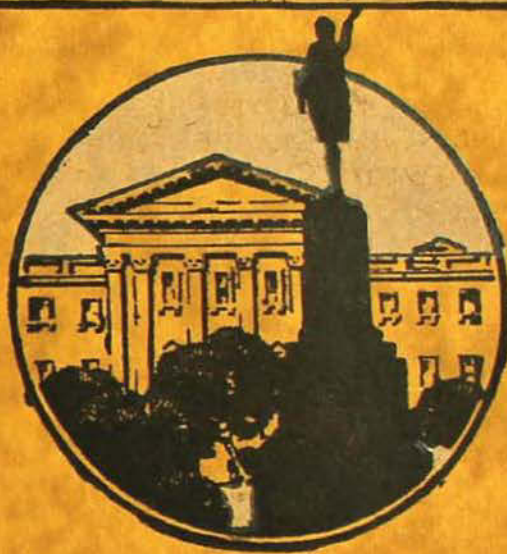


# The AUSTRALIAN MUSEUM MAGAZINE

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



- A Naturalist in the Chichester Valley - *A. Musgrave*  
The Little Penguin - - - - *J. R. Kinghorn*  
Opal, the Rainbow Gem - *C. Anderson, M.A., D.Sc.*  
The Yellow Monday Cicada - - *A. Musgrave*  
War in the Garden - - - - *A. R. McCulloch*  
Reminiscences of the "Challenger" *W. H. Hargraves*  
The Mystery Lake - - - - *H. O. Fletcher*  
The Palolo Worm - - - - *W. W. Thorpe*

PROFUSELY ILLUSTRATED.

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# THE AUSTRALIAN MUSEUM

COLLEGE STREET, SYDNEY.

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Young of the Flying Phalanger Taguan (*Petauroides volans*). This species was very common at Blue Gum Knob. The fact that the fur is not of commercial value is doubtless responsible for the preservation of the animal. (See page 195).

[Photo, from life—A. Musgrave.]



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## Editorial.

### MUSEUMS AND ENDOWMENTS.

THEY do these things well in America. A recent number of *Natural History*, a magazine issued by the American Museum of Natural History, New York, informs us that the Endowment Fund has been recently augmented by two gifts totalling \$1,250,000, and the trustees hope that during the present year at least \$2,000,000 may be raised for this fund. That is the proper spirit, and we hope that this objective will be attained. The great New York museum is the admiration and the envy of similar institutions the world over. It is admired because of its magnificent services to science and education, and its bold adventures in new methods of display, which have become classic models for imitation elsewhere. And it is envied because of its well merited success in arousing the interest of American citizens and gaining their material support for its projects. The greater part of its income is derived not from public funds but from private donations, which enable the trustees to finance vast schemes of exploration and research in all quarters of the globe.

We in Australia are more modest. We have our own continent, with a fauna and an aboriginal population more interesting perhaps than any in

the world and presenting many problems yet unsolved. Then we have the Pacific at our doors, teeming with possibilities for zoological and ethnographical research, and Australian museums would be up and doing. Can we not hope for a measure of public support, not, indeed, as great as American museums obtain, but commensurate with the wealth of our own country? It might be said that the public services of this museum are so slight in comparison that we cannot expect private donors to respond to our needs as in America. But we would reply that this museum is prepared, and tries to serve the public as fully as its resources and opportunities will allow. No reasonable request for information or help is refused. We give free public lectures both in the museum and outside. With our all too slender means we attempt, by collecting expeditions in Australia and the Pacific Islands, to gather the materials for scientific investigation, the results of which are published in our Records or in the proceedings of learned societies. We have had classes for the blind. We are ever seeking to make our exhibits more interesting and instructive to the public. We have established this Magazine for the benefit of those who wish to learn

more of natural history, but are not interested in technical details. We do not do so badly after all, but we should like to do more.

A distinguished American visitor to Australia informed us that in America no wealthy man is allowed to die before he has made substantial bequests for scientific and educational purposes. But how much more satisfactory is the

Carnegie and Rockefeller method of making the money available during the lifetime of the donor. Sometimes, when lamenting the fact that the lack of money puts an enticing piece of field work beyond our reach, we have wistfully canvassed the possibility that some kindly soul would generously establish for us a fund of, say £10,000, the income to be earmarked for exploring and collecting purposes.

## Notes and News.

We are sorry to learn that Sir James Burns, trustee, who is at present in England, had an attack of illness in London. Last accounts were to the effect that he was progressing.

Dr. J. R. M. Robertson, another trustee, who is on a visit to the Old Country, writes from Renfrew to say that he will be back in Australia early in January. He has visited a number of museums, but has seen none to compare with the Natural History Museum at South Kensington. He is looking forward to seeing the American Museum of Natural History on the return journey.

Mr. A. R. McCulloch, who is with Captain Frank Hurley's expedition to New Guinea, wrote recently saying that all was in readiness for the dash up the Fly River to Lake Murray, and a later wireless message announces that the party has reached the lake and are at anchor opposite a headhunters' village.

The late Mr. P. G. Black, who was for forty years connected with the firm of Burns, Philp & Company Ltd., made a very comprehensive collection of ethnological objects from the South Seas. His collection has now been offered for sale to the trustees, who are endeavouring to raise funds for its purchase, as they feel that this fine collection should be kept in Australia.

The last lecture for the session was delivered by Mr. E. le G. Troughton, on November 9th, his subject being "Aquatic Mammals." Since our last issue, Mr. J. R. Kinghorn lectured on "Who's Who among the Reptiles" to the Mechanics' Institute, Goulburn. The attendances at the lectures during the last year have been very gratifying.

A commencement has been made with the work of restoring the devastated area lying between the north wing of the Museum and William Street. This unsightly cut has long been an eyesore and a reproach, and it is hoped that the improvements now in progress will considerably enhance the appearance of the building.

The Museum now comes into contact with outside bodies in an ever increasing degree. Thus we have lately had the pleasure of a number of visits by members of the Naturalists' Society of New South Wales. These visitors were met by officers of the Museum and personally conducted round the galleries. A party of young people from Auburn, where a little circle has been formed to study Anthropology and various human problems, came to the Museum by arrangement to hear an address by Mr. W. W. Thorpe, Ethnologist, on Primitive Man. The same officer has twice lectured by request to the Eugenics Section of the Workers' Educational Association.

## A Naturalist in the Upper Chichester Valley.

BY ANTHONY MUSGRAVE.

**T**HE Upper Chichester Valley, which forms the subject of my narrative, lies between two spurs of the Mount Royal Range, about thirty miles from the township of Dungog, on the West Maitland-Macksville line. Some years ago a party of naturalists visited the Barrington Tops, west of the Chichester, but no collecting was done at the foot of the range, and, as the area has seldom been explored by naturalists, I eagerly seized the opportunity to accompany my friend, Mr. J. S. P. Ramsay, to the locality.

We camped in Duggan's Gully, our hut standing on a steep hillside overlooking a small clearing in which rose the gaunt forms of dead gum trees, their light grey trunks standing out against a dark background of dense



A Grey Ironbark (*Eucalyptus paniculata*) was the Host of the "Elk's horn."  
(*Platycerium bifurcatum*).

[Photo.—A. Musgrave.]



Portion of the trunk of a turpentine tree, showing the bark torn off by Black Cockatoos in their search for beetle larvae.

[Photo.—A. Musgrave.]

scrub. Through the clearing Duggan's Creek wound its way, rippling over the stones on its way to the Chichester River and the sea.

It was an ideal situation for a camp, for only a few minutes walking took us into a dense growth of subtropical vegetation. In front of the hut was an abandoned cultivation paddock overgrown with wild raspberry and nettle bushes, whilst small gum saplings and scrub trees scattered here and there showed that the bush was slowly reclaiming its own. On all sides clematis

festooned the smaller trees with its creamy-white blossoms; directly in front of the hut a huge mass of rocklily was in full bloom, and beautiful evidences of spring daily aroused our enthusiasm. Beyond the clearing the vegetation was on a wild and luxuriant scale and nearly every tree in the scrub seemed to be groaning under the weight of staghorns and orchids. The native figs appeared to be particularly susceptible to parasites, and a large tree growing near the hut was a host for epiphytic plants of all descriptions. The topmost branches were encircled by masses of staghorn ferns, which gave the tree an unwieldy appearance, while the tiny yellow figs attracted myriads of birds.

A curious sight was afforded by two dead turpentine trees growing on the opposite side of the gully, and appearing to have light reddish trunks with soft lace-like green foliage. The supposed foliage proved to be masses of "Old Man's Beard" moss, which hung from every branch and twig, while the trunks on examination showed the bark to be hanging in shreds, Black Cockatoos having ripped it up in their search for beetle larvæ.

Liana vines or monkey ropes matted the trees on the edge of the stream and made progress through the scrub an arduous task. The Giant Nettle (*Laportea gigas*) was frequently met with in our rambles, and carefully avoided. The Queensland Lily, or "Cunjevoi," which is found growing in the vicinity of the nettle, and whose juice is said to be a specific for the sting of the nettle, was noted, but fortunately we had no necessity to test its soothing attributes.

