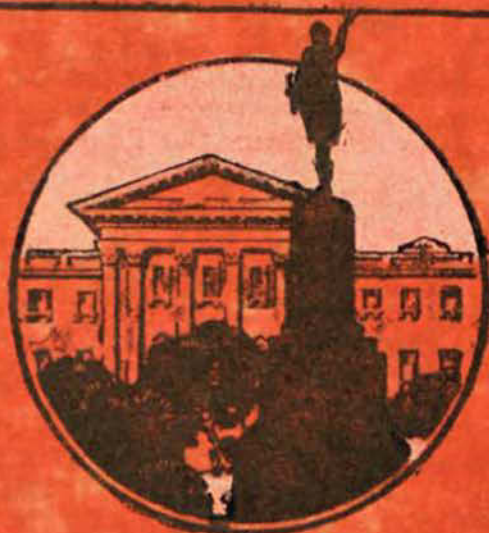


*The*  
AUSTRALIAN  
MUSEUM  
MAGAZINE

EDITED BY C. ANDERSON, M.A., D.Sc.



- Aua Island (British New Guinea) -  
*Captain G. H. Pitt-Rivers, F.R.A.I.*  
Wild Life of the Mallee - *Charles Barrett, C.M.Z.S.*  
Cannibalism among Snakes - *J. R. Kinghorn, C.M.Z.S.*  
Boomerangs - - - - *W. W. Thorpe*  
Some Australian Insects injurious to Man  
*Anthony Musgrave, F.E.S.*  
Excursion to Broken Hill - - - *T. Hodge Smith*  
Modern Taxidermy - - - - *Henry S. Grant*  
Extraordinary Habits of a Tame Magpie  
*J. R. Kinghorn, C.M.Z.S.*

PROFUSELY ILLUSTRATED.

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# THE AUSTRALIAN MUSEUM

## COLLEGE STREET, SYDNEY.

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Aua Island.—Dug-out outriggered canoe, made from trunk of bread-fruit tree. The ornamental, vertical, tapering, end-pieces ("aluna") are carved out of separate blocks of wood, dovetailed to the body of the canoe and fixed with wooden tie-pins, these suggest the fins of a shark. The canoes, like the houses, are preserved by constant limewashing. There is no caulking. The tail of a newly-caught shark may be seen protruding from the canoe.

[Photo.—*Captain G. H. Pitt-Rivers.*]





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## Editorial

### Expansion and Congestion.

**I**N previous issues we have stressed the urgent necessity for an extension of the Museum buildings and last year the Trustees approached the government with a request that a sum be placed on the estimates so that a commencement might be made with this much needed work. Unfortunately, it was not found possible to accede to this request. While fully sympathising with the treasurer, we would again emphasize our great need for more space and accommodation.

Elsewhere in this issue reference is made to the frequent shortage of accommodation at lectures—a fact no less deeply regretted by us than by those who travel some distance only to be turned away disappointed.

Congestion meets us at every turn. Regarding storage let us take one instance only. Our collection of aboriginal Australian skulls is a large and valuable one, and many specialists have travelled long distances to Sydney primarily to study it. This priceless collection is stored on shelves in a cellar and effectively occupies all the space allotted to it. The assistant in charge wished to place the skulls in separate boxes for safer storage, but found that space would

not allow this to be done. Then there is the valuable and extensive library—the best of its kind in the Commonwealth, and probably without equal in the Southern Hemisphere. Portion of it has been stored in the basement, a term more euphonious than cellar, for years. And it is only by dint of considerable energy that the books are maintained in a good state of preservation. It may be contended that since they are so kept what more is wanted? The reply is that the time and energy so expended could be employed to better advantage, and, moreover, they are inconveniently placed for reference. This acute shortage of accommodation not only hinders us severely in the performance of our duties, but also prevents us from doing much that we would fain attempt in the interest of education.

Many museums possess one room or gallery devoted to a synoptic collection of natural history. This collection affords a comprehensive view of the entire animal kingdom. It embraces representative forms of all the principal groups from the simplest protozoan to the most complex mammal. It illustrates on broad and general lines the principles of a natural classification. We possess no gallery suitable for this purpose.



Then there are the group exhibits, or, as they are sometimes termed, natural habitat exhibits. In recent years, several large and beautiful groups have been added to the collections, but the time is measurable when we shall have to halt. These groups illustrate life in its typical environment and convey a lesson for more effectively than the exhibit shown on a nicely polished mount. These exhibits create a good deal of interest without which our efforts towards educating the lay mind are practically worthless.

In a recent issue reference was made to the formation of a children's room, equipped

with furniture and exhibits suitable to the juvenile stature and mind. The importance of such a section cannot be over estimated, but, situated as we are, we are unable to attempt anything of that kind.

Not only is the building too small for our present day needs, but it is also deficient in labour saving equipment. Surely there are in this city few buildings or institutions of equal size and importance minus elevators, vacuum cleaning apparatus and similar every day essentials.

## Notes and News.

Professor W. A. Haswell, D.Sc., F.R.S., who has been a Trustee of the Australian Museum since February, 3rd, 1891, resigned in December last. There is, perhaps, no name so widely known to English-speaking zoologists and zoological students, for "Parker and Haswell," as the text-book by these distinguished authors is usually called, has for over twenty years been in general use in British and American universities. Professor Haswell has been associated with the Museum for many years, for in 1883 he was appointed acting curator during the absence of the curator, the late Dr. E. Pierson Ramsay. His wide knowledge and wise counsel were of the greatest value to the Trustees and the Staff of the Australian Museum.

Mr. Charles Hedley, Principal Keeper of Collections, retires from the trustees' service on April 1st. For thirty-three years this distinguished conchologist has been an officer of the Australian Museum, and our fine collection of shells is largely the result of his assiduous collecting round the shores of Australia and the islands of the Pacific. His numerous papers on mollusca which have appeared in our own publications or in the journals of various societies have earned

him recognition as one of the world's leading conchologists. Mr. Hedley is also an accomplished ethnologist, and his work on the distribution of animals and past geographical changes is well known to scientific men in all parts of the world. His retirement will leave a gap in the scientific staff of the Museum which will be difficult to fill. We rejoice that Mr. Hedley will continue as an active worker in the cause of Australian science, for he leaves the Museum to assume the post of Director for the Barrier Reef Investigation Committee.

Among recent visitors to the Museum were Colonel C. B. Palmer, Durham, who was much interested in our Cook relics; Dr. A. H. B. Kirkman, F.R.C.S., Seaton, Devon, Sir George Knibbs, Director of the Commonwealth Institute of Science and Industry, Melbourne; Mr. Chas. Barrett, C.M.Z.S., Melbourne, editor of *Pals*, a well-known writer of delightful natural history articles who often contributes to our pages; Mr. C. H. Rainford, Bowen, Queensland, a valued correspondent and a collector to whom we are indebted for many interesting specimens; Mr. A. W. L. Oliver, China, who, during his sojourn in Sydney was here frequently, in quest of literature to aid him in his researches.



## Aua Island (British New Guinea).

Ethnographical notes and illustrations

BY CAPTAIN G. H. PITT-RIVERS, F.R.A.I.

**A**UA or Durour Island (lat.  $1^{\circ} 28' S.$ , long.  $143^{\circ} 5' E.$ ), forms one of a pair of small coral islands usually referred to as the reputation for unhealthiness, had combined to make it very attractive to ethnographers. It is regrettable that recent plantation activ-



Aua Village.—The different types of houses are illustrated. From left to right: "vanioa" (living house), "uva" (bachelor's house), "leer" (provisions-house on piles), "rufu" (girls' house), and on extreme right "torro" (open-sided shelter). The girl in foreground is husking a coconut.

[Photo.—Captain G. H. Pitt-Rivers.]

North-Western Islands, owing to their situation in the Bismarek Archipelago to the north-east of New Guinea. The southermost of the two islands is Wuwuloo or Matty Island, the better known and more often visited of the two. Up to the time of my visit in 1921 Aua, unlike Wuwuloo, had, owing to the small amount of copra it could produce and its lack of commercial attractiveness, been spared an invasion by imported indentured labourers: this fact, as also its relative freedom from European contamination, supported by a

ities on the island now threaten to obliterate completely the native culture. Previously ethnographers never remained long enough to do more than stimulate anthropological curiosity, and we do not learn sufficient about the island culture from the short accounts in the German works of Hellwig and Parkinson, nor from the Swedish work of Count Mörner.<sup>1</sup>

<sup>1</sup> Mörner — *Arafis Tropicka Ar.*, Stockholm, 1914.  
Parkinson — *Dreissig Jahre in der Südsee*, Stuttgart, 1907.



Aua and Wuwuloo are both inhabited by a Malao-Polynesian or predominantly Malayan race with light brown skin and straight hair. Their racial characteristics differentiate them from the populations of all the other islands of the archipelago and the New Guinea mainland.

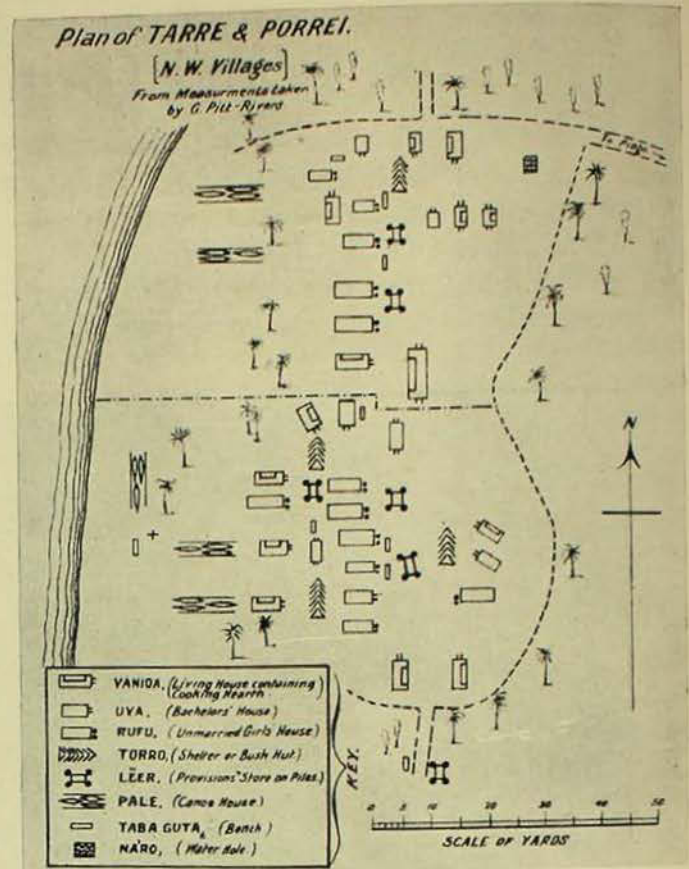
Up to 1904, in which year a white man for the first time established a small trading station for copra and shell on the island, the islanders depended exclusively on their stone age implements. Knives manufactured from shark's teeth, fish-hooks and axes fashioned from shells, and agricultural axe-shaped knives with blades of turtle-bone used for cutting roots, were amongst their equipment. These showed in their manufacture a high degree of skill and craftsmanship. The construction of their houses and of their canoes affords convincing evidence of a high standard of culture. The houses are built of hardwood planks, neatly riveted together and lime washed, and thatched with coconut mats.

For clothing there was little need in that torrid climate. A stitched pandanus leaf hood was sometimes used as a protection from the rain, or a taro leaf tied round the head as a protection from the sun, otherwise the men wore nothing. The women considered themselves sufficiently clothed with a leaf held in place by the much prized string girdle 'uru,' but now that the white man's ships call more frequently they are abandoning this primitive costume, or reserving it only for the privacy of the village, when they are alone.

#### SOCIAL ORGANIZATION.

The island is, or was, divided into three sections, north-west, south-west and south-east; each with its complement of little straggling hamlets along the shore. Each district had its own puala, or head chief, and each spoke a very slightly different dialect. Over most of the hamlets ruled a headman or subordinate chief called a päavi.

The päavis succeeded to office sometimes by paternal descent like the pualas, sometimes



by the system of maternal descent which prevailed amongst commoners, and sometimes by claims dependent less on descent than on their power and popularity, acquired as members of a class of technical experts or craftsmen known as anu-anu.

These anu-anu constitute a class of skilled experts in the various arts and crafts of war and peace, as warrior leaders in the field, as makers of all the best spears and fighting weapons, as builders of houses and of canoes and as agricultural experts. They are a class apart from the päavis from whom they take orders, although they are of great influence and prestige in the community. Occasionally one has been known to succeed as päavi when the heir was too young, weak, or unpopular.

Unlike the pualas, who lived in patriarchal fashion with their wives and families in their own puala-hamlets, the social organisation of commoners is strictly matrilineal and matrilocal, each matrilineal and matrilineal family



owning a group of houses of different types, each type dedicated to a different use.

Among the commoners, and sometimes though not invariably among the pāavis, a woman on marriage remains with her own family, her mother assigning to her a living-house (vanioa). The husband after marriage also remains with his own, that is, his mother's family. In his wife's house he is only a visitor. It is his female relations—his mother, sisters and aunts—who look after him and cook his food. In some respects the organization resembles that of the Khasi of Assam, where, according to Sir Alfred Lyall, in Jowal the husband neither lives nor eats in his wife's house.<sup>2</sup> The Aua husband fishes and cultivates taro to supply food for his mother's kin, though he often brings his wife's family presents of food. All property, except in the case of chiefs, passes by female heritage.

The system of mother-right and its influence upon kinship, descent and property, does little to impair the executive of the men or their use of property. Not only is chieftainship in the hands of men, but the family property, such as the wula (swamp-taro) holes, fishing holes on the coral reef, and canoes, although held in the name of the maternal family, are under the control of the men, the old mother's brother or her eldest son.

