong netting or link mesh and another watering place provided nearby. This should be done at least five days before poisoning and the dam enclosure shut up each night so as to accustom the animals to drinking (or "free watering") at the new trough.

It is imperative that no non-poisoned water be available during the nights when poison is laid.



## BIRD LOSSES

Preliminary tests have shown that unless the poison troughs are covered at dawn, birds will be killed. This means that each man has only sufficient time to handle approximately three mills, even if he starts half an hour before dawn. It is also important to see that no pools of poisoned water are left lying around on the ground as finches and other small birds will readily drink from these. Some owners may be inclined to float planks on the tanks in an effort to entice birds to water there. In some cases this has proved successful.

### LENGTH OF POISONING SEASON

In the West Kimberley region the poisoning season extends over three months from September to December—(or until the "wet season" breaks).

It may be possible, with a tasteless poison like "1080," to open the season a little earlier. However, this may not be necessary because of the limited area involved.

This year the Agriculture Protection Board instituted a large-scale field trial in this area. Pastoralists were asked to co-operate in the trial by having as many mills as possible poisoned. "1080" was used in this work. The poison was laid by competent trained operators and pastoralists were obliged to pay the costs of the scheme. These were based on the following:—

Labour and overhead costs—£7 13s. per day.

Mileage—1s. 2d. per mile.

Poison ("1080")—7s. per vial.

Stations could use their own vehicles to transport the operator if desired.

It must be remembered that these facts and this field trial only apply to the Sandy Wallaby. Work is being undertaken along similar lines with the Marloo, or Plains Kangaroo but this is only in its infancy and it is not envisaged that it will be completed for at least another two years.

In this first year of operations three stations participated. A total of only 19 mills was made available. These were poisoned at an average costs of £9 12s. 6d. per mill. They were all poisoned using a concentration of 20 grams "1080" per 100

gallons. This amount was used in response to a request from a pastoralist who was not content to use the smaller concentration. Further experimental work later showed that 3.0 grams. per 100 gallons was sufficient to effect an excellent kill. This large-scale trial at least showed the practicability of poisoning a large area for Sandy Wallabies. One operator was able to poison these 19 mills in 12 days. Many more could have been done in the time had they been available. This, together with a reduction in poison concentration would materially reduce the cost to the pastoralist.

### SUMMARY

(a) The experiments set out describe a suitable method for poisoning the Sandy Wallaby (*Macropus agilis*) in the Pindan country of the West Kimberley Region of Western Australia.

(b) The average consumption at a "first drink" for the Kimberley Wallaby was 36.2 fluid oz. (1 4/5th. pints).

(c) The lethal doses of the poisons used were, "1080," 0.2 mgms./pound, and arsenic pentoxide was found to be 7.5 mgms./pound body weight.

(d) The palatabilities of arsenic pentoxide and sodium arsenite were compared, *Macropus agilis* preferring the latter.

(e) The most suitable of the arsenic pentoxide solutions used was 12 oz./100 gals. This was further checked by obtaining individual consumption figures, shown in the mortality fraction table.

(f) Various doses of "1080" were used, as little as 3 grams./100 gals. proving quite satisfactory in field tests, these results were based on quantities of poisoned water consumed but unfortunately did not include confirmatory population counts. Very few carcasses were found.

(g) Three factors are discussed which are important in the application of water poisons—

(a) The exclusion of stock.

(b) The effect on native fauna.

(c) The length of poisoning season.

(h) The first year's wholesale poisoning operations are described and costs discussed.



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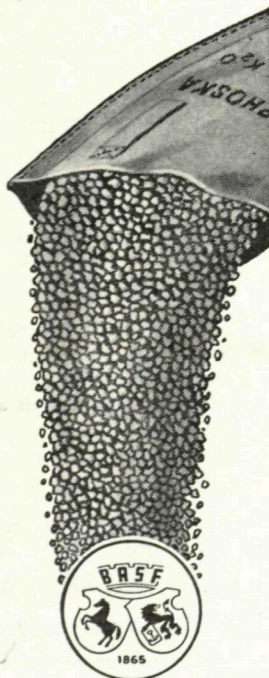


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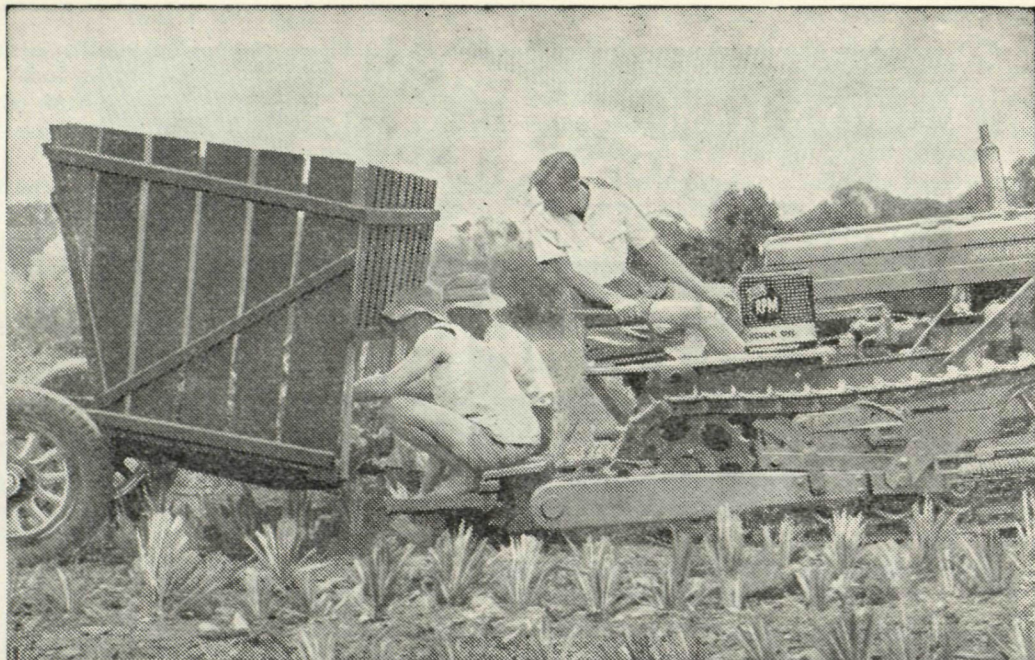
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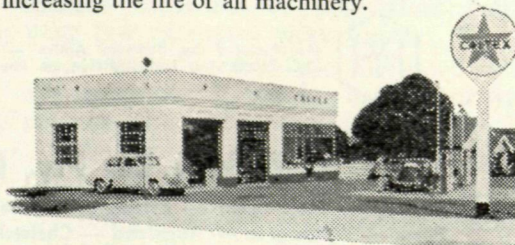


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