The season was too early for the majority of insects, though by diligent log-rolling many ground beetles were taken. The Nettle Butterfly (*Pyrameis itea*), however, was common, hovering over the nettles, and at night we were visited by swarms of a geometrid moth (*Xanthorhoe brujata*), which we dislodged in numbers from our clothing in the morning.

#### BIRDS.

But though the season seemed unpropitious for insects, bird life flourished in all directions. Here I saw for the first time a male Regent Bower Bird (*Sericulus chrysocephalus*) its black and golden plumage as it flew from tree to tree resembling the gorgeous coloured *Troides* butterflies of the Malayan and Papuan tropics. The giant fig-tree, previously mentioned, was daily visited by this species, which came to feed on the fruit.



On the banks of the creeks the lianas, or native vines (*Vitis hypoglauca*) impeded our progress.

[Photo.—A. Musgrave.]

All day long the scrub resounded to the call of the Coach Whip Bird (*Psephodes crepitans*), a long drawn out note ending in a whip-like crack and in many cases immediately followed by two sharp notes at a little distance away. Trustworthy observers state that these last notes are "reply" calls used by both sexes, but they follow so perfectly upon the first notes that a belief has arisen that the bird at times indulges in ventriloquism.



## MAMMALS.

At our camp the rats, which were in great numbers, proved to be a common bush species (*Rattus assimilis*), the difference between their soft fur and the coarse bristly coat of the common introduced brown rat (*Rattus rattus*) making identification easy. We set numerous traps and would frequently be aroused at night by the crack of one of them, indicating the sudden end of an unfortunate rodent who had been injudicious enough to try the raisin bait.

Rats were not our only visitors; one night a scrambling noise on the tin roof told us that some animal was abroad. We decided to investigate the cause, so with electric torches we sallied forth, and there on the roof sat a ring-tailed "opossum" (*Pseudochirus peregrinus*) gazing with large luminous orbs into the dazzling light as though fascinated by it. He was allowed to depart in peace. In the thick bush on the banks of streams we frequently came across the nests of this animal.

## TICKS AND LEECHES.

Ticks and leeches were exceedingly numerous in the scrub, and we usually returned home with both animals well represented on our clothing and bodies. The ticks (*Ixodes holocyclus*), popularly known as the "Bush" or "Dog" tick, were by far the most unpleasant, as their removal invariably resulted in a swelling, which in some cases persisted for weeks. We had many wet days, and during the rain the leeches would stand stiff and straight on the grass stems, and, on our brushing against them, would immediately fasten on to us and proceed to suck our blood. They thrive only in damp situations and are unable to travel on dry dusty surfaces, so that it was interesting to see them enter the hut as far as the line of dampness extended, and halt there, pathetically waving their heads as they sniffed our whereabouts.

## BLUE GUM KNOB.

Collecting in the vicinity of the hut having proved rather disappointing, we decided to try our luck further afield, so one sunny morning we set out for Blue Gum Knob, a spur some two miles distant, which divides the Duggan's Gully Creek from the Wangat or Little River. This spot proved to be a most enchanting locality, tall blue-gums rising like giant marble columns on every side, dwarfing our tent into insignificance. Insects were more conspicuous than on the lower slopes among the brush, and the beautiful green butterfly (*Papilio macleanus*) was a welcome sight as he hovered over the yellow and white flowers of the everlastings.

One night, after setting the rat traps in hopes of obtaining other species, we started out with a small rifle and torch in an endeavour to collect some Flying Phalangiers, or Flying Squirrels, as they are erroneously called, for the Museum collection. After wandering along the track for awhile, we espied one fairly high up a gum-tree and a lucky shot brought it to the ground; the torch helped us to pick our way down the steep hillside through long grass and fallen branches and showed the animal to be a very nice specimen of a female Taguan Flying Phalanger (*Petauroides volans*).

Its black and white fur looked most beautiful and soft in the torchlight, but fortunately for the animal it has little or no market value, being too soft to recover its position if it is flattened or pushed to one side, and known technically as "dead" fur. Shortly afterwards a second one rewarded our search, and, as it proved to be a male, we retraced our steps. A third one, however, with its black back and white under surface making it look for all the world like the cat immortalised by the artist. D. H. Souter, tempted our marksmanship, only to our immediate regret, for it proved to be a second female with a fully furred young one in its pouch. This young "squirrel" became for a

while a most delightful pet, living during the day in an old waistcoat pocket, with its long black tail curled round and round its face till the extreme tip just covered his little pink nose. At dusk he would emerge and be fed with weak condensed milk and a few gum leaves.

On our return to Sydney he lived for some time on milk, gum and pepper-tree leaves, the latter being quite a favourite dish. He was allowed his freedom and had a box for the daytime sleep in a corner of the verandah, while a plentiful supply of food was placed on a table each evening. He would leave his box and travel the length of the verandah to his meal, and, after a little exercise, would return to his nest, but ultimately he left his home and was not afterwards heard of.

Our hopes over the rat traps were

gratified to some extent by the capture of a Yellow-footed Pouched Mouse (*Phascogale flavipes*) with eight young in the pouch, but this was the only species secured apart from the ubiquitous *Rattus assimilis*. Here, too, this species found the raisin bait an irresistible delicacy, and we soon found our available jars well filled.

We accordingly packed our belongings and trudged heavily laden back to the hut, and a few days later a most delightful trip came to an end, though not without hopes of a further acquaintance with the locality.

The material collected affords a good indication of what the locality would produce during a more propitious season, and in the summer months the whole area must abound with mammal, bird and insect life.



The white and yellow flowers of the Everlastings (*Helichrysum elatum*) attracted the beautiful Swallow-Tail Butterfly (*Papilio macleayanus*).

[Photo.—A. Musgrave.]

## A Romance in the Life of the Little Penguin.

BY J. R. KINGHORN.

IT is seldom that the Little Penguin (*Eudyptula minor*) comes as far north as Sydney to breed, though occasional specimens have been found nesting on Cabbage Tree Island at the entrance to Port Stephens. This story is about a pair which made their temporary home at Collaroy Beach, a well-known and much frequented seaside resort about six miles north of Manly.

A little over a year ago, Mr. and Mrs. Penguin swam northwards along the coast of New South Wales, in search of a suitable locality in which to make their home. One morning towards the end of August, 1921, they rounded the headland at the southern end of Collaroy Beach and landed to inspect the site. They did not look round for long, however, as their attention was directed to a fine house situated at the top of a sandhill almost on the beach. The gate being open they waddled up the pathway and round the house to the back verandah, where they decided to boldly announce their presence and demand accommodation. They evidently regarded themselves as of sufficient importance to be able to "enter without knocking," and they made straight for the hall, but lo! a screen door barred the way, and, as further advance was impossible, they sat down on their haunches and serenaded the inhabitants with all the weird cries and noises that are known only to penguins, keeping their concert going until the desired result was obtained. Mrs. Brown, the owner of the house, went to see what the unearthly noise was, and, as soon as she opened the door, in rushed Mr. and Mrs. Penguin; once well inside they announced their names in loud voices and shouted at the occupants in a way which suggested that they were telling them to get out, as they were going to occupy the house; furthermore, they scolded Mrs. Brown



She at first resented my interference and was alarmed at the size of the camera.

[Photo.—J. R. Kinghorn.]

and her friends when they were told to be quiet or they would be thrown out. At this threat the penguins changed their attitude and became frivolous, danced about, waved their little wings and squealed for forgiveness.

After a short time, Mrs. Brown decided that they had outworn their welcome and put them outside; they disappeared for the time being, evidently going down to the sea for their lunch; but that house was to be their home, and, as they could not get inside, they went underneath, as far under as they could get, to a place where it would be impossible to disturb them without taking part of the side of the house down, and there they made their nest. The noise every night made by the penguins was almost unbearable; they would scream at each other in anger, they would cackle with laughter, or they would sing songs of thanksgiving for the two little youngsters which were eventually hatched from the eggs after a vigil of about six weeks.

It was about three or four months after their arrival that they disappeared completely and suddenly, and without one word of thanks or a good-bye to those who had given them a home and put up with all the noise, not to mention the odours which came from beneath the floor boards from decaying food, and the sea weeds of which the nest was made. Where the family spent the winter no one knows, and where they were going to spend this springtime was known only to the penguins until late this August, when a terrible cackling outside advised Mrs. Brown that they were back again. When the door was opened, Mr. and Mrs. Penguin marched boldly and triumphantly in, followed by two inquisitive and rather shy youngsters. As soon as Mrs. Brown had fully realised that the same pair had returned with their grown chicks, the birds all began to dance round, shouting approval of their recognition. They sang songs, among which could be recognised "Here we are again," and that more disconcerting one "We're here because we're here." They could not be quietened, and the inhabitants of the district came round to see if all was well, or if anyone had gone mad (for I assure you that four penguins voicing their greetings is not an altogether pleasant sound).