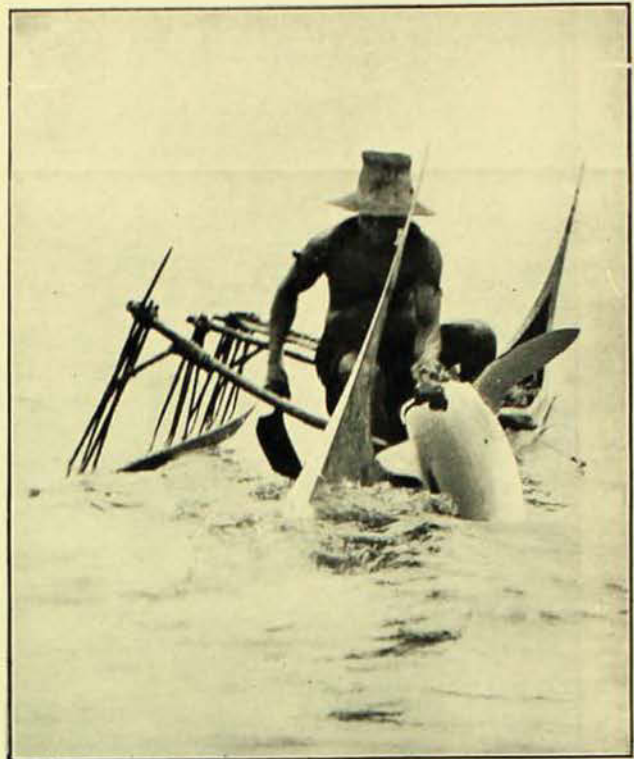
Before the recent decline in the population, and the consequent deficit of women<sup>3</sup> polygamy was common and absorbed the surpluse of women. When a commoner had more than one wife, the wives were usually sisters, or close relatives, who would normally share a house.

#### SHARK AND CORAL REEF FISHING.

The Aua Islanders are adept at a great variety of methods of fishing, fish being their staple diet. As in all their occupations some methods are reserved to men and some are pursued by women: thus in calm weather women fish in the surf on the fringing reef with sago palm rods. A division of labour between men and women is practically universal, but in more primitive societies the di-

<sup>2</sup> Lyall's introduction to P. R. Gurdon's "The Khasis" pp. xxiii, *c.s.*, quoted by W. J. Perry, "The Children of the Sun," p. 245.

<sup>3</sup> This correlation of declining numbers and disturbance in the balance of the sexes has not attracted sufficient attention and forms the subject of a forthcoming work.



Landing a shark single-handed.

[Photo.—Captain G. H. Pitt-Rivers.]

visions are more clearly marked, the dividing line between male and female occupations being based partly on physiological differences and partly decided by the arbitrary evolution of custom and usage. In Aua society the discrimination between male and female occupations is most strictly observed, and extends to the different branches of fishing.

Sharks are caught by the men on lines cast from their light dug-out canoes. The moment a shark bites he is played to the surface and a long barbed spike thrust down his throat. With his left hand the fisherman seizes a hardwood mallet and belabours the struggling shark on the nose, while the canoe spins round like a top. When the shark is exhausted a dexterous twist of the wrist lands him into the canoe. Sometimes a brother fisherman assists at this moment by steadying the canoe but often the feat is accomplished single-handed.

Coral hole fishing is essentially woman's work, and no man ever takes part in it, except in the preliminary work of constructing the hole in the coral reef. This is a slow and laborious process, which may take a year and more to complete. The holes are excavated out of the coral reef and each belongs to the





Women catching fish in prepared holes in the coral reef.

[Photo.—Captain G. H. Pitt-Rivers.]

family that made it, and is named after the original constructor. When excavated the hole is filled up with flat stones. The holes may be no more than some six feet square, while the biggest one I visited was about ten yards square.

The first proceeding consists in placing nets around the hole, as seen in the accompanying illustration, and then one by one the flat stones are thrown over the net. As the

stones are removed the fish are driven to the bottom of the hole in attempting to hide beneath the stones. A long coconut bag is placed along one side of the bottom of the hole and in this the fish eventually seek refuge. Finally the bag is closed; two or three women lift it out of the water, and it is carried to the beach, where the catch is counted. As many as three hundred fish have been caught in one hole.

When Mr. E. L. Troughton, of this Museum, was engaged collecting on the east-west railway line, he noticed that rats formed a favourite food of the owls that live in the district. Consequent upon this observation, Mr. Troughton urged the Lord Howe Island board of control to introduce owls into the

island to combat the rat pest. Accordingly, a number of these birds were sent to the island through the good offices of Mr. A. S. Le Souef, Director of the Taronga Park Zoological Gardens, and latest advices from the board of control are to the effect that the owls are doing great work in destroying rats.



## Wild Life of the Mallee

BY CHARLES BARRETT, C.M.Z.S.

THE Mallee lands of Victoria are so vast (11,000,000 acres), that, in all my little journeys through them, I have gained soil prepared for wheat growing. Where once the emu and the dingo roamed, and the lowan's mound was safe from human



In Angry Mood. Young "Major Mitchell" Cockatoo. These beautiful birds are becoming rare in some of their haunts at least.

[Photo.—C. Barrett.]

only glimpses of the wild life that has lured naturalists from far and near, to "camps in the wilderness." As a swallow, in flight over some great lake, captures insects here and there, so have I gleaned notes and pictures from the "surface" in Mallee wilds.

Our wilderness is shrinking every year, as the scrub is rolled down and burnt, and the

"robbers," rich cereal harvests are now reaped, and prosperous farmers travel in their cars along roads deep in dust. There are townships where before the war I camped, and stalked shy-birds with field-glass and camera.

We have one large reserve in the Mallee—Whyperfield, or Wonga Park, between Lake



Albacutya and Pine Plains; an area with small lakes, a creek—rarely more than a dry bed—lined with old grey “river” gums; pine ridges, dense belts of Mallee eucalypts, wide tracts of “spinifex” or “porcupine-grass” (*Triodea*), and other typical vegetation.

In Wonga Park and around the Pink Lakes of Linga, I have rambled most recently, but some of my photographs were taken long ago, in the Ouyen district, and in tracts of Mallee near Lake Boga.



The sphere of spines. Echidna, or “Porcupine,” rolled up ready to repel an enemy’s attack. On soft soil it would “dig-in.”

[Photo.—C. Barrett.]

#### MAINLY ABOUT MAMMALS.

In the Mallee, beyond the settled districts, kangaroos still abound, I believe; but in my wanderings, I have seen very few within coo-ee of crops and homesteads. At Wonga I came suddenly upon a splendid “upstanding” roo. He remained for a minute, erect and watchful, then went bounding from his foraging ground in the open, to cover among a crowded company of little, glossy-leaved gums. Their spoor is plentiful in the soft, clinging sand, even along the wheat-field fences; and often the crops in sparsely settled areas are invaded by kangaroos.

Dingoes, of course, still abound in the Mallee, and some are monsters, if one may believe the settlers’ stories. An old bushman told me, as we smoked by a camp-fire near Wonga, of a dingo he had captured when it was an engaging pup, and reared to doghood. It became rather friendly with his big kangaroo hound, and they went

a-hunting together. But sometimes the tame-wild dog “went bush,” remaining away for days. It returned to resume civilized ways, and camp in a kennel at night when its untamed kin were on the prowl. It returned a score of times from these secret excursions; but at last came a day, when the call of the wilderness was heeded, and never again did the dingo come back to its kennel by the door of the hut.

The aliens, fox and rabbit, will flourish in the Mallee when all the native mammals have gone. Close to wheatfields you may see big warrens, and, as you walk or ride along in the evenings, rabbits scuttle down burrows on either side of the way. Foxes are taking heavy toll of the lowan and other ground frequenting birds. They open the



Bearded Lizard basking. In the Mallee, as in other dry areas, this lizard is plentiful. It perches on tree-stumps and fence-posts, and is also often disturbed upon the ground.

[Photo.—C. Barrett.]

the lowans’ mound-nests, and with eager paws dig out the eggs. Cats “gone-wild,” as we say, are increasing in some localities; they, also, are enemies of bird life—a greater menace perhaps than Reynard, for they hunt in the trees as well as on the ground, and destroy many kinds of perching birds.



## THE "PORCUPINE."

Echidnas are common in most of the Mallee districts known to me. At Linga, one was captured, buried in a heap of "cocky" chaff, in a wheat-farmer's barn. When I carried it into the open, and dumped it on a patch of hard ground, the "porcupine," after a vain attempt to "dig-in," curled up like a chiton out of water, and became a sphere of bristling spines. A terrier barked at it bravely enough, but declined to attack the queer little monotreme. After a camera snap-shot we strolled away, and presently the echidna unrolled and shuffled off into the wheat, whence, doubtless, it had strayed on the previous night.

In a hundred-acre patch of scrub, surrounded by cultivated land, I noticed everywhere signs of *Echidna aculeata*—places where the earth had been ploughed by foraging claws. In soft soil, a "porcupine" digging like a navvy for a wager, can get "below" in a couple of minutes, or even less, I believe. I had a race with one, trying to photograph him with a stand camera, before he disappeared. We started off scratch, and, before I could focus sharply, and slip in the dark slide, my subject was nearly out of sight—just a bunch of spines showing above two little ridges of excavated earth. I had to give him a handicap, keep him inactive until I had the camera all ready again.

## REPTILE LIFE.

The Mallee lands are rich in reptiles. Concerning snakes I can say little, for, strangely enough, I seldom encountered one in my rambles. But never a day passed without some record of lizards, large and small; and often the tally ran far into double figures.

In Gippsland, and parts of New South Wales, I have seen, goannas (*monitors*) of startling proportions. Most of them were off in a flash, racing over the ground or climbing a tree-trunk as easily as a snake glides to cover. Sometimes, one would stand at gaze for a moment or two; but neither defiance nor menace was shown. A captive *Varanus varius* however is apt to bite savagely, if it gets a chance. The Mallee monitors (*Varanus gouldi*) are smaller than their cousins, and, in my experience, neither aggressive nor vicious. I rescued one from a

fox-terrier, near a farmer's home. It was not disabled, yet it allowed me to handle it freely, making no attempt to bite. The terrier just mentioned was a confirmed lizard-hunter, and I was not always quick enough to save its victims from death. It killed "goannas," bearded dragons (*Amphibolurus barbatus*), stump-tails (*Trachysaurus rugosus*), and other species indiscriminately.

Dragons and stump-tails, are plentiful all over the Mallee lands where I have wandered, and I obtained many photographs of each species. The dragon, I usually found on tree-stumps or fence-posts, basking in grotesque attitudes; "stumpy," asleep on a bed of sand or dust, or crawling along at a snail's pace in the sunshine. The dragon when annoyed or startled makes a menacing "display," with jaws agape and the neck frill outspread—a beard of long spines—while the body is puffed out to add to the fearsome effect. Rather a startling picture for a new chum to contemplate. Stumpy, too, tries to scare any disturber of his sleepy existence. His stout body swells, and he hisses savagely, flickering his broad purple-blue tongue the while. But he can neither alarm nor escape birds of prey; brown hawks (*Ieracidea berigora*), I know, prey upon *Trachysaurus rugosus*.

Of the lesser lizards there are many kinds in our Mallee country. Most engaging, I think, are the geckos, splay-footed and goggle-eyed little creatures, that lurk beneath loose bark on the gum trees, hide under debris, and venture often into huts and houses. A rather common form at Linga is about six inches in length, has soft skin, and is prettily coloured—chestnut-brown, with spots and streaks of ashy-white. I could never harden my heart to make a specimen, so I do not know this gecko's proper name—I think it is *Gymnodactylus miliusii*.

All the smaller lizards are attractive, and some make charming pets. I had a tame gecko in Egypt: it hunted on the ceiling and walls of the old Pasha's palace where I was domiciled for a while. The Arab servant feared and hated it; a bite from the harmless little reptile, they said, or even a "look" might be fatal. A stupid Eastern superstition. Even some enlightened Australians, though, regard geckos with suspicion. The beauty of quaint ugliness has a limited appeal.

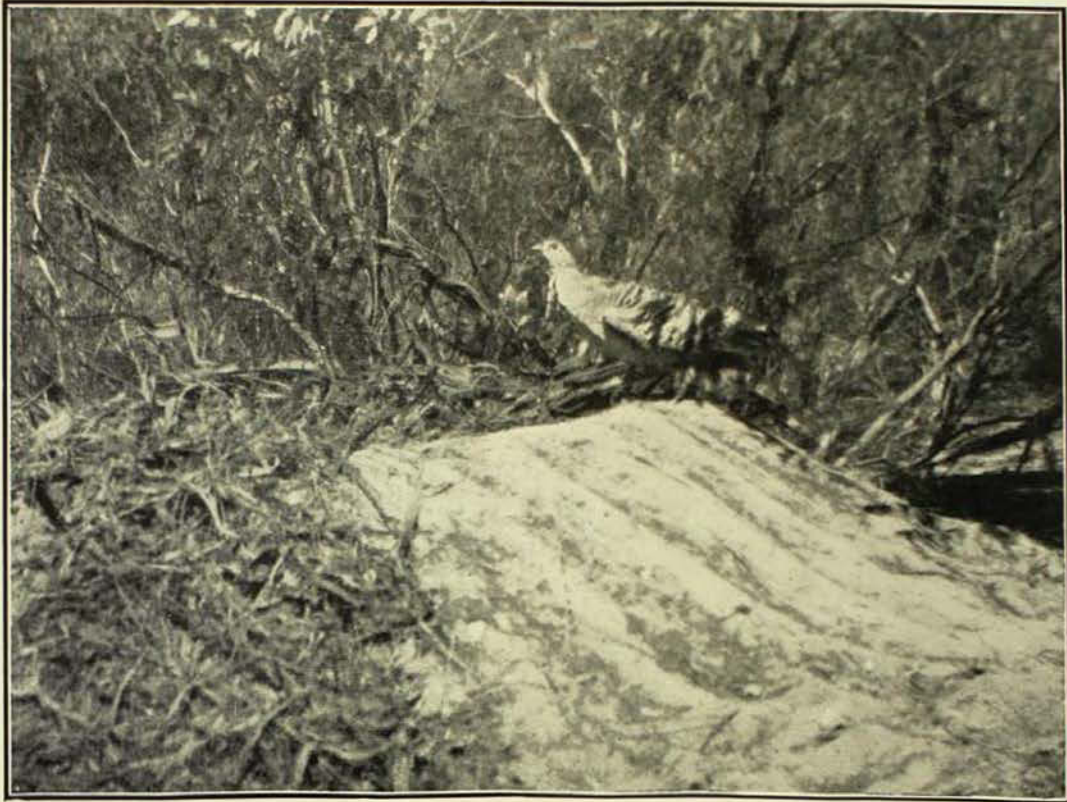


## THE EMU.

Emus are fairly safe from their enemies in the remotest parts of the Mallee country, that are penetrated only by the most experienced bushman, and to them are but vaguely known.