The owners of the house put the whole family down on the beach and drove them away, but later, after having driven away the chicks, the parent birds returned and went under the house to the spot which they had occupied the year before. The celebrations were so loud and long that next day Mr. Brown decided to take some of the boards down and get the birds out. That night they were taken by car to Palm Beach, a distance of about twelve miles up the coast, and liberated, but next morning saw them back again. I understand that they were taken away a second time, but once more returned, and this time were allowed to stay, but were given a home of their own in the far corner of the garden. A



Eventually she came up and posed for her photograph.

[Photo.— J. R. Kinghorn.]

large case was turned upside down and placed on two beams, a hole was cut in the fence to allow the birds free access to the beach, and netting was put on the house side to keep them "in their own back yard." Here the couple proceeded to build a nest of sea weeds, and later two eggs were laid. They took it in turns to sit on them, and, if Mr. Penguin stayed out late, he was in for a terrible half-hour when he came home to take his turn on the nest. Then Mrs. Penguin would go out to fish for her dinner or supper, and, as her husband had stopped out beyond his time, she would make up for it by doing likewise; later when she arrived home, after shouting all the way up the beach, she would be severely scolded and would retaliate, then a noisy argument would result, which would last well through the night.

After about six weeks two sooty-brown chicks emerged from the eggs, and the noise that night and the next few, while the celebrations lasted, caused many people of the district to shudder, thinking that someone was being ill-treated. During the days that followed, the parent birds took it in turn to fish and swim in the sea, but at night, very often, they would go out together to find a suitable supper somewhere in the

bay, and at about nine p.m. they could be heard returning up the beach, chuckling away and jibing at each other until the nest was reached, when all thoughts were turned towards the two little, fluffy, sooty-brown chicks. As I write, the family is still at Collaroy, but is probably making arrangements for the southward journey, to a locality where the summer and winter will be spent.

#### NOT THE ANTARCTIC PENGUIN.

This species, which does not grow more than 19 inches in length, must not be confounded with any of the Antarctic penguins, as it does not extend south beyond Tasmania. It is distributed along the coasts of South Western Australia, South Australia, Victoria, Tasmania, and northward along the New South Wales coast as far as Port Stephens. The adult bird is a slatey-blue colour on the upper parts, the sides of the face and neck are inclined to be light grey; the wings are a darker shade of blue with a white inner edge. The whole of the under surface is silvery white, and the legs and feet fleshy white, while the soles and nails are blackish.

The Little Penguin often builds its nest in crevices in rocks on almost inaccessible cliffs, though on some of the islands off the coast of Victoria it has been found nesting in open burrows in the sandy soil among the grass tus-



A young penguin is not exactly a pretty bird.

[Photo.— J. R. Kinghorn.]

socks. Its food does not consist entirely of fish, the diet being varied occasionally with marine algae and small crustaceans.

I was fortunate enough to be able to visit the scene of the story in October last, and there learnt from Mrs. Brown the outline of the plot, and my very best thanks are tendered here for the information gained and the facilities given for photographing the mother and her young at the nest. I spent over an hour there, hoping to get a photograph of the male bird also, but he did not put in an appearance. He was about two hours overdue when I left (according to his daily time table) and, as the mother was getting very restless, I imagine that he was in for a warm reception when he eventually came home.



She carefully examined the chick which I had photographed.

[Photo.— J. R. Kinghorn.]

## Opal, the Rainbow Gem.

BY C. ANDERSON, M.A., D.SC.

**O**PAL is composed of hydrous silica, and differs from quartz, agate, jasper and other silica minerals merely by the presence of a variable amount of water. Unlike most minerals it is a colloid, that is, it shows no sign of crystallization; in fact, it might be described as a silica jelly.

There are many varieties of opal, which is a mineral of common occurrence in nature. The purest variety is called hyalite or glass-opal, which is transparent or translucent, colourless, and commonly forms nodular bunches

the sapphire, ruby, emerald, and other coloured gems, for, by transmitted light, precious opal is colourless, milky, or yellowish, but shows no "fire"; it is by reflected light that the wonderful play of colours is seen, green, blue, or red flashing out as the stone is viewed from different angles. The commonly accepted explanation of this phenomenon is as follows. As the silica jelly dried it became traversed by cracks, which were subsequently filled by opal matter containing a different amount of water, and therefore differing slightly



The Opal Workings at Lightning Ridge.

[Photo.—Dr. J. V. Danes.]

resembling clusters of grapes. The noble, or precious opal, which is also comparatively pure hydrous silica, is the best known variety, although it is found in only a few favoured spots. Common opal, unlike the foregoing, is opaque, by reason of included impurities, and gets various names, such as milk opal, prase, liver opal, and several others.

The most important and most interesting kind is, of course, the precious opal, which is one of the characteristic Australian gems, and is considered by many to be the king of gemstones. The origin of the gorgeous play of colours, to which the opal owes its beauty and its value, is still in doubt. The colours are not caused by any pigment in the stone, as is the case in

in its refractive effect on light. The result of this lack of homogeneity is that each crack acts on light like a soap film, or a thin layer of oil, and produces a similar effect.

### THE OLDEST OPAL MINES.

The opal mines of Czerwenitza, formerly in Northern Hungary, now included in Czecho-Slovakia, were until recently the only important source of the gem, and they have been worked since very ancient times; the opals known to the Romans, by whom they were highly prized, probably came from there. The workings at Czerwenitza are now very extensive, the underground galleries being several miles in length.

The opal occurs here in an igneous

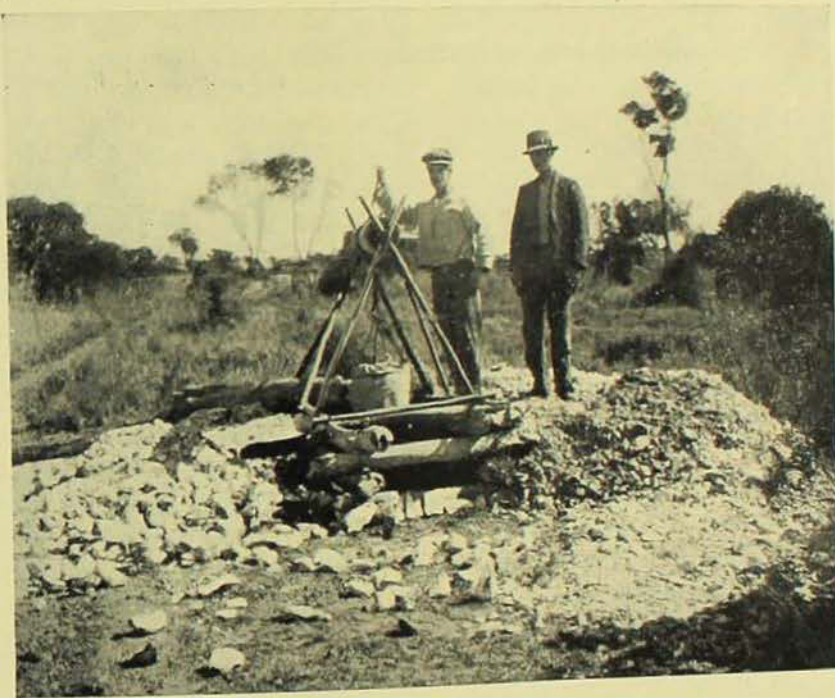
rock known as andesite, and is usually in small stones, though occasionally larger pieces have been found, and one preserved in the Vienna Museum is as large as a man's fist and has been valued at £3,500.

#### WHITE CLIFFS.

Australian opals have now almost ousted the European product from the world's markets. Precious opal was found filling cavities in the decomposed basalt of the Abercrombie Ranges, New South Wales, in the 'seventies, but Australian opal did not become impor-

a sulphate of soda and lime, forming aggregates which from their appearance have been called fossil pineapples.

Much of the opal found at White Cliffs has very little or no value for gem purposes, and is known as potch, but the field has produced many fine stones. In valuing opal, several points must be taken into account. Colour is the most important, red fire, or red in combination with blue, green, and yellow, being considered the best. Pattern is also an important factor. In pinfire opal the colour is in very small patches, almost pin points. Harlequin opal has the colour distributed in small, fairly regular



A Lightning Ridge Opal Mine, showing the mouth of the shaft and the windlass by which the broken rock is hauled to the surface.  
[Photo.—Dr. J. V. Danes.]