## THE LOWAN AT HOME.

None of the Mallee birds is more famous, both in Australia and overseas, than the lowan (*Leipoa ocellata*). A wonder-bird it is, with habits as remarkable as those of the bower-builders. I have found scores of their



Lowan just arrived at nest mound: A remarkable photograph taken by the late "Mallee Bird" who knew the wild life of the Mallee so well.

[Photo.—C. McLennan.]

Coming from a screen of trees on to the shores of the largest of Linga's pink lakes, I saw six emus a hundred yards away. They commenced to run immediately, but, instead of darting for cover, raced round the lake in full view. Again, travelling by motor from Kulkynne towards Mildura, I encountered a small flock of emus, which ran ahead of the car for several minutes. We did not "extend" them, but slowed down instead for the pleasure of watching the big birds, which, on their part, displayed some interest in two men approaching them awheel.

Drought sometimes drives emus close to country towns, even in normal seasons they often venture into "home" paddocks where wheat growers have claimed their ancient demesne.

nest-mounds, but only twice have I seen lowans at close range. They are wary as a rule and secretive in their ways. And yet, at Linga, within a stone's throw of the school ground, where youngsters were shouting and laughing at play, a lowan walked quietly on to the track a few yards in front of me. I "froze," of course. The bird saw me, but continued at the leisurely pace, remaining in full view for nearly two minutes. Every Australian nature lover knows that the lowan, or Mallee-fowl, is a mound-builder; that its nest is a big incubator, a rounded heap of sandy soil and debris, with a hot-bed in the centre. The large pinkish-buff eggs are deposited in the "incubator" in tiers, each in a vertical position resting on its smaller end. There is still difference of opinion regarding



some of the lowan's nest habits ; but all the facts and theories have been published in popular books and journals, so I shall not record them here.

Unless we reserve, permanently, several large areas in the Mallee as sanctuary for wild

#### BOWER BIRDS.

In Mallee country near the Murray River, below Mildura, I found the spotted bowerbirds (*Chlamydera maculata*) in fair numbers, but fruit-growers were waging war against them, alleging orchard raids. Every morning



Black Swan on nest. Hundreds of swans nest on some of the Mallee lakes. It is said that when a lake dries up before the cygnets learn to fly, the youngsters are guided overland by their parents to a lake that still contains water.

[Photo.—C. Barrett.]

life, the lowan will surely disappear and become as a tale that is told ; and that within fifty years maybe. The loss will be national. Many of our marsupials are doomed, and many of our birds. We have been careless of our wild life, and are not too careful now.

in a pepper-tree close to the homestead, I saw the owners of a bower which was hidden among bushes, not half a mile away. The birds were confiding because they were made welcome by the station manager and his family. They did not fly even when I stood



beneath the boughs and gazed rather rudely at them. Their treasure of bright objects at the bower included glass bottle-stoppers, pellets of lead, blue parrot feathers, bits of blue glass, a land shell or two, and hundreds of bleached bones gleaned from the bush, and, also, I fancy, the vicinity of the dog-kennels at the homestead: hard crumbs from Rover's table were not beneath a bower-bird's notice.

White cockatoos flew overhead, screeching defiance and anger at our presence in their capital city—the Canberra of the clan, but with a population greater than *our* capital is likely to boast, in our time. "Major Mitchells" we saw indeed, but not a score in all. Bird-trappers, you see, had been operating around Wonga's lakes and along the Outlet Creek, for years perhaps, and young



The biggest of the Pink Lakes. The salt is harvested with scrapers. The figure is standing on a shore of salt, and all the lake is salt with a film of water over it in some parts.

[Photo.—C. Barrett.]

#### PARROTOPOLIS.

Cockatoos and parrots breed in thousands at Whyperfield. There I found, in hollows of the old grey river-gums, nests of the white cockatoo (*Cacatua galerita*), the rather rare "Major Mitchell" or pink cockatoo (*C. leadbeateri*), the glorious "smoker," or regal parrot (*Polytelis melanura*), and several other species of the noisy tribe. There were doves, too, and pigeons, and a host of smaller birds; but pre-eminently Wonga is the domain of cockatoos and their crestless cousins.

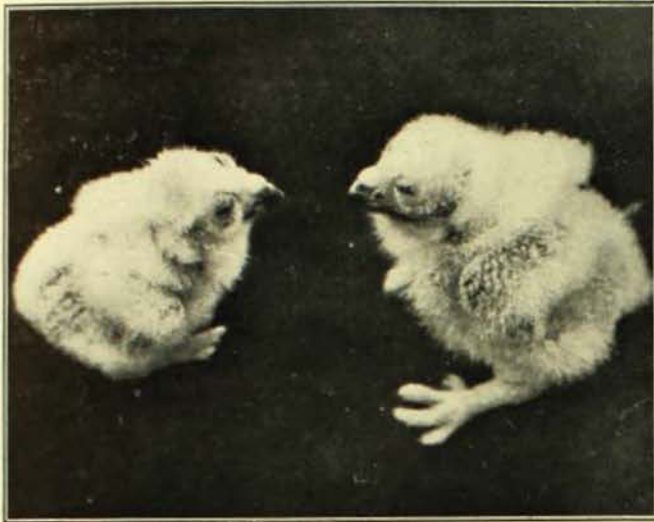
majors and smokers had been consigned to Melbourne and Sydney, or wherever they are sold, in hundreds. This traffic now is unlawful—at least the birds are on the list of fully protected species. Yet one still hears of raids on bird-homes in hollows out in the wild Mallee lands.

#### NOISY INFANTS.

I collect neither birds, skins nor eggs, but I confess to a mild form of nest-raiding; I borrow baby birds from their parents, and



pose them for portraits. Some of the youngsters do not mind; others strongly object, and say so, noisily. I had trouble with a young Major Mitchell, and snapped him as, with crest erect, he voiced his final protest. Mind you, I treat these bird babies tenderly, and they are restored to their parents in good order and condition except, perhaps, for ruffled feelings and feathers.



Baby Boobooks. One chick is obviously older than the other—several days perhaps.

[Photo.—C. Barrett.]

Regal is a more fitting name than smoker, for *P. melanura*. Flying in sunshine, these parrots look so beautiful, it seems hardly too fanciful to call them golden birds; the colour of the plumage though, is really olive to greenish-yellow. As cage birds smokers have always been popular, and, in Victoria at least, their ranks, as wild birds, have been sadly thinned by the trappers. One man is said to have taken in a season two hundred young birds from Wonga, before it became a sanctuary for wild life.

#### ON THE LAKES.

Wonga's lakes are beautiful. They mirror trees and the summer sky, and the water-fowl that swim serenely from shadows to sunshine, and back again, or stand, as the herons, in reedy shallows, a yard or two off shore. But I did not linger by Brambruk and its satellites; a lake less beautiful, out in the open, lured me, because news came that swans were nesting there in battalions. So I travelled on to Pine Plains homestead, and was welcomed, though a stranger, like a long expected friend.

The swans were nesting; but most of the broods had ranged. I rode, with the camera across my back, through ooze and reeds, and the grey-white stems of dead "tobacco" plants, to an islet, where the nests were abundant in rows. All empty, though, and so were many others—circular mounds of mud and aquatic weeds, dotted about the shallows. My swan photographs were taken far from Pine Plains.

#### MIXED COMPANY.

After a trip to the Pink Lakes themselves, where the salt, rose-pink like a flamingo's "under" feathers in sunshine, is harvested, I devoted days at Linga to bird life near the homestead—our headquarters. My companion, Mr. F. E. Wilson, a noted Victorian entomologist, and a bird-student, too, discovered an island of scrub in a paddock, where bird homes abounded. Barely half an acre of bushes and trees, yet there we found the nests of more than twenty species, from bee-eaters (*Mecrops ornatus*) to brown hawks and boobook owls (*Ninox boobook*).

All about was cleared or cultivated land, and a mixed company of birds had resorted to the "island" for nesting. I exposed scores of plates on many good subjects, and had the luck to get some unique pictures.



Sleepy in sunshine. Young Tawny Shouldered Frogmouth (*Podargus*). These birds, whose plumage is protectingly coloured, generally perch as shown in the picture, and not across a branch.

[Photo.—C. Barrett.]



But the best in my Linga gallery were not taken there, namely the portrait of a young scrub robin (*Drymodes brunneopygius*), and a pair of baby boobooks.

One of the Mallee's most delightful small birds found elsewhere too, eluded my camera lens. The owllet night-jar (*Aegotheles novae hollandiae*), was common enough, sheltering by day in spouted limbs, but every one that we disturbed declined to pose for a portrait. It was some consolation to succeed with another nocturnal species, the frog-mouth (*Podargus strigoides*). A nest containing fledglings was found in a tree-hollow, and nearby was the home of a pair of many-coloured parrots (*Psephotus multicolor*), from which a well feathered baby was borrowed.



Young Scrub-Robin sheltering among dry grey boughs and dead leaves. Their plumage harmonises well with the environment in nature. [Photo.—C. Barrett.]

Every "good" hollow in this paddock seemed to be tenanted, while big knot-holes on the trunks, and the ragged ends of broken boughs, were also nesting sites. Here the skimming tree-martins (*Petrochelidon nigricans*) had come to rear their broods; wood-swallows (*Artamus sordidus*), too, diamond birds (*Pardalotes*), and many more.

#### QUEER BEETLES.

Birds and beetles! My companion at Linga, with an eye for birds, had yet a keener one for coleoptera. He did not go unrewarded, and his cabinet, to my mind, contains no specimens more interesting than the "digger" and "tiger" beetles that we captured at Linga a year or two ago. Out in the Mallee I learned to understand some of Fabre's fascinating facts and theories concerning beetle-life.

The Coprides, or dung-burying beetles, have unpleasant ways at table it is true, yet they are neat and clean, and have highly-polished elytra if not polished manners. They are most remarkable insects, when you

consider their structure and mode of life. The species most common at Linga was *Bolboceras sloanei*. The male is heavily armed, with a big horn jutting from the front of his head, and on either side of the thorax, a shorter one. The female lacks these weapons, implements, or ornaments—call them what you please.

Strolling across the sand-hills after sunrise, every day we found small mounds of excavated soil, not a loose mass of particles, but a heap composed of coils, like lengths of macaroni. If we dug to a depth of about three feet, vertically, beneath a heap a *Bolboceras* might be found there. At night, some specimens were taken on the wing, attracted by the beam of an acetylene bicycle lamp—one of the insect-hunter's artful dodges.

We failed to find balls of beetle-food in these vertical shafts, and all were far from places where manure existed. But I am content to apply to our *Bolboceras* Fabre's inimitable account of its relatives in France, *B. sloanei* is really a fine fellow, with his great frontal horn, and its minors, his polished chestnut-brown armour, and strong leg



beautifully adapted for the earth-work that is his daily occupation.

*Megacephala australis* is the scientific name of the fierce, swift-footed, and splendidly colored tiger-beetles, that we found at Linga, in the Mallee. We saw them first at night, running over the ground, as the lamp beam struck a path through darkness. They were so quick upon their ways, that we needed nimble fingers; and those fingers were sharply nipped when they did effect a capture. The

tiger-beetle is a fierce little hunter, a terror for his size to other insects.

We discovered the headquarters of the "tigers" when we went to the big Pink Lake. There in the salt ooze, beneath old salt-incrusted planks lying on the "frozen" shore, they were at home. As a plank was lifted little flakes of emerald, embedded in the rose-tinted ooze, flashed and sparkled in the sunshine; we had tracked the tigers to their lairs!

## Cannibalism among Snakes.

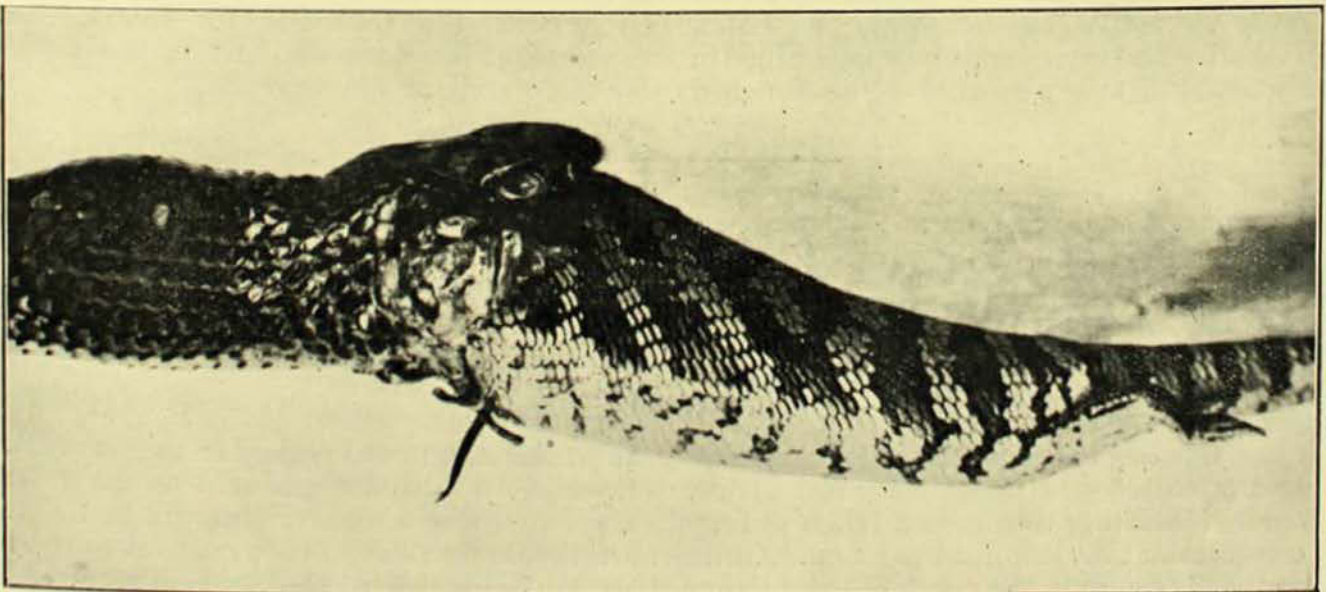
BY J. R. KINGHORN, C.M.Z.S.