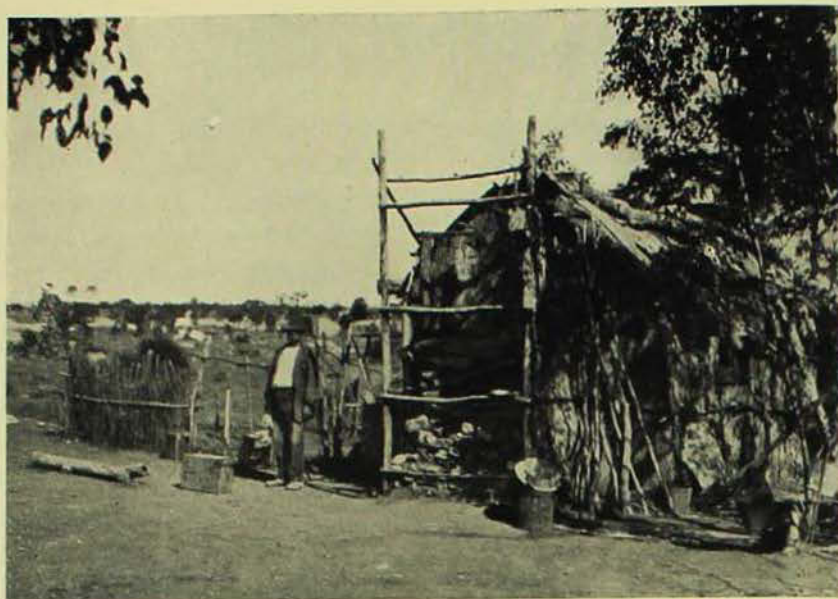
tant until the White Cliffs field was opened up. In 1889, a hunter was tracking a wounded kangaroo in the drought stricken region beyond Wilcannia, and noticed a brilliantly coloured stone, which he picked up and retained as a curio. Other discoveries followed and soon the White Cliffs opal mines were in full swing.

At White Cliffs the opal occurs in a white siliceous rock, a kind of sandstone, of Cretaceous age, filling cracks and seams in the rock, or replacing the material of wood, shells, and reptilian bones. It also occurs as a replacement of a spikey mineral, probably glauberite,

squares. In flash opal the fire shows as a single flash in large patches.

#### BLACK OPAL OF LIGHTNING RIDGE.

The most valuable opal now comes from Lightning Ridge, near Walgett, New South Wales. This field was discovered about 1895, and has produced some of the finest opal ever found. The opal occurs here in a sandstone containing much iron, and the iron is doubtless responsible for the dark colour of the matrix, which makes a splendid setting for the wonderful colours shown by a Lightning Ridge black opal of good quality.



An opal miner's residence at Lightning Ridge.  
[Photo.—Dr. J. V. Danes.]

At Lightning Ridge the mode of occurrence of the opal is the same as at White Cliffs, namely in a white, powdery, siliceous rock, through which it is scattered in an irregular manner. There are practically no surface indications to guide the prospector, who must just hope for the best. Many of the miners work for a long period, perhaps months, with little or no reward, others may make a valuable "strike" in a few days. This lends a fascination to the search, for even the novice may cherish hopes of encountering a rich patch, if not to-day, then to-morrow. No great skill or experience is required, just strong arms, a stout heart and an optimistic outlook. The miners generally work in small parties of two, or three, or four, pick their claim as close as possible to one which is known to be payable, sink a shaft perhaps to a depth of from forty to a hundred feet, and then drive tunnels outwards through the rock in search of the elusive gem.

#### QUEENSLAND OPAL.

In Queensland some fine opal has been found widely distributed over the south-west, as at Barcoo Creek, Opalton, Yowah, Jundah, and other places. It occurs in the so-called Desert Sandstone, frequently as the nucleus of large ironstone nodules.

#### STUART RANGE OPAL FIELD.

This, the newest opal field, was discovered about 1915. Stuart Range, about ninety miles west from William Creek station, on the northern railway line, South Australia, forms the divide separating a lake with the handy name of Cadibarrawirracanna from that containing Lakes Woorong, Phillipson, and Wirrida. These "lakes" are usually mere claypans, holding water only for a short time after rain has fallen (which is seldom).

The mode of occurrence of opal at Stuart Range is strikingly similar to that of the opal of New South Wales and Queensland, for it is found in irregular veins and patches enclosed in sandstone and claystone of Cretaceous age, and also replacing the remains of fossils. The method of working at Stuart Range is very simple, a pocket knife being sometimes the prospector's only tool. The soil is carefully worked over in search of fragments of bleached opal, which are followed till the seam is found, then the opal is carefully extracted and trimmed with pliers.

In all the Australian opal fields the miner's bugbear is scarcity of water, for it is only in the dry country, with an annual rainfall of not more than fifteen or sixteen inches, that the rainbow gem is found. And this is probably no mere accident, for it seems prob-



able that the extensive opalization of the sandstones of White Cliffs, Stuart Range, and the other localities where opal is found in quantity, results from "weathering" under arid conditions, whereby silica in solution is deposited in seams and cavities, and replaces the material of shells, belemnites, bones, and other fossils.

#### THE GREAT OPAL SUPERSTITION.

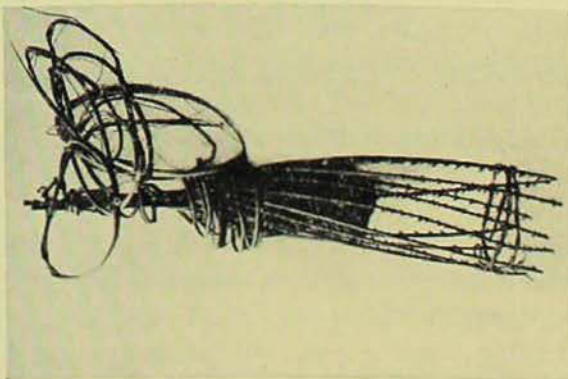
It is almost incredible that, in this supposedly enlightened age, many people the world over are firmly convinced that the opal brings bad luck. No more striking proof could be offered of the frailty of the human mind than this "monstrous legend." It is difficult to trace the origin of this superstition. In the Middle Ages the opal was considered a luck-bringing and beneficent gem, symbolical of hope; it stimulated the heart, preserved from contagious

diseases, and drove away despondency. It is only in comparatively modern times that the opal has contracted its evil reputation, which has affected its popularity and its value to a very considerable degree. In Scott's novel, *Anne of Geierstein*, evil influence is ascribed to the opal clasp worn by the beautiful Persian wife of the Baron of Arnheim, and it is said that within a year after the publication of the book the price of opal declined by half. A recent Australian visitor to Paris was informed that the opal is regarded as unlucky in France for the following reason. In 1500 there were several large stage coaches in Paris, which were named after the various precious stones, and several notables, including Napoleon in later years, had suffered calamities while passengers in the "Opal," and that even now it would almost be considered disloyal for a Frenchman to wear an opal!

## An Example of Parallelism in Human Culture.

BY W. W. THORPE.

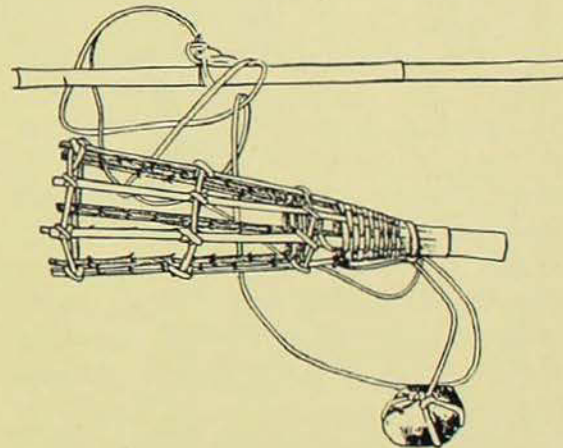
THE attention of those who handle and study the implements and other manufactures of so-called savage man is frequently arrested by the striking similarity between the implements made by native peoples, often widely separated in origin and habitat. The



Barbed Fish Trap from Fly River,  
New Guinea.

[Photo.—G. C. Clutton.

resemblances are, of course, governed by local conditions and requirements,



Barbed Fish Trap from British Burma.

[After I. H. Burkill.

but they go to prove that the adaptive mind of man, wherever situated, will often attain the same result. For instance, the Melanesian of the Bismarck Archipelago, and the Papuans of New Guinea, have racially, nothing in common with the Chins of Arakan, British Burmah, yet these three folk manufacture barbed fish traps so similar in idea and effectiveness, that a com-

parative description might be of some interest to our readers.

In the Bismarck Archipelago a number of stems of the prickly palm (*Calamus* or *Daemonorops*) are bunched together at one end and allowed to open out at the other, forming what will ultimately be, when interlaced, a conical-shaped basket. Vine or cane lashing is used and gives the trap rigidity. The palm stems are so arranged that the hook-like thorns point inwards. A piece of string is attached to the trap, a slab of drift-wood tied at the other end, and a bait placed well inside the basket. To set the trap the native sinks it and places a stone on the string, allowing the float to rise on the surface. The fish readily enters the trap, but on trying to back out or turn, it becomes impaled on the thorns.

The trap from British New Guinea is of more solid construction, but the shape and idea is the same. The barbed stems are lashed to cane ribs, and a crossed stick prevents its being rolled over or otherwise displaced.