CANNIBALISM among snakes must be fairly common, judging by the instances that come to light from time to time. In the Museum gallery there are several exhibits illustrating the cannibalistic habit of some of our snakes; one shows a Ringed Snake (*Furina occipitalis*) which has swallowed as much of an unfortunate Blind Snake (*Typhlops*) as it can comfortably hold, while in another a Superb Snake (*Denisonia superba*) has swallowed one of its own kind.

Cannibalism may be deliberate or accidental; the former may be resorted to as the final act of offence or defence when fighting, or it may be that, on account of the scarcity of food, one is forced by necessity to make a meal of another. The snakes may belong

to the same or different species, and it often happens that the smaller specimen gets first hold and gradually swallows its larger enemy, a feat which, if the victim is not very much the larger, can be accomplished with safety, but if, on the other hand, the cannibal is smaller than it thought it was, it generally succumbs to its greed, or its courage, as the case may be.

An interesting account of deliberate cannibalism was reported some time ago by Mr. H. A. Longman, Director of the Queensland Museum. A four foot specimen of the Yellow-spotted Black Snake (*Pseudechis guttatus*) was placed in the same cage as a large Death Adder (*Acanthophis antarctica*). The following morning the Death Adder had disappeared



This Black Snake was killed in the act of swallowing a Blue-tongued Lizard.

[Photo.—H. Selkirk.]



but a decided increase in the girth of the Black Snake told a "story without words." The same morning the Death Adder was disgorged in a considerably mangled condition, which suggested that it proved unpalatable to its swallower.



The cannibal Brown Snake was opened in view of numerous onlookers and its victim extracted.

[Photo.—S. D. Groome.]

Accidental cannibalism occurs more often in captivity than in the wild state, and it is generally through two snakes tackling the same article of food, such as a lizard, from opposite ends. When the lizard disappears and the snouts of the snakes are touching, neither being willing to let go its hold, the inevitable result is that the smaller snake follows the lizard down the throat of the conqueror.

Lizards form one of the main articles of diet of many of our snakes, and the accompanying photograph, which appeared in the *Daily Telegraph*, clearly shows a Black Snake five feet three inches in length, killed in the act of making a meal of a Blue Tongued

Lizard (*Tiliqua*). Had there been a smaller snake hanging on the end of the lizard's tail it would undoubtedly have served as the second course to the larger snake, provided the latter had been spared.

An incident relating to cannibalism among Brown Snakes (*Demansia*) in which the smaller swallowed the larger is depicted in a photograph on this page, and the story is as follows:—

Mr. F. Kanowski, when driving from Glencoe into Toowoomba some time ago, saw the cannibal on the roadside, and on his approach it made as rapidly as possible for the shelter of some prickly pear near by. About six inches of the swallowed snake appeared from the mouth of its captor, and, before Mr. Kanowski could pin them together with a nail, several more inches were disgorged. The specimen was taken into the office of the *Toowoomba Daily Chronicle*, exhibited, and photographed. The cannibal was very much alive, but after it was killed and cut open the spectators were surprised to find that while the one it had swallowed measured four feet six inches in length it measured only four feet. This case appears to be one of deliberate cannibalism, as there was no evidence of their having attempted to swallow the same mouthful of food.

As suggested earlier, snake cannibalism is by no means rare in Australia, and the Museum would always welcome any specimens illustrating the habit, should the finders feel disposed to send them along. I am much indebted to Mr. Kanowski and to Mr. Groom of the *Chronicle* for information concerning the incident and to the latter for the excellent photographs.

The trustees have obtained by purchase a meteorite found at the head of Tigraco Creek, Murchison Gold Field, Western Australia, in 1922 by Mr. J. F. Connelly, who also discovered the Mount Stirling meteorite. It is a metallic meteorite or siderite of the octahedrite variety, weighing approximately one hundredweight. The surface is coated with a reddish crust of iron oxide, indicating that it had fallen at some considerable time before it was found. Owing to the difference in the power of the different nickel-iron alloys of which it is composed to resist the action of atmospheric weathering,

crude Widmanstätten figures have been produced naturally on the rough surface, which is characteristically thumb-marked. There is a hole through the centre of the meteorite and one small hole near one of the edges.

The meteorite will be cut in two, and one half exhibited in the gallery of the Museum. In order to have a permanent record of its shape and size, a plaster cast will be made. The mould for this has been made already by Mr. G. C. Clutton of the Museum staff. So irregular is the meteorite that this had to be constructed of forty-nine separate pieces.



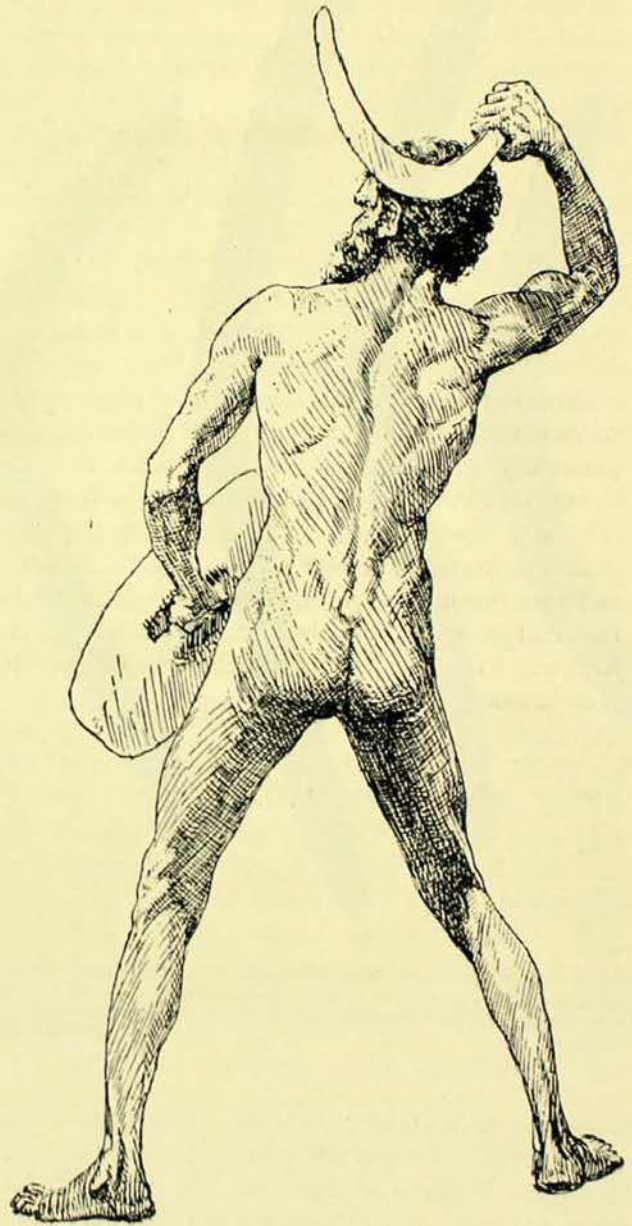
## Boomerangs.

BY WILLIAM W. THORPE.

PROBABLY the earliest reference to the Australian boomerang is that made by Captain William Dampier in his description of the natives of Western Australia and the weapons they carried, on the occasion of his visit there in 1688. To quote his words: "These poor creatures have a sort of weapons [*sic*] consisting of a piece of wood, shaped somewhat like a cutlass, and a long straight pole with the sharp end hardened in the fire." If the buccaneer had only likened the former to a sabre, a weapon with a definitely curved blade, the description would have been more appropriate to the boomerang. But a more definite description was given by Captain (then Lieutenant) James Cook, when writing of the natives of Botany Bay, on the occasion of his landing on April 28th, 1770. He says: "All of them were armed with long pikes [spears], and a wooden weapon shaped somewhat like a cimeter" [scimitar]. The scimitar, as is well known, is a short curved sword used by the Persians and Turks, hence Cook's description is more appropriate to the boomerang than to any other weapon or implement we know of from Botany Bay. Moreover, in the Cook collection of this Museum there is a boomerang collected by the great navigator, but unfortunately we have no means of knowing whether it came from Botany Bay, or from the Endeavour River, Queensland, where he careened his ship. From the general appearance of the specimen, and the fact that the boomerang is not recorded amongst the weapons carried by the Endeavour River natives, one may, with little reservation, ascribe its origin to Botany Bay.

There are two forms of Australian boomerang, the "returning" or "come back," and the "non-returning" or "war boomerang." The peculiar action of a returning boomerang, to be described further on, is special to itself, and, however close external resemblance may be, it is practically certain that no weapon quite similar to it was known to any other people. In other words, the "come-back," boomerang is as typically Australian as the kangaroo or lyre-bird.

Amongst projectile weapons comparable with the boomerang is the flat "fowling



Hurling the boomerang. With his left hand the aboriginal grips a shield of the goolmarry type.

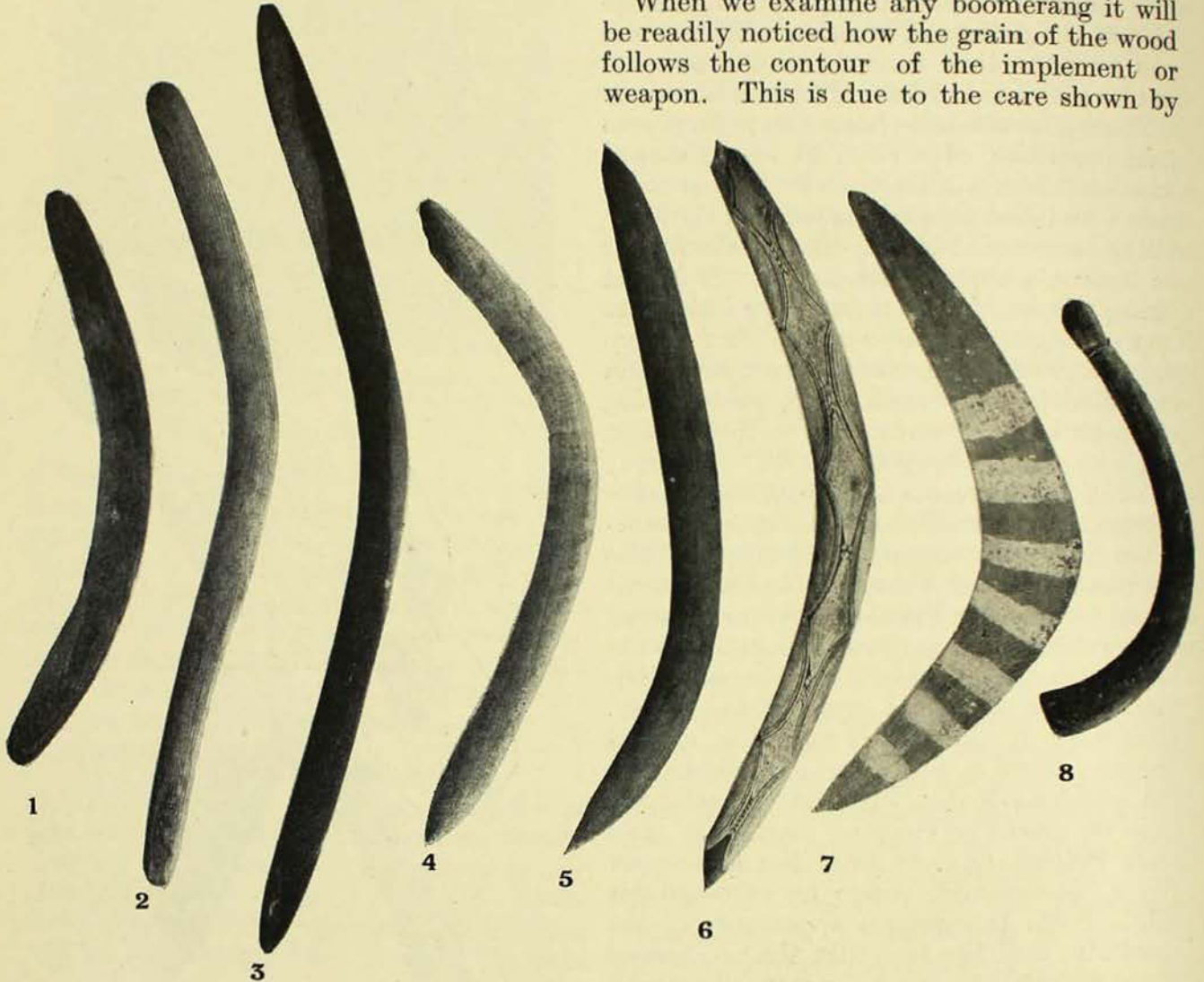
[After Thomas.]



stick" of Ancient Egypt; the *cateia* of Roman writers, a curved missile with a rotary motion; the two forms of Indian "boomerang" so called, namely the *katari* of the Kols of Guzerat, which is thrown directly at an object, and the *vālai tadi* of the Tamil Kallans and Maravans of Southern India, which

so. This type measures up to thirty inches across the arc, and does not possess the degree of curvature so noticeable in the "come-back." It is usually fluted on the rounded or convex side and when used in combat is hurled directly at the enemy.

When we examine any boomerang it will be readily noticed how the grain of the wood follows the contour of the implement or weapon. This is due to the care shown by



Types of Australian Boomerangs.—1. Western Australian "Kiley." 2. War Boomerang from the interior. 3. Lachlan River, N. S. Wales, Boomerang. 4. Sickle-shaped Boomerang, Illawarra, N. S. Wales. 5. Leaf-shaped Boomerang, N. E. Queensland. 6. Carved Boomerang, Gympie, Queensland. 7. Fluted "Kiley," Western Australia. 8. Indian Boomerang.

[Photo.—G. C. Clutton.

possesses a whirling motion, causing it to return to the place from which it was thrown. The Zuni Indians of Arizona are also said to use a curved implement thrown directly forward, and called *kleane*.

Before dealing with the returning boomerang, its probable evolution and fantastic flight, let us turn our attention to the other form known as the "war boomerang." This is of heavier construction, and made intentionally on the one plane, so that, if soiced on a level surface, it lies flat, or nearly

the aboriginal in selecting a suitable portion of a tree from which to fashion his boomerang. The region of the root and ascending trunk is a favourite spot, failing that a well bent limb or twisted branch would be chosen. One feature that all boomerangs possess in common is a flat and convex side, and when thrown the flat side is underneath soon after it leaves the thrower's hand.

Regarding the geographical range of the boomerang it has not been observed north of the Palmer River in Queensland, neither



is it in general use in the Northern Territory. It was formerly in common use throughout New South Wales, Victoria, and the southern part of Western Australia, but was unknown to the Tasmanians.

To the casual mind all boomerangs seem more or less alike, yet on closer acquaintance one may observe sensible differences in degree of curvature, weight and size. These variations are governed by geographic occurrence or tribal usage; thus boomerangs from the coast of Queensland differ in shape from those of Western Australia, and the "war boomerangs" of western New South Wales vary from those of central Australia, though the latter heavy type has a wide range in the interior of the continent. Sometimes they are carved, especially the war weapons. Very regular and pleasing patterns are incised on the convex side. At other times they may be painted with earthy pigments, ornamented with swan's down and human blood, but this treatment is usually associated with ceremonies.

The name "boomerang" like many other Australian objects, has a strictly local derivation. It was known as *bumarin* by the Botany Bay tribe, but the corrupted name has been adopted and used everywhere when these interesting objects are referred to. One could give perhaps twenty local names for the boomerang. For example the "come-back," is known as *kiley* in Western Australia, and *wonquim* in Victoria.

#### PROBABLE ORIGIN AND EVOLUTION.

Some of the weapons of the Australian aborigines merge one into another so that a series could be selected to show the transition from an ordinary club to an almost rectangular boomerang. How did these primitive people arrive at such a complete and effective implement as the boomerang, and especially the "come-back," with its peculiar flight? Was it brought about by observing the falling gumleaf? In this connection it may be mentioned that one of the amusements of the aborigines, especially the younger set, was to throw dry leaves into the ascending smoke of the camp fire and watch their curious spiral behaviour.

General Pitt Rivers, F.R.S., has at some length elaborated an hypothesis as to the probable evolution of the returning boomerang. This eminent ethnologist has traced the

derivation through four definite stages which may be condensed as follows:—

Stage 1. All savages are accustomed to throw their weapons at their enemies.

Stage 2. A curved stick was noticed to rotate more freely than a straight one.

Stage 3. It was found that by splitting the weapon in half throughout its length, and thereby exposing to the atmosphere a thinner edge, both the rotation and range would be further increased. This is considered to be the most important stage in the development of the boomerang. The weapon in this stage is comparable with the heavy war boomerang, and would be retained after the returning property had been discovered. The reader may be reminded here that, while the war boomerang is flat, the peculiar quality of the "come-back" is associated with a twist or warp at both extremities, but in opposite directions. Now at this stage it would not be possible to construct all boomerangs upon a truly uniform plane. Bends and twists must naturally occur from the imperfections of the wood and the crudeness of the tools used to make them, and it would soon be noticed that certain twists had the effect of causing the weapon to screw itself up in the air when thrown. These accidental twists would be studied and imitated and the weapon would develop into its fourth stage of improvement.

Stage 4. The following factors would now be in operation:—the forward movement; the movement of rotation; the force of gravity tending downwards; the screw movement tending upwards, or at any rate in a direction perpendicular to the plane of rotation. When these last two movements operated in the same vertical plane they would partly neutralise each other, but when, from a slight divergence of the axis of rotation from the perpendicular, they began to operate at an angle with each other, the resultant would cause the weapon to fly off in another direction, and this, combined with the gliding qualities of the weapon would produce some of the peculiar movements of which the returning boomerang is capable.

By constant practice and experience, which alone has been the instructor of the savage, rather than by a knowledge of the principles of its flight, he would soon learn to control and utilize these movements so as to make the weapon return to him after it had done its work in the air.



## THE FLIGHT OF THE BOOMERANG.

It is exceedingly interesting to watch a good boomerang thrower at work. With confident step he advances, holding the boomerang by one of its extremities, the other end pointing forwards. Before launching it on its flight he faces the direction of the wind, takes notice of any obstacle which may hinder its journey, and poising it for a moment hurls it forward with all his strength. It at first travels in a straight line, then turns its flat surface towards the earth, with the convex side uppermost. It makes a circuit, rotating all the time and, if not intercepted, will return to the thrower. Sometimes it may be sent skimming close to the ground, and, when it appears to be nearly spent, will rise high and return as before. At other times, after its return, it will circle over the head of the thrower, and gradually descend in a spiral curve. One can imagine how disconcerting it would be when thrown amongst a flock of birds; no hawk could strike terror into a flock of ducks to such an extent as a boomerang. A short description of an actual boomerang flight given by Sir George Grey, the explorer, is as follows:—

“Perhaps as fine a sight as can be seen in the whole circle of native sports is the killing of cockatoos with the kiley or boomerang. A native perceives a large flight of cockatoos in a forest which encircles a lagoon; the expanse of water affords an open clear space above it, unencumbered with trees, but which raise their gigantic forms all around, more vigorous in their growth from the damp soil in which they flourish, and in their leafy summits sit a countless number of cockatoos screaming and flying from tree to tree, as they make their arrangements for a night's

sound sleep. The native throws aside his cloak, so that he may not even have this slight covering to impede his motions, draws his kiley from his belt, and with a noiseless, elastic step, approaches the lagoon, creeping from tree to tree, from bush to bush, and disturbing the birds as little as possible. Their sentinels, however, take the alarm; the cockatoos furthest from the water fly to the trees near its edge, and thus they keep concentrating their forces as the native advances; they are aware that danger is at hand, but are ignorant of its nature. At last the pursuer almost reaches the edge of the water, and the scared cockatoos, with wild cries, spring into the air. At the same instant the native raises his right hand over his shoulder, and, bounding forward with the utmost speed for a few paces, to give impetus to his blow, the kiley quits his hand as if it would strike the water; but when it has almost touched the unruffled surface of the lake, it spins upwards without almost inconceivable velocity and with the strangest contortions. In vain the terrified cockatoos strive to avoid it; it sweeps wildly and uncertainly through the air, and so eccentric are its motions, that it requires slight stretch of imagination to fancy it endowed with life, and with fell swoops is in rapid pursuit of the devoted birds—some of whom are almost certain to be brought screaming to the ground.”

The maximum forward distance the returning boomerang can be thrown is about one hundred and fifty yards.

The timbers mostly used for making boomerangs are the native hard woods such as ironbark, jarrah, and honeysuckle, together with lighter woods of the wattle family, *i.e.*, myall, gidyea, and ironwood.

Mr. W. W. Thorpe, Ethnologist of this Museum, recently visited New Zealand for the purpose of studying Polynesian ethnology. He gleaned a good deal of information, and, in addition, was able to assist museums

in the Dominion with his knowledge of Melanesian and Papuan ethnological objects, habits, and customs, to which he has paid considerable attention, and on which he is a recognised authority.



## Some Australian Insects Injurious to Man.

BY ANTHONY MUSGRAVE, F.E.S.

THERE are many insects in Australia which injure man indirectly by destroying his crops and fruit or his dwelling, but an examination of our large insect fauna shows that there are but few which can annoy him by their bites or can inoculate him with toxic substances. Insects usually molest man either because they resent his interference with them or because they regard his body as a source of sustenance. In the first case they answer his interference by means of bites, irritating hairs, stings, and odours. The second group presents some of man's deadliest foes, as it includes such blood-sucking insects as the fleas and mosquitoes, which are able, through the agency of their bites, to transmit to him certain diseases. In this article I do not propose to enter into the part played by disease-transmitting insects, which, in the case of the fleas, has already been dealt with by Dr. E. W. Ferguson,<sup>1</sup> but to deal briefly with the injuries some of our insects are capable of inflicting upon us.

Although this article is intended primarily to deal only with aggressive insects, still it is appropriate to mention those forms which have been considered harmful but are in reality innocuous. These we will deal with first so as to remove more speedily the stigma under which they have laboured so long.

### HARMLESS INSECTS CONSIDERED INJURIOUS.

Some insects we will find are harmless in their larval or caterpillar stage and only harmful in their adult condition, while in other forms the reverse is the case. Many however, are harmless in all stages of their development, and such are the maligned "earwigs," which constitute the order Dermaptera. These are readily recognised by the pair of forceps on the last segment of the abdomen, which they often carry flexed over the back; this gives them an appearance strongly suggestive of a scorpion. Earwigs were believed to enter the ears of sleeping persons and penetrate to the brain. A num-

ber of species have been recorded from Australia, all of which are harmless.

Mantids and stick insects are also perfectly harmless, but they are handled very carefully by their captors when brought to the Museum for identification. Their spiny bodies, though certainly uncomfortable to the touch, are, however, unable to inflict injury.

Dragonflies, or Horse-stingers, as they are erroneously termed in Australia, are also unable to sting, as they do not possess any stinging apparatus whatsoever. They certainly flex their abdomens under their bodies, and this fancied resemblance to the somewhat similar action on the part of a wasp or bee may have given rise to the legend. Dr. R. J. Tillyard, our foremost authority on the dragon flies, relates how on one occasion he was collecting in the mountains near Cairns when he captured one of the largest species, to the great consternation of a farmer who was standing by, "One of those horse-stingers" he said, "killed my horse last week and very near flattened the old woman." So much for the prevailing ignorance on the subject. The dragonfly, instead of being regarded as harmful, should really be regarded as beneficial, for it destroys a prodigious number of mosquitoes.

### INSECTS INJURIOUS BY BITING.

Those insects which are capable of inflicting injury by biting are many and varied, but the effect of the bite in the majority of cases is negligible; only those which are capable of transmitting disease through their bites are to be feared.

Biting may be affected in two ways according to the nature of the mouth parts. These are (1) the mandibulate type, in which the mouth parts consist of a pair of jaws or mandibles which move transversely on one another through the agency of certain adductor muscles, as may be instanced in the cockroaches and beetles; (2) the suctorial or haustellate type, as exemplified in the mosquitoes and bugs, in which the mandibles and maxillæ are developed into piercing organs with which to pierce the prey and suck the body juices.

Of the mandibulate forms the cockroaches (family Blattidae), shy, nocturnal creatures,

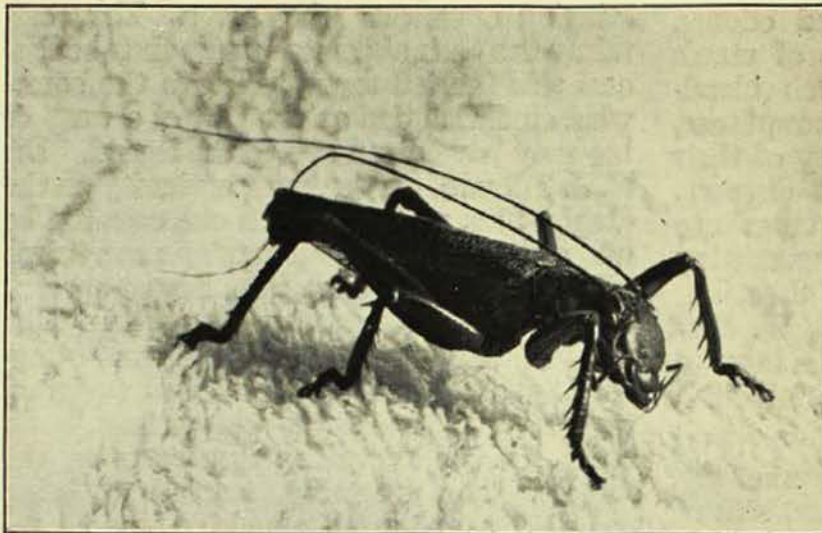
<sup>1</sup> *The Australian Museum Magazine*, Vol. I., No. 4, 1922, p. 114.



do not bite, properly speaking, for their jaws are not adapted for that purpose, nevertheless, when they occur in great numbers, they may nibble the toes of would-be sleepers.

Perhaps the most formidable biters of the Australian insect world are some of the long-horned grasshoppers (family Phasgonuridae) and of these we need only mention the members of the genera *Anostostoma* and *Paragrillacris*. In the genus *Anostostoma* the head and jaws are so strongly developed as to occupy more than a third of the length of the body. The largest member, *Anostostoma australasiae*, is said to occur around Sydney,

nacity; it will bite viciously if molested and therefore, like the harmless "triantelope," is decidedly unpopular among householders. It is frequently brought into the Museum for identification, and the visitor will often produce a sadly battered specimen from a box, and tell a moving tale of providential deliverance from its jaws. The insect itself measures about two inches in length inclusive of the wings. It is yellow brown in colour with spiny legs and well developed jaws.



The Tree Cricket (*Paragrillacris combusta*), which often comes into the house, is an unwelcome guest, on account of its unpleasant bite.

[Photo.—A. Musgrave.]

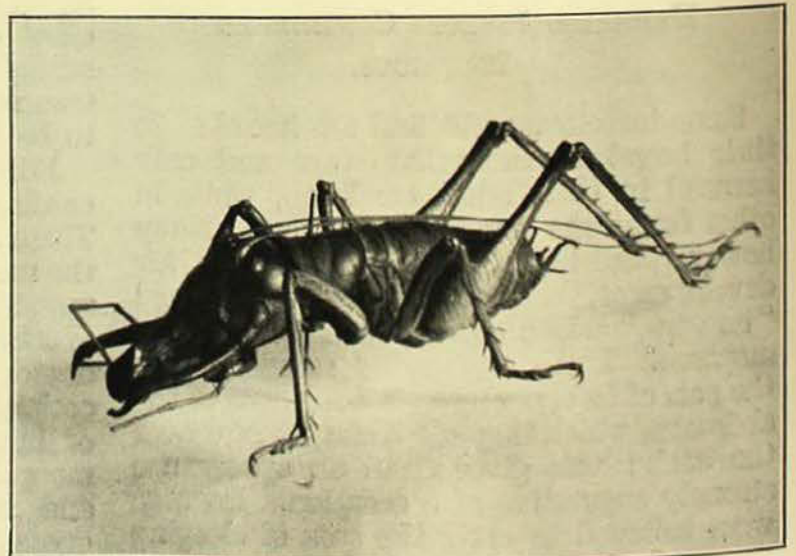
but all the specimens I have seen have come from the northern portion of the State or Queensland. This insect is dark brown in colour and measures from three to four inches in length.