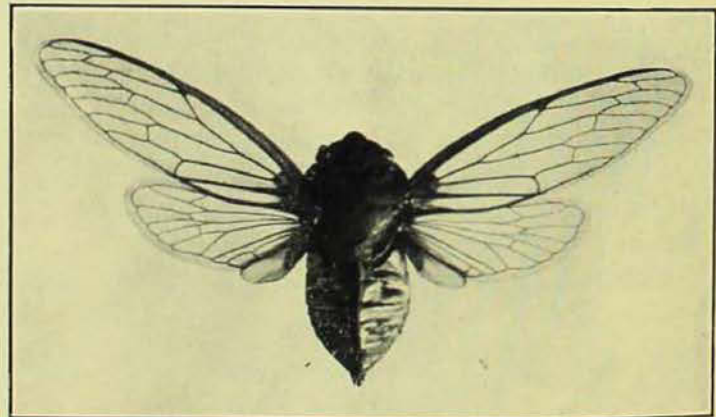
The frame of the Burmese device is made of bamboo. A stem of about twenty inches, butting on a node or knot, is split longitudinally into seven or eight strips. These rib like divisions are interlaced with rattan, as in the forms already described. Stems of the prickly palm are lashed in position inside the cane, and, baited as before, it is placed in the river with the mouth down-stream, and anchored in place by means of an attached stone. Its position is indicated by a bamboo pole inserted in the river bank, this pole being connected to the trap by a length of rattan.

## The Yellow Monday Cicada.

BY ANTHONY MUSGRAVE.

**T**OWARDS the end of October, when the days are getting longer and hotter, the shrill note of the cicada announces the advent of summer. The cicada whose piercing din is so familiar to Sydneysiders is the Yellow or Green Monday Cicada (*Cyclochila australasiae*) though other species occur in and about the city.

Cicadas, or as they are more commonly, but wrongly, termed locusts, are members of the order Rhynchota, a group of insects which includes bugs, leaf hoppers, scale insects and aphides. All these are provided with a sucking proboscis, by means of which they are able to pierce the bark of plants and suck up the juices. The true locusts, or short-horned grasshoppers, belong to an entirely different order, the Orthoptera, in which are also placed such



Yellow Monday with wings outspread, showing the strong network of veins.

[Photo.—G. C. Clutton.

insects as cockroaches, mantids and stick insects. These, on the other hand, possess mouth parts that are used for biting their food, which may consist of leaves, or grass, or other insects, as in the case of the mantids.

Cicadas are widely spread over the globe, but prefer warm countries. Only one species is recorded from England, where it is by no means common, while

over two hundred species have been recorded from Australia.

When we come to examine a Yellow Monday Cicada, we find that it measures nearly two inches in length and has a wing spread of five inches. It is usually yellow in colour, as its vernacular name would suggest, though green varieties are common, but after death their colour frequently changes to a yellow brown. The most noticeable thing about the broad head is the triangle of ruby-like ocelli situated between the pair of large eyes. Projecting before the eyes may be seen the small antennae, consisting of a stout basal segment and terminating in a bristle. Springing from the sides of the thorax are the strong, transparent, shining wings (tegmina), with a network of stout green-coloured nervures or veins. The hind wings which follow are smaller and not so heavily veined. These glistening wings were, at one time, much sought after by the urchins of Sydney, under the extremely erroneous impression that they were of commercial value. How this fallacy arose is not clear, but it was every year responsible for the mutilation of many of these unfortunate insects, which were forcibly stripped of their wings and left to crawl about the foot-paths until they eventually succumbed to the attacks of ants or the footfall of some passer-by. On the under-surface of the body are the legs, which are well developed and enable the insect to cling to a swaying tree-top without fear of being dislodged by the wind. At the base of the abdomen there occur in the male the sound producing organs, which are recognised by the tympanal coverings on the upper part of the abdomen, and the broad plates or opercula on the lower surface of the abdomen. These are absent in the female, which is somewhat larger than the male.

#### THE SONG OF THE CICADA.

It is interesting to learn that the ancient Greeks knew and venerated the cicada, and one of these insects sitting on a harp or lyre was regarded by them as symbolical of music. The Latins, it



The Yellow Monday Cicada, showing the normal position assumed by the wings while the insect is clinging to a tree trunk; when singing they are lowered at the sides of the body.

[Photo.—A. Musgrave.]

is said, were not impressed by the charm of the cicada's song, an impression which is shared by all Australians who have listened to their noisy screech. Virgil describes them as "bursting the very shrubs with their noise," a saying which could be felicitously applied to the arboreal orchestras of our suburbs.

The song of our Yellow Monday usually commences with a few opening notes given with staccato-like effect, followed by a continuous whirring screech, which is taken up by all the cicadas in the neighbourhood, until the noise seems to burst the very drums of one's ears. The refrain is kept up well into the night, with intervals of rest, unless an atmospheric change, such as a thunderstorm or cool southerly, springs up, when their voices are hushed and comparative silence reigns where was pandemonium. No article on cicadas would be complete without the famous lines of Xenarchus, a Greek poet, who sang :

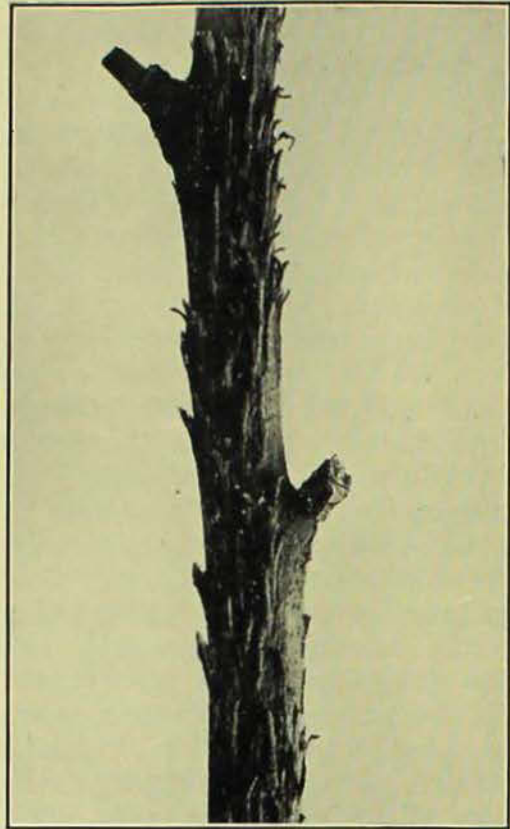
"Happy the Cicadas' lives  
For they all have voiceless wives."

This cynical reflection serves to impress upon us the important fact that the sound-producing organs occur only in the male. These are situated on the upper surface of the first segment of the abdomen. The sound is produced by the bending of a stiff horny membrane which is acted upon by a muscle. The same effect is produced if one rapidly buckles the bottom of a kerosene tin backwards and forwards. The opercula, or "drums," as they are wrongly termed, which are seen on the ventral surface of the abdomen as thin plates, probably serve as resonators but have nothing to do with the production of the sound. When singing, the Yellow Monday usually lowers his wings from their roof-like position and elevates his abdomen.

The Yellow Monday has, in common with other species, been the plaything of the boys of Sydney, probably since the earliest days of the colony. The unfortunate insect is subjected to every indignity and abuse that childish ingenuity can devise. An outrage frequently perpetrated by juvenile offenders on the defenceless "locust," is to insert a blade of grass into its body, then to liberate the victim and watch it fly into the air with the long appendage trailing behind it. A more common practice is to take them into school, where they serve to enliven the somewhat dull proceedings of a lesson by giving vent to loud protesting squawks in response to an occasional shake by their captors. Every Sydney school-master during some time of his career has had cause to execrate these noisy insects. Not even during its "pupal" period is the locust safe from these young marauders, for in our parks during the summer it is no uncommon sight to see small boys carrying bottles of water and searching most diligently for cicada burrows. These they flood with water, causing any pupae that may be within to ascend to the surface of the ground, where they are promptly secured.

#### LIFE HISTORY.

The female cicada is provided with a strong saw-like ovipositor, or egg-laying



Portion of a eucalyptus branch ripped up by the ovipositor of the female when laying her eggs.

[Photo.—G. C. Clutton.

organ, by means of which she is able to rip up the bark of small branches and deposit her eggs in rows in the excisions thus made. Little is known of the life history of our Yellow Monday, but as many cicadas lay about three hundred eggs, it is generally supposed that she lays about the same number.

When the young cicadas emerge from the eggs they are tiny and shrimp-like in appearance. They make their way to the ground, many falling off the branches. On reaching the ground, they work their way down to the roots, where they pass the greater part of their life, deriving nourishment from the sap. The length of time passed underground has been estimated at three years, since they are most numerous every third year. An American species, *Cicada septendecim*, spends seventeen years of its life underground. During its subterranean existence the cicada moults many times, but in the case of the Yellow Monday this important detail of its life history still remains undiscovered.

When we examine a hole from which a cicada has emerged, there is no accumulation of dirt around the entrance, as is the case with those insects which tunnel *into* the ground. A question that is often asked is: What then becomes of the earth that the pupa dislodges as it tunnels upwards to the light? The secret has been shown to lie in the insect's method of excavating. The front pair of legs of the pupa are seen on examination to be much larger and more powerful than the middle and hind pairs, the femur being broad and spade-like, the tibia pick-like, while the hooks of the tarsus can be likened to a rake. With these powerful implements the pupa pounds its way upwards from its earthly dwelling-place. The earth is first dislodged by means of the strong claws of the tibiae, and the debris raked in towards the body by means of the claws of the tarsus. The dirt is then seized by the tibia and the large flat femur, the legs are thrust outwards, and the dirt is rammed hard against the earth wall. In this manner the wall to the tunnel is at length constructed.