A smaller species, *Anostostoma erinaceus*, occurs near Sydney, and specimens are in the Museum collection from Dorrigo, but it does not appear to be common. The other genus, *Paragrillacris*, contains a number of forms distributed over Australia and our common Sydney species is said to be *Paragrillacris combusta*. This is the insect that invades the house and may be seen climbing up the curtains, or it betrays its presence by falling with a bump from the ceiling. Its demeanour towards man is one of extreme pug-

of our beetles is undoubtedly *Trogodendron fasciculatum*, a member of the family

There are many other members of the same family occurring in Australia, but these are for the most part harmless and make no attempt to bite. The result of a nip from any of the species mentioned would probably have no more disastrous effects than the breakage of the skin.

Some families of the beetles are provided with strong jaws which are capable of nipping unpleasantly if their owners are carelessly handled. Many of the Ground Beetles (Carabidae) possess large jaws but they are all comparatively harmless. The most ferocious



With head and jaws occupying more than a third of the length of the body, the giant wingless Tree Cricket (*Anostostoma australasiae*) presents a formidable appearance.

[Photo.—A. Musgrave.]



Cleridae, which is parasitic on the pupae of wood moths. This beetle when captured bites so savagely and holds on so tenaciously that its body may be pulled off its head. It measures nearly an inch in length, is dark brown in colour with broad white bands at the ends of the wing covers, while the head bears bright yellow antennae.

Of those insects which have the mouthparts suctorial or haustellate, the bugs may first be considered. They are interesting too, in that they possess examples of both groups of noxious insects, the wilfully aggressive and those capable of exacting painful retribution for interference.

The best known of the bugs which attack man for the purpose of sucking his blood is the bed bug (*Cimex lectularius*), a member of the family Cimicidae, which lives in the walls of dirty houses, in the mattresses of beds, and in furniture. The effect of the bite sometimes produces a small swelling accompanied by an itchiness which, however, soon passes away. The bedbug has been accused of transmitting diseases, but to what extent this is true it is not possible to say.

Among the carnivorous bugs of the family Reduviidae, there are certain forms which, if injudiciously handled, are capable of inflicting a sharp stab with their beak or rostrum. These bugs suck the juices of other insects, and *Pristhesancus papuensis* destroys numbers of hive bees by lying concealed in a flower and securing the bees as they come to gather the honey. This habit has earned for it the vernacular name of the Bee-killer.

When my friend Mr. E. Troughton was collecting at Mount Lyndhurst, thirty miles east of Farina in South Australia, he noticed that large numbers of a reduvid bug (*Havithus rufovarius*) came to feed on the bodies of birds and animals he had skinned, and clung in fringes to the carcasses with their rostrums embedded in the flesh.

Another bug, The Golden Spotted Ground Bug (*Pirates ephippiger*), is able to drive its stiletto-like beak into the hand of the person interfering with it. It is found under logs and stones in damp situations and occurs commonly at the Myall Lakes. It measures over three-quarters of an inch in length, the body is black and the antennae and legs yellow-brown, and a similarly coloured spot is at the base of the wings.

#### BLOOD SUCKING FLIES.

Those flies which are provided with a piercing and sucking proboscis for the purpose of sucking the blood of their victims, though capable of giving one an unpleasant nip, cause little annoyance so far as the actual bite is concerned. It is the knowledge that certain species are capable of transmitting diseases through their bites that makes them so universally dreaded.

On the banks of the tidal rivers in the vicinity of Sydney, the Sand-fly, *Culicioides molestus*, at times makes life unbearable. The bite of this extremely minute insect raises a small lump which may persist for some days, all the while making itself most apparent by its itchiness.

Mosquitoes, the terror of the European arrival, occur in numbers in many of the Sydney suburbs towards the end of summer and necessitate the use of mosquito nets. Of these four species are to be commonly recognised. The Salt Water Mosquito, *Culicelsa vigilax*, is a black stout insect, its legs basally banded with white. Its larvae were first recorded breeding in salt water by Dr. Bancroft of Queensland. The second species is *Scutomyia notoscripta*, a small black species with silver lines on the thorax, white bands on the bases of the terminal joints of the legs, and a silvery-white band in the middle of the proboscis. It is widely distributed over Australia, being very common in Sydney during the summer months, and can inflict a very painful bite. The Scotch or Hexham Grey, *Mucidus alternans*, is one of our largest mosquitoes, and the light grey and brown scales with which its body is clothed, together with its size, make it readily distinguishable. It is a savage biter, and during the larval stages may be found in salt water swamps or pools of water left by the spring tides.

The world-wide species, *Culex fatigans*, also occurs commonly in the vicinity of Sydney, and is a brown insect with two dark parallel lines on the thorax, which also bears golden scales, and on each segment of the abdomen there is a curved white band.

The females of the flies of the genus *Spaniopsis*, which is included in the family Leptidae, are small blood-sucking black flies, with wings veined like those of the March flies and with three-jointed antennae, which may or may not end in a bristle. They are in-



teresting from the fact that they belong to a family in which blood-sucking species are rare. They were first discovered by Dr. Cleland in June 1911, and, since that date, other species have been discovered. They appear to be restricted to the mountain and coastal areas, since no specimens have been captured west of the Dividing Range. Like the March flies they are very persistent in their attentions and their "bite" is like the sharp prick of a needle. An interesting account of these insects is given by Dr. Ferguson in the Journal and Proceedings of the Royal Society of New South Wales for 1915. "Bung eye" has been attributed to these flies, but Dr. Ferguson doubts if they are in any way responsible. It would therefore be of the greatest value if readers of this article who have any definite knowledge of the fly which causes this malady, would send specimens and particulars to the Director of this institution.

March flies or Horse flies are common about Sydney and the Blue Mountains during the summer, and hover persistently around until they get the chance to alight on one's neck or ankles or any other part of the body where they can drive their proboscis into the skin, the resulting "bite" being sharp and painful. They are economically important from the fact that they have been accused of spreading the bacillus of cattle anthrax by their bite. They form a distinct family, the Tabanidae, and are large or medium-sized insects with well developed eyes, which are close together in the males and separated in the females. The antennæ are three-jointed and do not end in a bristle. Two very large genera occur in Australia, *Pangonia* and *Tabanus*, representatives of both occurring near Sydney.

The Stable Fly, *Stomoxys calcitrans*, a widely distributed species occurring also in Europe, Asia, and Java, resembles the common house fly in appearance but may be easily distinguished from it by its long, proboscis which projects outwards from the under surface of the head, and the chess-board pattern on the abdomen. It is a member of the family Muscidae, which includes the house fly, and the blow-flies. This is the little miscreant which bites one so viciously on the ankles if one is trying to read quietly in the shade or watching a tennis match. It has been accused of spreading infantile paralysis, and, though it has been shown by experiment to be capable of trans-

mitting the disease from monkey to monkey, it is not known if it does spread the disease under normal conditions.



Dog Flea. (*Ctenocephalus canis*.)  
[Photo.—R. Grant.]

### FLEAS.

During the summer months, plagues of fleas frequently occur, the Human Flea (*Pulex irritans*), the Dog Flea (*Ctenocephalus canis*), and the Cat Flea (*Ctenocephalus felis*), being the chief offenders. The Dog and Cat Fleas may be distinguished from the Human Flea by the presence of combs on the head and thorax, but are themselves very closely alike, differing only in minor respects. The effect of a bite from a flea produces different reactions in various people; in some, it raises a round white lump about the size of a sixpence, while others suffer very little inconvenience, though they may object to the "promenade" as the French lady termed it.

### INSECTS AGGRESSIVE BY STINGING.

Under this category falls a group of insects, which are, perhaps, capable of causing more direct physical pain to man than any other. The division Aculeata of the great order Hymenoptera embraces the bees, wasps and ants, which are characterised by the possession of a sting in the females. This sting is really a modified ovipositor or egg-laying organ and is very conspicuous in the Braconid and Ichneumonid Wasps, which help to form another division of the Hymenoptera. In the wasps, bees, and ants, the ovipositor is no longer used for egg-laying and serves as a means of defence or for killing prey for the young. The sting of a hive bee consists of a sharp pointed sheath in which are situated two chitinous darts or stylets. The ends of the darts are barbed like a crochet needle. During the process of stinging, the sheath is pushed into



the skin and the darts are successively thrust deeper into the wound, projecting before the end of the sheath. The poison is secreted by two glands, one producing an alkaline fluid while the other produces formic acid. It is the combination of these two fluids which produces the burning reaction consequent upon a sting from one of these insects. The fact that the sting of a bee is left in the flesh is due to the barbs of the stylets holding the sting so firmly in the wound that the movements of the insect cause the whole sting to be torn out of the abdomen, the membranous connection between the sting and the abdominal organs being extremely delicate.

In Australia there are large numbers of native bees, but they do not live in communities with the exception of our little Black bees of the genus *Trigona*, which construct a comb containing about a pint of honey; these bees are stingless.

#### WASPS.

There are in Australia a number of wasps which are capable of inflicting severe punishment upon the disturbers of their peace. For the most part they are peaceably inclined, and their warning colours of yellow and black, or red and black, should be sufficient to act as a deterrent to those who may be so injudicious as to molest them. Wasps, unlike the honey bee, have the stylets of the sting unbarbed so that they are able to withdraw the sting after the venom has been injected. It is stated that in those wasps which only paralyze their prey the alkaline glands are functionless.

The sting from some of our larger wasps such as the Sand Wasp (*Exerius lateritus*), is capable of causing intense pain, and several stings from one of these insects may be attended by serious results. The Paper-nest Wasps, *Polistes*, which often construct their nests in the shelter of caves or verandahs, are always on the alert and ready with their tiny poison daggers.



The Sand Wasp (*Exerius lateritus*), though not an aggressive insect, is capable of inflicting a severe sting on provocation.

[Photo.—A. R. McCulloch.]

#### ANTS.

Ants occur everywhere throughout Australia, and in three of the five sub-families a sting is well developed. The stylets are not barbed as in the honey bee, so the ant lives to "fight again and to strike another blow." The Bull-dog and Soldier Ants of the genus *Myrmecia* which occur only in Australia are considered by Professor Wheeler, an American authority on the group, to represent the prototype of all ants. These large ants are provided with a very formidable sting, and Mr. D. Le Souef in his *Wild Life in Australia* relates that in Victoria on one occasion two drunken men fell on the ground near a nest of ants, and were so badly "bitten" that they eventually succumbed. The larger species construct small mound nests from which they emerge in numbers on the approach of danger. The Green Head Ant (*Chalcoponera metallica*) which is common in gardens about Sydney, can also cause a slight swelling from its sting.

The Meat or Mound Ant (*Iridomyrmex detectus*), which occurs abundantly throughout Australia, and constructs the large gravel nests that one frequently encounters along road-sides in the country, can bite savagely, but not sting. When people refer to an ant's bite they mean its sting, as all the pain one experiences on being "bitten" by an ant is due to the action of the toxin or poison injected into the wound. Some ants have no sting, but the poison glands are well developed and the poison is injected into excisions made with the jaws.



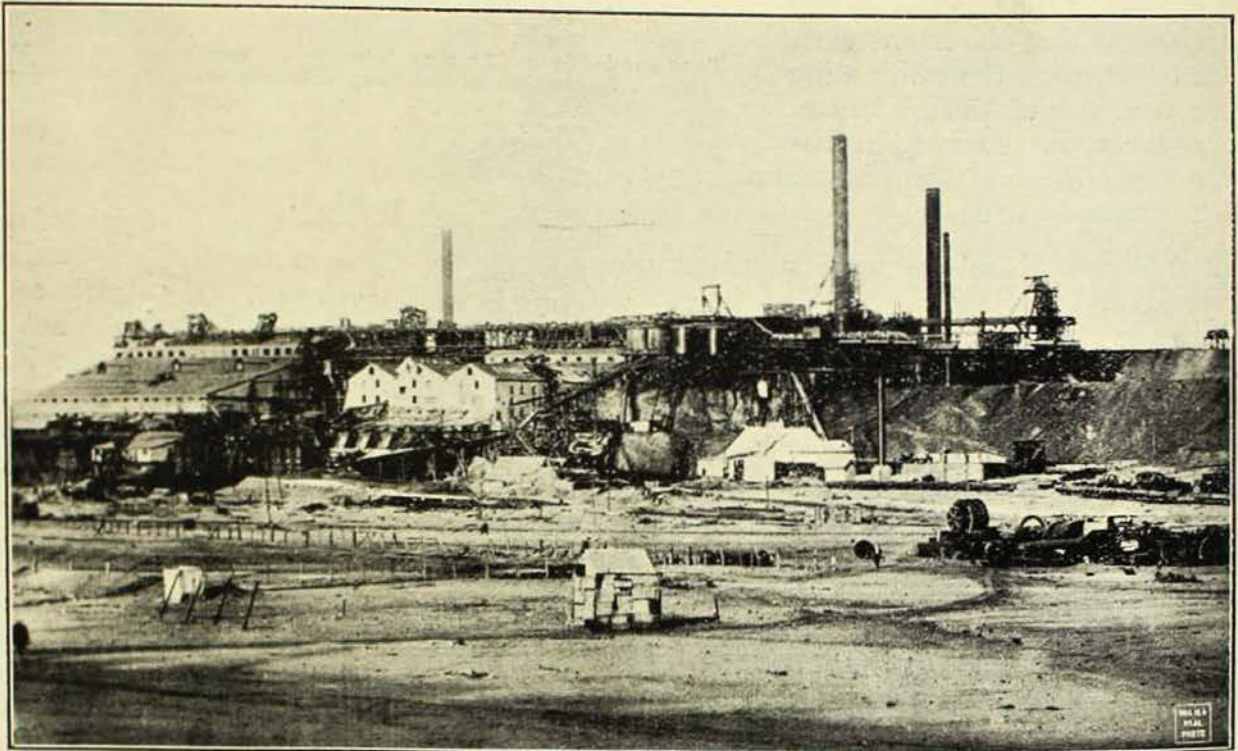
## An Excursion to Broken Hill.

By T. HODGE SMITH.