The writer has sometimes observed a turret of clay placed over the openings of the tunnels from which the pupae have emerged, and, though this habit is not confined to our Yellow Monday, the reason for it is unknown. It has been suggested that they serve to protect the burrow from flooding, but there does not appear to be enough evidence to support this conjecture. Another theory, which is probably the correct one, is that the pupa comes to the surface before it is quite ready to emerge. It therefore constructs a turret as a temporary retreat.

Though the cicada, when it emerges from the ground is usually termed a pupa, the name is really misleading, as it is not a true pupa, such as we find in moths and butterflies, where the pupal stage indicates a quiescent condition during which the insect is incapable of movement. The cicada "pupa" is, on the other hand, extremely active, as we have seen, and the term pupa is, therefore, used only as a matter of convenience. The pupa is very similar to the



The adult cicada emerging from the pupal shell.

[Photo.—A. Musgrave.]

larvæ, except that wing pads are present during the pupal stage.

#### TRANSFORMATION.

According to Mr. Froggatt, the pupa emerges from its tunnel about eight o'clock in the evening. It then climbs a tree, fence, or some similar object and fastens itself firmly to the bark by means of its claws. This is very necessary, as the claws will have to bear the whole weight of the insect during its movements while the subsequent process of transformation takes place. The skin then splits down the middle of the pupa's body, from the head to the first segment of the abdomen, and the back of the adult cicada emerges. Then follows the head, after which the insect falls over backwards and draws out the legs and the wings. At the same time the linings of the thoracic air tubes which take the form of long white threads, are drawn out of the body of the adult. These are plainly seen in the photograph of the old shell of the Yellow Monday. The adult cicada now bends back again into a forward position, and seizing hold of the front of the pupal shell draws out the abdomen. After this growth is very rapid, the wings gradually lengthening and becoming hard and dry, so that, when morning dawns, the insect is ready to



The pupal skin remains clinging to the tree long after the adult has departed.

[Photo.—A. Musgrave.]

join its comrades in the tree tops. The shell of the pupa remains clinging to the tree long after its owner has departed.

#### FOOD.

One of the curious anomalies that one meets with in Australia is the readiness with which many of the indigenous insects forsake their native food-plants for those of introduced species. Thus we find the larvæ and pupæ of the Emperor Gum Moth (*Antheraea eucal-*

*ypti*) on the introduced pepper tree, though its natural food plant is the eucalypt. And so with the Yellow Monday, while in the bush one rarely meets with the insect, in the city and suburbs their numbers on the introduced trees are prodigious and their noise deafening. They seem to have acquired a preference for the English oak, and Mr. Froggatt, who has given a good account of this insect in the *Agricultural Gazette of New South Wales* for 1903, states that he has counted over forty on the trunk of one oak tree. As the tunnels occur in numbers at the foot of these trees, it may be taken as indicating the fact that in the larval stages they derive their nourishment from the roots of the trees. During the adult stage, Mr. Froggatt states that he has never known them to feed, a habit which is certainly not shared by all our "locusts." In a garden at Parramatta, one of the oldest in the State, I was kindly permitted by its present owner, Mr. J. Bradley, to take photographs of the shells of the Yellow Mondays which occur there abundantly at times on the trunks of the English oaks and other trees. Though eucalyptus trees did not occur in the grounds, shells were to be seen on the camphor laurel and pine trees. The Yellow Monday would seem, therefore, to be most catholic in its tastes.

*The Wilderness.*—By AMY E. MACK.

*Boronia Babies ; Gum-Blossom Babies ; Gum-Nut Babies ; Wattle Babies ; Flannel Flowers and other Bush Babies.*—By MAY GIBBS.

One looks for something bright and interesting from the pen of Miss Amy E. Mack (Mrs. L. Harrison) and in "The Wilderness" this is fully realised. It is an account of the wild life frequenting a not much traversed plot within an area already well marked with homes. The disadvantages to the builder have converted it into a veritable sanctuary. The nature lover will find much enjoyment in this booklet,

which reflects credit upon all concerned—author, artist, publisher and printer.

Miss May Gibbs' charm and style is well maintained in the series above listed. The appeal to young folks should be strong. The mind of the child is a naturally enquiring one, and reading material of this nature cannot but have a good effect in moulding the outlook towards all things living, and rendering, perhaps, less necessary the provisions of the *Native Animals and Birds' Protection Act*. The booklets are admirably produced.

Our copies from Angus & Robertson, Ltd.

## War in the Garden.

BY ALLAN R. McCULLOCH.



The Yellow and Black Sand Wasp (*Exeirus lateritus*) which every year exacts heavy toll from the cicada world.

[Photo.—A. R. McCulloch.]

WHEN the sun is shining his hardest and the cicadas, or screech-bugs, as our American cousins appropriately call them, are screeching their loudest, the time is ripe for unlimited tragedies. In an old Parramatta garden, where the soil is loose and sandy, and oak trees form a thick leafy canopy overhead, the cicada finds everything to his taste. In his larval life, when tunnelling his way through the ground, he finds no difficulty in moving the soil with his powerful front legs in search of food. And later, when he has crept out of his brown, hard skin, and emerged a slim, shiny creature, he has merely to spread his gauzy wings and fly into the nearest tree-top to trill away the few remaining days of his life. So well does it suit him and his kind, and so much noise does he make, that he attracts numerous small boys, who delight to catch and shake him violently in a hot dirty hand, causing him to rattle loudly in protest. Boys and birds and what would seem to be still more dangerous enemies, wasps, harry the poor cicada from the cradle to the grave.

In a corner of the garden, a number of Digger-wasps (*Exeirus lateritus*) have established themselves, appearing year after year to wage war upon the host of

cicadas living in the trees above them. They burrow deep tunnels in a small space several yards square, and heap up small hillocks of it at the entrance to their subterranean dwellings. Each burrow is about the size of a mouse-hole and the sand excavated from it would fill an ordinary cup four or five times.

Each year, about the middle of November, when the sun has warmed up the earth, they may be seen industriously shovelling sand out of the tunnel mouth and scattering it far behind them. Standing firmly on the two hinder pairs of legs, with the abdomen raised, they turn the front pair inwards till their tips almost touch, and scoop away the sand with quick short strokes, throwing it backwards beneath the body. The amount of sand moved at each throw is, of course, small, so one can imagine what a large amount of energy is expended in digging out several tunnels ten to twenty inches long, from which every grain has to be shifted to the surface with many successive throws, and piled up outside the burrow.

When a wasp considers its burrow deep enough, it flies off in search of a cicada to entomb within it for the



The wasp engaged in excavating its burrow for the reception of the cicadas.

[Photo.—A. R. McCulloch

nourishment of one of its babies. It may be seen hovering over the trees in search of its prey, and one is led to wonder by what means it can detect them. The suggestion that it traces the cicada by the noise it makes is not to be relied upon, because I have known a wasp to secure a "locust" at a time when none were "ringing."

Further, the wasp must be guided by form rather than colour, since it is equally partial to both Green and Yellow Mondays as well as the black and yellow Fiddler, any of these being seized as soon as discovered. Finding a cicada, the wasp stings it in such a way that it becomes paralyzed, and the two drop to the ground, sometimes from a great height, with a thud which provokes a last rattle from the now moribund captive.

Once the cicada is quieted, the next thing is to get it home to the nest. According to a work on Australian insects, the wasp rides the cicada to its nest, but no details are given as to how this is done. In this garden they always fall from the tree with the locust as described and then set

to work to drag it through grass and weeds, over sticks, or anything else that may be between it and the burrow. A wonderful part of the whole business is the unerring instinct which guides the wasp in an almost straight line to its own burrow. Even though it be ten, fifteen, or twenty yards away, and notwithstanding that it has flown all round the tree in search of its captive, the wasp unhesitatingly turns in the right direction, passing by other burrows without faltering until it comes to its own.

Throwing the cicada on its back so that it will glide along easily, and straddling across it, the wasp grips it firmly with the middle pair of legs. Using its long hind legs and shorter front ones, and often assisting itself with its wings, the homeward journey is commenced. The wasp travels along the ground at an amazing rate. Nothing stops its progress, and every available grass stem or other hold is made use of by the long and spiny limbs. The wasp's legs not only end in two long curved claws, but every joint bears a series of strong spines, which



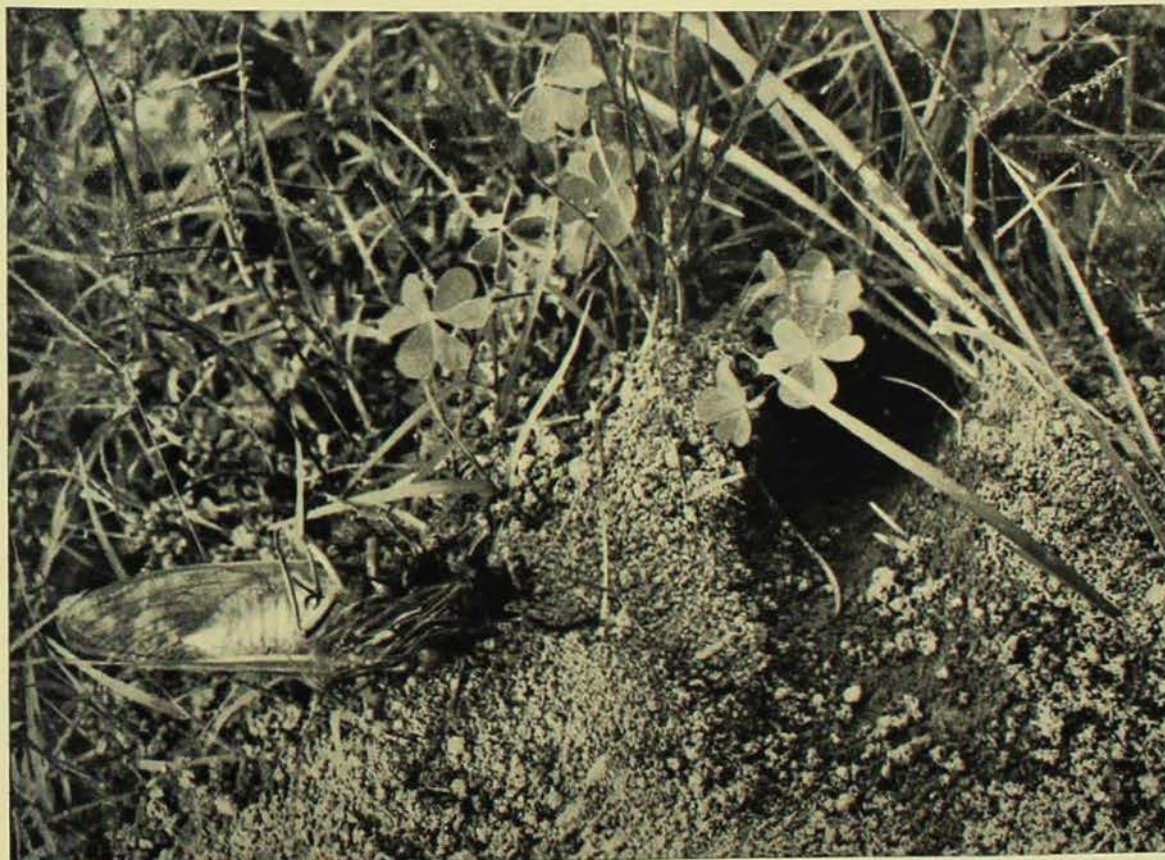
are as useful as the foot proper to catch against anything that may afford a hold. The loose soil outside a burrow appears to offer the greatest difficulty since it offers no foothold for the wasp. I have seen a cicada abandoned after a struggle lasting several minutes, and their dead bodies are not uncommon around the burrows.

Having once secured its prize, the wasp is not willing to lose it without a struggle. One which I caught soon after it had come to the ground would not loose its hold upon the cicada even in the folds of the net, but struggled around with the captive while endeavouring to find a way of escape, even though the wasp weighed but fifteen grains, while the cicada turned the scale at thirty-two.

Each wasp recognises its own burrow, and avoids trespassing into that of a neighbour. Though its course may take it past the mouths of several other burrows, it rarely hesitates. On one

occasion I noticed a wasp dragging a cicada up a sand heap in which there were two burrows within a few inches of one another. It came first to the wrong opening and, after momentarily hesitating at the entrance, turned round in a circle so that it came back to the same tunnel. But it refused to enter and made off again to its own burrow, into which it quickly disappeared with its prey.

Again, I once saw two wasps, each with a captive cicada, travelling along within a few inches of each other. Their struggling with the coarse grass, brought them into collision, but they seemed far too interested in their work to notice each other. One, getting a little ahead, passed over the sand around the mouth of a burrow, but without hesitation, passed on to his own. The other then arrived and turned in with such certainty that no doubt was left as to its being the proper owner. Once, when I was photograph-



A wasp dragging a paralyzed cicada to its burrow.

[Photo.—A. R. McCulloch.]

ing, I placed a dead cicada and wasp at the mouth of a suitable burrow in the most life-like manner possible, and, while focussing the camera, noticed the rightful tenant bringing in a cicada. It could not pass without bumping against the dead wasp, but gave no sign of interest in it whatever and passed rapidly down into the depths.

I dug the ground up around several burrows and found cicadas buried ten to eighteen inches from their mouths. It would seem that several tunnels are scooped out, each of which is connected with the main opening, and a cicada is placed at the end of each tunnel. Several cicadas were found in an area of about two square feet, each providing nourishment for a more or less advanced larval wasp. These are blind, legless

and very helpless creatures, very soft and translucent, whose principal claim to solidity lies in the possession of a large pair of horny jaws, terminating the ridiculously small head. Their large bodies rest upon the locust, only their small heads being inserted into its body. One cicada, fresher than the others, had a white, spindle-shaped egg attached to the lower surface of its thorax, near the bases of the legs, which is probably the place selected by the mother wasp to deposit her eggs, since all the cicadas were attacked by the grubs in the same part. The cicadas in the burrows belonged to two species the common green Monday and the black and yellow Fiddler being about equally numerous and of both sexes.

## Reminiscences of the "Challenger" Expedition.

BY W. H. HARGRAVES.

[H.M.S. *Challenger* cruised for three and a half years over the oceans, dredging and exploring the depths, and laying a broad foundation for the science of oceanography and making most valuable contributions to zoology in general. Mr. Hargraves, now a trustee of this Museum, and a life-long student of conchology, well remembers the visit of the famous exploring ship to Sydney in 1874, and in this short article he recalls a few incidents of her stay.]

THE *Challenger* arrived in Port Jackson on 5th April, 1874, and remained until early in June. From the Manly boat I frequently saw the ship's steam pinnace dredging in the harbour, and one afternoon, as Mr. John Brazier, afterwards of the Museum staff and still happily alive, and I were dredging between the Sow and Pigs Reef and the South Head, the ship's party came close to us and commenced operations. After an hour or so our dredge ropes became entangled, which served as an introduction and started conversation.

"What are you dredging for?" we were asked. "Oh, anything we can find

in the way of shells," I replied, "What are you trying for?" "Trigonias<sup>1</sup>, and we have got five. Did you get any?" "A few," said I, and, taking the bailer from under the thwart, I exhibited our catch of twenty-five or thirty *Trigonias*, one or two with a beautiful *Myochama* attached. The *Challenger* party were delighted at seeing such a quantity of this rare shell and wished to buy the lot. I said "They are not for sale, but as you do

<sup>1</sup>Trigonia is a shell of common occurrence as a fossil, but living specimens are found only in Australian seas. It resembles a small cockle.

not appear to have been very successful, we shall be pleased to give them to you."

Before we parted, we received an invitation to visit the ship, and on the appointed day we went on board. Professor Moseley, Dr. Suhm, Dr. Crosbie, and others were there, and we spent a very pleasant afternoon. All on board were eager to have *Trigonias*, and before the ship left Sydney I had parted with all my duplicates.

Prior to the departure of the *Challenger* for New Zealand, Captain Nares and his officers and the scientific staff invited a number of Sydney residents, including myself, to accompany the ship on a trip outside the Heads to witness dredging and trawling operations. Captain Nares consulted me as to the best place to cast the dredge, and I advised him to wait until we were six or seven miles outside the Heads, as, nearer in, it would probably bring up some of the silt dumped by the punts. However, on the advice of Dr. J. C. Cox, who was later Crown Trustee and President of this Museum, the dredge was lowered when we were but two and a half miles out. The following extract from the *Evening News* describes the result:—

As soon as the donkey winch commenced to heave away, an anxious crowd gathered on the bridge, and, as the rope came in, the eager throng held their breath in expectation. When the chain attached to the dredge appeared in view, the interest heightened.

Mr. J. F. G. Stokes, Ethnologist of the Bernice Bishop Pauahi Museum, Honolulu, worked for some time at this Museum recently. He is specially interested in Polynesian peoples and their culture.

Lieutenant-Colonel L. Hore, District-Officer, Kokopo, New Guinea Territory, is at present on holiday in Australia, and took the opportunity to examine our entomological collection. He hopes to do a good deal of natural history collecting when he returns to New Guinea.

There stood the scientists, like bloodhounds on the leash. Professor Thompson<sup>2</sup> tried to look as dignified as a man of his experience in such matters should look. Drs. Cox and Bennett strained their necks and eyes. Messrs. Hargraves and Brazier, the possessors of every known shell on our coasts, wore a look of painful anxiety. Even those not immediately interested in Conchology, or any other science, were infected. The Reverend W. B. Clarke was excited and uneasy. The eager crowd was not kept long in suspense. First appeared the shackles and chain, then the arms of the dredge, and then the object of all their hopes itself—*empty and bare*; not a specimen was visible. The lengthening of jaws was perceptible, and even groans escaped from the enthusiasts. Silently and sadly they laid it down on the deck of the bridge.