IT was the writer's privilege to accompany a party of members of the Pan-Pacific Congress, 1923, on an excursion from Sydney to Broken Hill, New South Wales. Leaving Sydney by train, we reached Cobar, a journey of 467 miles. Here we beheld a scene of desolation; wide beautiful streets with up to-date shops and numerous houses,

district. The failure of the mines is wholly responsible for the desertion of the town itself, and as one left Cobar, it was with a feeling of awe and reverence for the town as one thought of the ambition and energy of its one-time inhabitants.

From Cobar the party proceeded by car to Wilcannia, on the Darling River, a distance



The Proprietary Mine, Broken Hill, showing the surface workings. This will give some idea of the development of the lode since the early 'eighties.

but for the most part empty and deserted. What was responsible for the enormous amount of energy and money that had been spent in building this erstwhile beautiful town? A short walk from the hotel where we rested the night, and the mystery was solved; here were the remains of what had been a very large treatment plant and copper mine. All the machinery had been removed, and the buildings had the appearance of having recently undergone a somewhat intense bombardment, while a stone dropped down the shaft revealed the fact that the mine now contained much water. The great Cobar mines have produced approximately £7,500,000 in copper, while £4,000,000 is the value of the gold won in the

of 120 miles. The character of the vegetation gradually changed; as we approached Wilcannia it became more and more stunted and the famous salt bush and mulga made their appearance. The country had been through a long period of drought, but after a good fall of rain it becomes covered with green as if by magic, and so it was when we passed through. Still there was plenty of evidence of the recent bad times, for everywhere trees, more especially the mulga, had been cut down to provide fodder for the sheep, while many trees had died, being unable to withstand the very severe drought.

When the Darling River has sufficient water, a great deal of material is transported over it by shallow draft steamers, but when



we arrived there the water was too shallow for such transport, and the river had been in this condition for the past two years. It was a great surprise to learn that the river steamers were being overhauled and prepared for duty after their long period of idleness. The reason for this activity was the fact that in June rain had fallen in the south-east of Queensland and the north-east of New South Wales, and the water caught in this part of the catchment area of the Darling River would swell the river sufficiently for steamer transport about the end of November; that is, it takes the water five months to travel from its source along the Darling to its junction with the Murray River. It must be remembered that this distance is about 3,282 miles, while the general grade of the river in New South Wales is only three inches to the mile. In times of flood the river overflows its banks and covers the low-lying country on either side for many miles. Steamers have been navigated from twenty to thirty miles away from the channel during periods of flood.

We rested at Wilcannia for the night, and next morning we walked about three miles to Lake Woychugga, which is about nine miles long by three miles wide. It is not exactly the kind of lake to which one would walk for a refreshing swim, for the area over which the writer walked contained not a drop of water. From the bed of the lake, which was covered with green herbage, the sandy shoreline could be traced as far as the eye could see. On this shoreline were literally hundreds of stone implements and broken "nardoo stones," the latter used by the aborigines for grinding seeds. In good seasons the wandering tribes who inhabited the far west would gather around the lake when it contained an abundant supply of water, and upon its retreat they would set off for a more favourable camping ground, leaving their implements behind them.

Leaving Wilcannia in the afternoon, the party set out by car for Broken Hill, passing over the so-called desert, which looked at the time a very green one. Darkness had fallen by the time we began to rise gradually from the plains to Broken Hill, which is about 1,000 feet above sea level. Suddenly, away in the distance appeared a blaze of electric lights; one's first impression was that it was a dream, but it was really our first view of Broken Hill. A turn in the road and they

were lost again, but very shortly, it seemed that we had been precipitated suddenly into the heart of a city. It was a most extraordinary sensation, for the only signs of life we had seen that day were one or two camel teams and a few emus.

This veritable human bee-hive with all its modern comforts, was quite unknown to man eighty years ago, the first to visit the site being Sir Charles Sturt, Surveyor-General of South Australia, when leading an expedition to Central Australia. He expected to find a great inland sea occupying Central Australia and his expedition carried a large boat in order to explore it. Instead, he found hundreds of miles of sandy plains with absolutely no signs of water. His return trip from Broken Hill was one of intense suffering, and affords an example of heroism unsurpassed in the annals of exploration. He gave the name Barrier Ranges to the district of Broken Hill.

In 1867 a great rush, known as the White Quartz Rush, set in, for it had been reported that gold reefs existed in the district. Unfortunately for the diggers, the quartz contained no payable gold, and the story of their hardships and starvation forms a most tragic page in the history of Broken Hill.

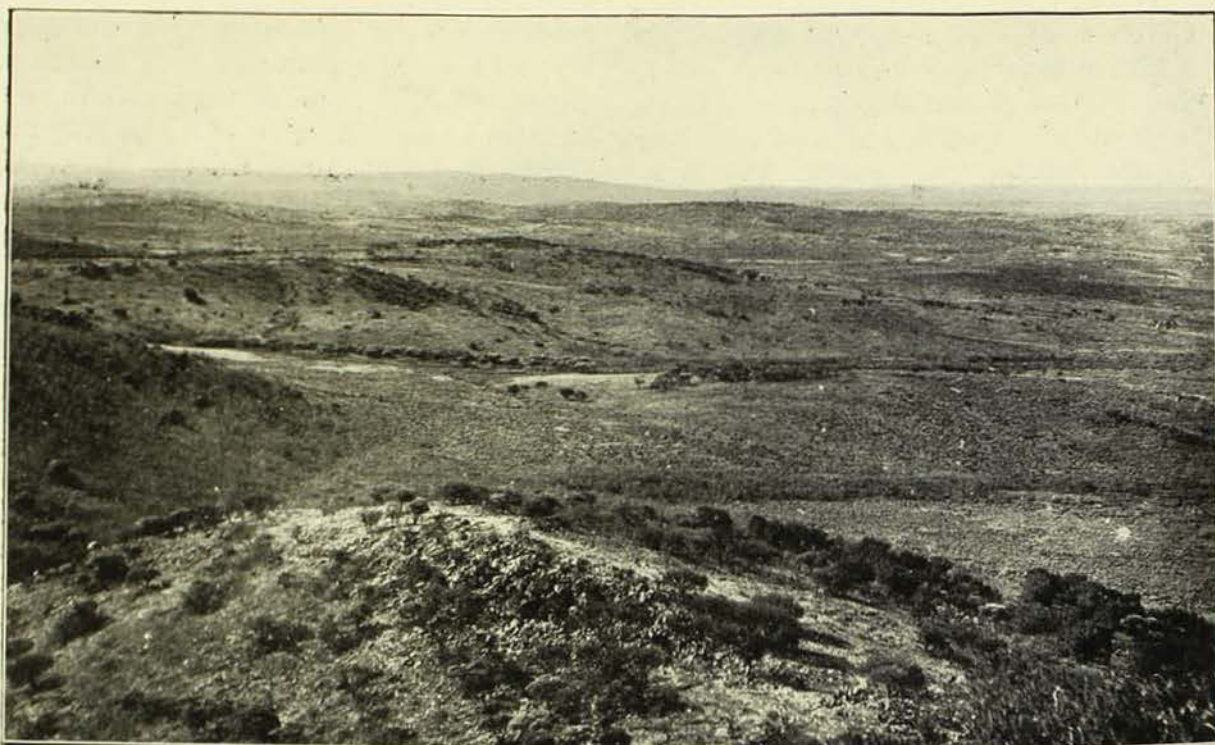
After Sturt's visit, the district became divided into large pastoral holdings, and in September, 1883, the outcrop of the Broken Hill lode was discovered by Rasp, a boundary rider of the Mount Gipps Station. However, the real nature of the lode was not known, for it was mistaken for a tin lode. This resulted in seven blocks being taken up along the line of lode.

A little later, the owners of the blocks amalgamated to form the Broken Hill Mining Company. From the very commencement of operations, nature seemed loth to give up her long-hidden secret. The heroic little company met with disappointment after disappointment, but they persevered until the great lode was opened up. Yet with all its fabulous wealth laid bare, their difficulties were almost insuperable. It would seem that nature was angered at the discovery of her secret, for those early miners were threatened by the collapse of the walls of the lode, the crushing of mine timbers, and fire. One by one, difficulties were overcome by the skill of the mining engineer, and the determination of the miner, until to-day mining men from all over the world express their admiration of these wonderful mines.



On the 1,400 foot level of the North Mine, were it not for the trucks of ore, it would be difficult to realise that one was really down in a mine. Here we passed through a labyrinth of passages lined entirely with oregon, while the air was quite cool and fresh. Suddenly we came to a "stope" where the great mass of galena (sulphide of lead) and zincblende (sulphide of zinc) were revealed. Some men were winning the ore, and others were building wooden passages similar to those we had just passed through, while great "square sets," constructed of ten inch by ten inch oregon, supported the lode overhead.

of New South Wales, stands as a monument of perseverance and skill. For a comprehensive account of Broken Hill the reader is referred to this work. The rocks of Broken Hill are of very great age (*Archaean*) and have doubtless been buried to great depths, and, during the immense period of time that has elapsed since their formation, they have been extremely altered, folded, crumbled, and crushed. To add still further to the problem, under the influence of enormous temperature and pressure, they have not acted as ordinary solids but as a plastic body, and thus there are great zones of rock flowage. The for-



Looking North from North Pap. This is typical of the country surrounding Broken Hill.

Others, again, were occupied in filling up the space left by the extraction of the ore with sand, which is called by the miners "mullock," and is the waste product after the ore has been concentrated. In this way it is estimated that approximately £112,000,000 has been won from the lode, which is three miles in length, while the value of dividends paid exceeds £26,000,000.

Just as the miner has been able to succeed, by a most arduous fight, so the geologist has been able to unravel the geology only by overcoming many difficulties. The work of Mr. E. C. Andrews,<sup>1</sup> Government Geologist

of the lode itself, is of considerable interest. Mr. Andrews has shown that it represents a replacement of the altered sedimentary rocks by emanations from igneous masses. He suggests that there were four different emanations, of which the last was responsible for the formation of the great silver-lead-zinc lode.

In a very much more recent geological period, though probably millions of years ago, the whole area was raised above the level of the plain that surrounds it. This elevation was accompanied by a great cracking on the earth's crust along a meridional direction to the west of Broken Hill. At Mundi Mundi Trig. Station, one is standing

<sup>1</sup>E. C. Andrews, Mem. Geol. Surv. N.S.W. (Geology) No. 8, 1922.



850 feet above the plain which stretches away to the horizon. But this, by no means represents the amount by which the Broken Hill shield has been elevated for since its upheaval the highland has been much denuded. Indeed, the thick covering of alluvium over the plains for about forty miles to the west has been supplied by the weathering and transportation of material from the highlands. Had it not been for this elevation it is more than probable that the famous lode would have remained to-day one of nature's secrets, for it would have been buried under the sands of the desert.

On the way to Mundi Mundi we saw an excellent example of the desert mirage.

Over on the western horizon could be seen what appeared to be a beautiful lake, and we could readily understand how the early explorers and pioneers, weak with thirst, made a strenuous effort to reach the mythical lake only to die in the attempt.

A description of the excursion would not be complete without a mention of the beautiful Sturt's Desert Pea, which grows in profusion in the district. Unfortunately a photograph fails to reproduce the beautiful scarlet and black colouring of the flower. It is hard to imagine a more fitting emblem of Sturt's great work of exploration than the flower which bears his name.

## Modern Taxidermy.

BY HENRY S. GRANT.

**M**ANY are the methods employed by taxidermists in the mounting of animals. Formerly the skin was stuffed with straw, shavings, or other material until it took on some semblance of the living animal, but this method is now discarded and instead a model or manikin is constructed on which the skin is fitted. As the manikin, if properly prepared, faithfully reproduces the bodily proportions and contours of the animal, the mounted specimen is a life-like representation of the original.

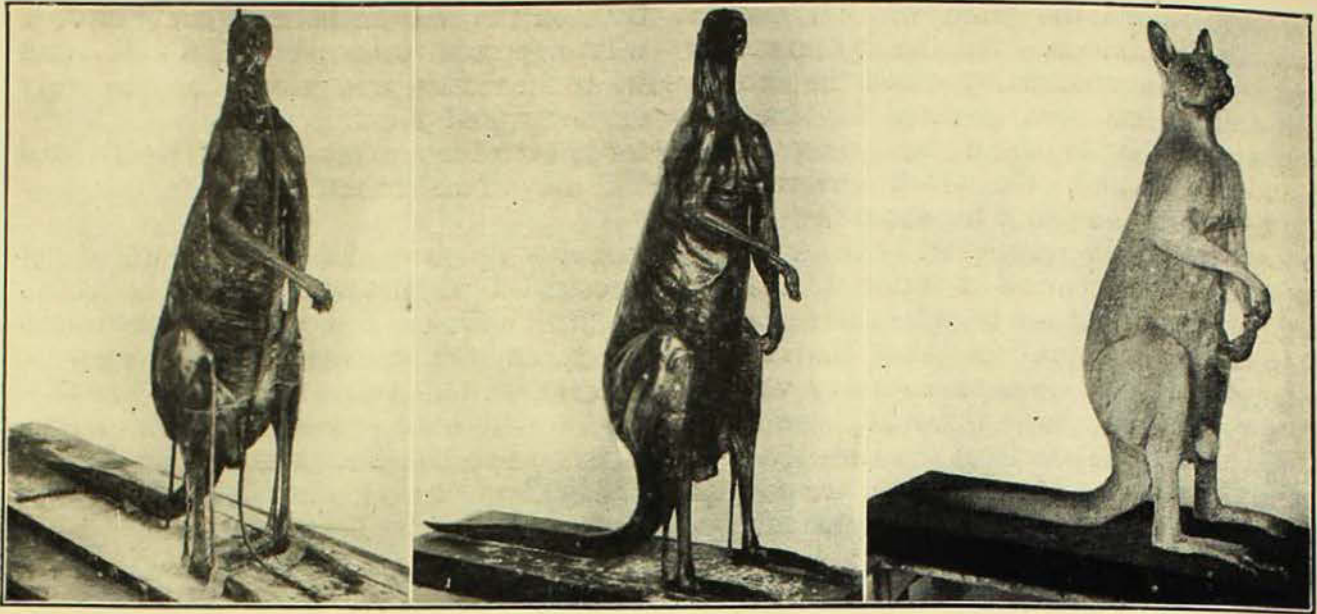
In June, 1923, a magnificent example of the great grey kangaroo (*Macropus giganteus*) was, through the good offices of stock inspector C. L. G. Fielder received as a donation from Mrs. F. R. White of Booloombah, Armidale. This fine specimen has now been mounted on modern lines, and this short article describes the method by which the exhibit was prepared.

We first carefully measured the body, then removed the skin, taking great care not to lacerate it or puncture the body. The skin was then washed, cleaned, and immersed in a preserving solution of brine. Next the body was posed in a natural position to be cast. Iron rods were cut to convenient sizes, suitably bent, and placed in position to sup-

port the body. The body was then coated with a layer of plaster of paris specially prepared. Thus a two-piece mould of the body was obtained, which, after it had set, was removed, dried, and coated with shellac. Iron rods, three eighths of an inch in diameter, were next fashioned, two as supports for the bones of the hind limbs, which had been cleaned and prepared ready for the next stage, one for the tail, another for the body, all with screw threads and nuts. A wooden plate, carrying light iron sockets to match the three rods, was then made to fit inside the cast.

The mould was then thoroughly greased, the limb bones with their iron supports placed in position, also the tail and body rods. Papier mâché was next prepared and pressed into the inside of the mould so as to form a layer half an inch in thickness. As soon as the papier mâché was dry, the plaster mould was chipped away, leaving perfect models of the two halves of the body. The wooden plate was next placed inside the papier mâché cast and the two halves of the latter were brought together by screwing the rods into the sockets fitted on the wooden plate for their reception. The join was





Illustrating the three stages in the mounting of the Great Grey Kangaroo. The carcass skinned and in position for casting; the papier mache cast; the cast, with skins in position, as exhibited in the Gallery of Australian Mammals.

[Photo.—G. C. Clutton.]

filled up with papier mâché, the rough edges and inequalities removed, and the cast shellaced.

This manikin, now ready to receive the skin, was next coated with an adhesive paste and the skin was carefully fitted over it.

By the temporary aid of tacks and pins, the muscles and other details of structure were brought out, and, after receiving a few final touches, the great grey kangaroo was ready for display in the gallery of Australian mammals.

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## Prize Essay Competition.

Entries for the prize donated by Mr. George A. Taylor, Editor of "*Building*," for the best essay by a pupil of a New South Wales school upon "A visit to the Australian Museum" closed on March 31st. The num-

ber competing was not so large as was anticipated, neither was the standard high. The advisability of making an award is under consideration, and the decision will be announced later.

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## Popular Lectures.

THE popular scientific lectures conducted by this Museum have proved a great attraction. During the last year no fewer than three thousand attended, and in some instances the lecture proved so fascinating that it had to be repeated. Had more accommodation been available there is little doubt that the attendance would have been correspondingly greater. These lectures are illustrated by lantern slides and specimens, and show the wealth of interesting things contained in the collections. The following is the syllabus for the 1924 session, time of delivery 8 p.m. :—

- April 10th.—Architects of the Animal World. F. L. Grutzmacher, F.C.S., F.G.S.
- May 8th.—The Oyster: Its Structure, Growth, Cultivation and Pests. T. C. Roughley.
- May 22nd.—Extinct Birds. Tom Iredale.
- June 12th.—Fishes and Things. A. R. McCulloch.
- June 18th.—The Duck-billed Platypus. Prof. L. Harrison, B.Sc., B.A.
- July 10th.—Lord Howe Island, the Madeira of the Pacific. A. Musgrave, F.E.S.
- August 14th.—Nests of some Australian Birds. J. R. Kinghorn, C.M.Z.S.
- September 11th.—Nature the Master Sculptor. T. Hodge Smith.
- October 9th.—The Beginnings of Life. E. A. Briggs, B.Sc.
- October 23rd.—The Dawn Man. Prof. J. I. Hunter, M.B., Ch.M.
- November 13th.—Non-Marsupial Mammals of Australia. E. le G. Troughton.
- December 11th.—Evolution of the Horse. W. S. Dun.

Whilst this series reaches the metropolitan resident, the Museum is not neglectful of its

country supporters. For their benefit the Extension Lecture scheme has been founded. Lectures, exactly similar to those given here, are delivered in suitable country centres, and have been conducted with great success. All that is asked is that a local committee will undertake to provide a hall and lantern, attend to advertising and generally do what is necessary to make the lectures successful. No fee is asked for the lecturer's services, and the Museum defrays his travelling expenses. The lectures at present available are mentioned here :—

- A. Musgrave, F.E.S. — Ants and Ant Communities. Spiders: their Structure and Habits. A Naturalist on the Nepean River.
- J. R. Kinghorn, C.M.Z.S. — Value of Birds to Man. Australian Reptiles. Snakes and Snake Venom. Some Nests of Australian Birds. A Ramble on the Sea Shore.
- T. Hodge Smith. — The Romance of Gold Mining in New South Wales. The Formation of the Blue Mountains and the Coastal Plain. The Geology of the Sydney District. Nature, the Master Sculptor. Meteorites.
- A. F. Bassett Hull. — Australian Sea Birds. Beautiful Australian Birds. Useful Australian Birds. Birds of Australia.
- F. L. Grutzmacher.—Life in our Ponds and Creeks. Common Insects of the Bush. A Sea Shore Ramble.
- A. H. Chisholm.—The Sport of Bird Study.
- W. S. Dun. — Evolution of the Horse.

In co-operation with the Department of Education, a series for children has also been established. For particulars, teachers are requested to communicate with their inspectors, who also will make the necessary arrangements for attendance.



## The Extraordinary Habits of a Tame Magpie.

BY J. R. KINGHORN, C.M.Z.S.

THE MAGPIE as we know it in the wild state is generally a very different bird from the one we know in captivity, for its habits under the latter conditions are liable to such changes that some of Nature's most rigid laws appear to become modified. The photograph illustrating this note shows a very tame and inoffensive magpie that developed the extraordinary habit of building nests and laying eggs, almost indiscriminately, in various parts of a Sydney suburban garden.

The writer was informed that, of the nests built last year, one was in a flower pot, a second in an old pot, a third in a basket as figured here, a fourth on the top of a staghorn fern and there were others, the total number for the year being seven. In each nest the magpie laid four eggs, making a record of twenty-eight for the year.

It must not be thought that when a nest was built and the eggs laid the bird deserted merely to repeat the performance elsewhere. On the contrary she was most attentive, and sat on the eggs, all of which were infertile, until she evidently became rather doubtful as to her capabilities as an incubator and turned moody. Her master, not liking to see his old pet worrying herself, would confiscate the nest and eggs when her back was turned and destroy them, after which she would soon regain her cheerful spirits and go about her way whistling for a month or so, but eventually the instinctive maternal desire would assert itself and she would commence to build all over again. So far as I can find, twenty-eight eggs and seven nests for one magpie, all within one year, is something of a record.

Under natural, wild conditions, a bird generally builds only once a year, though some species when seasons are exceptionally good and there is an abundance of food, might bring forth two broods during the breeding season. But under the unnatural conditions accompanying domestication, with artificial, well assured protection, relief from the struggle for existence, and superabundance of unnatural but very rich food, a bird tends to change its ordinary life habits. As an example we may instance the domestic fowl which in the original wild state produced comparatively

few eggs at a regular period during each year, but which under domestication with its subsequent interbreeding, artificial selection, and special feeding, has developed certain varieties, each individual of which lays an egg almost every day for the greater part of the year.



One of the seven nests built within a year by a sixteen years' old magpie.

[Photo.—B. Chisholm.]

The magpie in question is sixteen years old and has been laying for some years. The last nest was confiscated and presented to the Museum, where it is now on exhibition, but the bird still refuses to give up hope of hatching a family, and has commenced building operations again.

Magpies in general are often referred to as good talkers and whistlers but Mr. Theo. Stewart, who is an aviculturist, says that its wild notes are powerful and mellow but melancholy. As a talker it has a very restricted vocabulary and will never learn to whistle the last notes of any tune. Its singing too leaves something to be desired, for a bird belonging to Mr. Stewart mixed the words of two songs and persistently sang "Pop goes the King," and "God save the Weasel."



## Reviews.

*Origin of Australian Beliefs.* By PROFESSOR LAMBERT EHRLICH. Anthropos, Vienna, 1922. 5/-.

Professor Ehrlich has recently published an interesting study of the "Origin of Australian Beliefs." Evidently to the author, "Australian" everywhere means "aboriginal." Ehrlich considers various theories of the origin of religion in the light of facts gleaned from our aboriginals. He stresses the great scientific interest of the latter, for he states: "the standard of civilisation among the aborigines is on so low a level that it bears a striking resemblance to that indicated by the recently discovered traces of paleolithic man in Western Europe." Ehrlich discusses the various aboriginal rites concerning dances, burial, magic, totems, churingas, and the Supreme Being. He then considers Tylor's animistic theory of primitive religion, and shows that the aborigines had a higher form of belief in which there was a close alliance between religion and morality. Frazer's "Theory of Magic" may explain the "Gods" of south-east Australia who sent the lightning, but does not account for the deities of Central Australia who stand aloof from man. The writer summarises pithily as follows: "according to Tylor man dreamed his religion, according to Frazer he thought it out, according to Marett he danced it out, according to Ames he lived it out biologically, according to Smith he anthropomorphised his Gods out of totem-animals, according to Dunkheim he symbolised them in group-totems."

The second part of the book deals with varying migrations which brought in different cultures. Ehrlich states that complete matrilineal principles do not obtain among the Australians, but he holds that the father-right culture probably preceded the mother-right culture. In general he agrees with Graebner's culture-zones, but they reached Australia at a very primitive stage. Thus the first migrant brought the Tasmanian culture. Then followed the boomerang culture. The totem cultures came next (also from the north) and split the earlier cultures, so that some primitive relics still occur in the far north-west, as well as in the south-east. Then came the fourth migration with matri-

lineal dual organisation, which occupied the central east portion of the continent.

Ehrlich gives an interesting account of the rival claims of Bayame and Daramulun, the supreme beings of the New South Wales blacks. He thinks that they originated partly as deified tribal chiefs of Kamilaroi and enemy tribes. But the Gods also create the earth, initiate ceremonies, produce men and animals. Under this aspect, these Australian Gods carry us back to a stage before ancestors came to be worshipped, before the time of inter-tribal conflicts, in fact, back to a Golden Age! The book closes with two very useful maps, showing the tribes and their social organisation.

*Griffith Taylor.*

*Linnaeus.* By B. DAYDON JACKSON, Ph.D. H.F. and G. WITHERBY, London. (Angus and Robertson, Ltd.), 25/- net.

The romance of the life and work of the "Father of Natural Science" is here revealed in a most readable manner, the well known anecdotes being included with dates authenticating them, or facts proving their fiction. Although many "Lives of Linnaeus" have been published, the present one excels in every respect, being an abridgement of the extensive and authoritative work by Fries which covers every detail of the long life and achievements of this wonder man. His contemporaries declared that "*Deus creavit, Linnaeus disposuit*" (God created, Linné set in order), and after two hundred years trial of his system of ordering little improvement has been effected. Linnaeus as a systematist revolutionised the study of botany and zoology, and the story of his trials and tribulations ere his goal was achieved is well told. Linnaeus as a teacher was even more successful, as all the great naturalists of the "glorious age of natural history" were his pupils. The first naturalist to set foot in New South Wales was Solander, one of Linnaeus' pupils; he was the mentor of Banks, and these were the botanists whose wonderful collections in Botany Bay so impressed Captain Cook, who was not particularly interested in natural science, that he changed its name from Stingray Harbour to the one it now bears. The collection of



insects made by these botanists was worked out by another pupil of Linnaeus, the famous Fabricius.

Not only Australia was visited by his pupils, as Kalm and others went to America, Thunberg to South Africa and Japan, Sparrmann to South Africa and New Zealand, Hasselquist and Forskal to North Africa and Arabia, and Osbeck to China, to mention the first names that come to mind. These and many more are mentioned in "Linnaeus," a galaxy of

great names, all men who acclaimed Linnaeus as their teacher. A wonderful memorial for one man, an undying system and a host of illustrious pupils. It is interesting to note that this magnificent figure was yet very human, full of frail vanities, heedful of superstition and gratified by praise. It is necessary to read the book to enjoy all the intimacies presented, and it is difficult to lay it on one side when once the leaves are opened.

Tom Iredale.

Before his death, the late C. M. Hoy contributed an article on "The present status of the Australian Mammal Fauna" to the *Journal of Mammalogy*. This accomplished naturalist and keen observer, whose early death was a signal loss to zoological science was well qualified to speak on the subject, for he had travelled and collected widely in our continent. He says: "It seems to be generally held that most of the Australian native mammals are close to extinction, but in three years' work in which time I collected in every State, with the exception of Victoria, I found that this was far from true. There has never been any systematic work done among the mammals of Australia, especially as to their distribution, and I found that many of the reports as to the scarcity of certain mammals were based on trips to only one locality. It is true that some of the mammals with very limited distribution are becoming very scarce, but most of the Australian mammals are rather wide spread, and although they may be completely exterminated in one locality, they are often exceedingly plentiful in another. However, I do not mean to convey that there is no danger of the ultimate extinction for there is great danger if conditions keep the same as they are now. The number of the marsupials, taking Australia as

a whole, has greatly diminished and their ranks are yearly dwindling."

Hoy placed the agents of destruction in their order of importance as follows: rabbits, foxes, domestic cats, clearing of the scrub and bush land, heavy stocking, bush and grass fires and the direct efforts of man through shooting and snaring.

We cannot agree with the statement that there has never been any systematic work done among the mammals of Australia but certainly our knowledge of their distribution is by no means complete. In this respect the available information contrasts rather poorly with the very full data regarding the bird fauna which we owe to the numerous and enthusiastic amateur ornithologists that Australia boasts. It is high time that systematic and continued field work was undertaken, so that data might be accumulated regarding the present distributional limits of various species, which would not only be of great scientific value but, if continued, would also enable us to discover what forms are in danger of extinction and to take measures for their preservation. It is a humiliating thought that no Australian museum is in a position to do continuous field work, which, as was said in a previous number, is the very life of a museum.