When we were about four miles out the trawl was cast and some rare fish were obtained. Six miles out the dredge was again let down in much deeper water and brought up a number of interesting specimens, including *Voluta undulata*, a new species of *Murex*, three species of *Trigonia*, a new *Comatula*, crabs, and other rare animals.

After lunch we lost one dredge off Long Bay and another between Coogee and Bondi, in consequence of the rocky nature of the bottom; before this the *Challenger* had lost only one dredge on the whole voyage.

Just before dark the ship returned to her moorings off Fort Denison, everyone having spent a most delightful day.

<sup>2</sup>Professor C. Wyville Thomson, leader of the scientific staff of the *Challenger*.

Mrs. Wilson, widow of Dr. E. A. Wilson, who perished with Captain Scott's last Antarctic Expedition, recently called at the Museum to examine our collection of Australian bats, a group to which she has devoted considerable attention. Mrs. Wilson is an accomplished naturalist and a skilful collector.

The coral pool group is now installed and makes a striking and beautiful exhibit. We hope to publish a description of the group and its construction in our next number.

## The Mystery Lake.

BY HAROLD O. FLETCHER.

[Mr. G. H. Halligan recently organised an expedition to investigate Lake Eyre and kindly invited the Trustees to send a member of the staff to accompany the expedition for the purpose of making zoological collections. Mr. H. O. Fletcher was chosen for this task, and the following article describes his experiences.]

LAKE EYRE, a vast expanse of salt water far more briny than the sea, is situated in the interior of South Australia, over five hundred miles north of Adelaide, and is known to many people by name only, but the writer is one of the fortunate ones who has had the opportunity of visiting it, as a member of a party of scientists who went there with the object of carrying out a number of investigations.

The lake is divided into two parts, North Lake Eyre, which is ninety miles long by fifty miles wide, and connected by a narrow channel, ten miles in length, to the southern portion of the lake, which is forty miles long and fifteen miles wide. The district around Lake Eyre is over thirty feet below sea level, and it naturally follows that the bed of the lake is much more than this, as it is supposed to be between fifteen and thirty feet deep in the centre.

One of the most puzzling features of Lake Eyre is its power to hold enormous quantities of water for a short time, and then without any warning whatever to absorb most of it, so that only a comparatively small lake is left in the centre, surrounded by impassable mud and slime, coated to a depth of a few inches with glistening white salt which extends for miles. This water shifts about under the action of the wind, and may move either north, south, east or west, as the wind varies.

Very little is known about the centre of the lake, or the life that might be there, but Prof. W. Howchin, in his *Geography of South Australia*, says: "There is reason to believe that Lake Eyre, in its earlier history, was a fresh-water lake covering a much greater area than at present, with an outlet to the sea, but in which direction is not at

present known. At that time the Diamantina and other large rivers had a permanent flow of fresh water and were frequented by crocodiles, turtles and the curious mud-fish *Ceratodus*; large marsupials (such as the *Diprotodon* and others) now extinct, and giant birds of the moa and emu type lived on the plains."

An expedition was organised on information gained earlier in the year when the leader flew over the lake area in an aeroplane lent by the Defence Department. At considerable risk a large number of photographs were taken, to show the extent of the water in relation to the surrounding mud and desert, and at this time the lake appeared to be full enough to allow the launching of a boat at the mouth of the Frome River, which enters North Lake Eyre from the south.

The party, consisting of Mr. G. H. Halligan, F.G.S., hydrographer, of Sydney (leader and organiser), and Messrs. S. M. R. Sharland (from the *Mercury* office, Hobart), H. W. Strong (from the Melbourne University), and the writer, started from Adelaide some months later, to try to add scientific information to that which is already known, and to attempt to solve problems relating to hydrography and the existence or non-existence of certain mound springs. A considerable quantity of equipment accompanied them, included in which was a sixteen foot boat complete with sailing gear and a small collapsible canoe.

For several hundred miles north of Adelaide we travelled, through the well-known wheat areas, until Quorn was left behind, and the train, gradually creeping away from the crops, entered into the desert regions, a seem-

ingly endless waste composed of sand, gibbers, and salt bush, while here and there emus and kangaroos would be seen, either feeding unconcernedly, or scampering away to a safe distance at our nearer approach.

At Maree, two days' journey from Adelaide, we detrained and all preparations were made for transferring the equipment to the camel team which was to convey it to the Frome River, where the main base was to have been made. The team driver, however, who had just completed a round-up of camels in the country close to the lake, informed us, much to our dismay, that the lake was almost dry, and, where our photographs showed water, there was only a treacherous mud and salt marsh, making it impossible to use the boat.

To investigate this report, some of us left Maree for the lake in a camel buggy, and, after a very trying day's travelling over undulating sand hills and through gibber country, which was here and there dotted with clumps of salt bush and prickly acacia, the only flora which will thrive there, we arrived at the Government Camel Station at Muloorina. Next morning a further start was made for the lake, and, as the sand was beginning to get much softer, two more camels had to be attached to the buggy. Unfortunately these two camels were rather fresh and commenced to play up, thereby frightening the other two, and all four bolted and were soon tearing along at their highest speed with the buggy swaying perilously behind. They did not pull up until our driver steered them into the thick shrub surrounding a water hole; even then they continued on through this, almost capsizing the buggy, and, when they were eventually brought to a halt by the density of the undergrowth a genuine sigh of relief was given.

After this little escapade they behaved well for the rest of the trip to the lake, where we saw a most disappointing sight; for instead of water, there was, as far as they eye could see, nothing but soft treacherous mud, covered with a

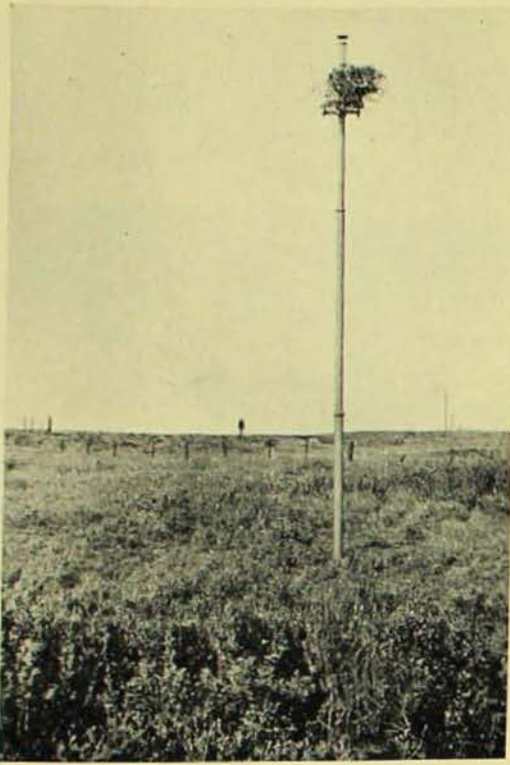


The country passed through on the way to South Lake Eyre. The stream is an overflow from an artesian bore.

[Photo.—H. O. Fletcher.]

coating of white glistening salt. Returning reluctantly to Maree, we decided that it was impossible to make any investigations on North Lake Eyre, and so our attention was turned to South Lake Eyre, the southern shores of which could be reached from the railway line about thirty miles north from Maree. As the next train north to Oodnadatta was not due for two weeks, we arranged with the railway authorities for the hire of one of their motor trolleys, which went by the name of "Casey Jones," and a very interesting journey was made as far as the lake cottages, the nearest point to the lake.

Some very interesting country was passed through during this thirty-mile trip to the cottages, the line at times being hardly visible owing to the shifting of the sand caused by the winds, while a short time after we would be rattling across single line bridges, spanning some of the gullies, at our fastest speed, which was about fourteen miles an hour. Large mobs of emus and numerous kangaroos were passed, while various species of interesting and rare birds were observed.



There being an absence of trees for many miles, a crow builds its nest on a telegraph pole.

[Photo.—H. O. Fletcher.

A number of very peculiar nesting-places of crows were noted and photographed, nests being found built on the iron standards carrying the wires of the Trans-Australian Telegraph, which spans Australia from Adelaide to Darwin. No doubt the crows thought these ideal positions, as trees are few and far between in that district. The smoothness of the poles also afforded the birds and their homes great protection against possible raids by small mammals, goanas and other reptiles which are known to be fond of eggs.

When crossing one of the larger bridges we were astonished to see a crow fly from almost under the

trolley, and, on stopping to investigate, we found to our great surprise that the bird had almost completed building a nest on a sleeper between the two lines. Whether the nest was ever completed we cannot tell, but probably, after the bird had survived the experience of a train thundering over the line, it thought less of its choice, and hurriedly left for a quieter and safer position.

After walking a distance of about three miles we arrived on the shore of the lake, and, much to our surprise, found that although we sank in the salt crust and mud for a few inches, it held our weight and allowed us to walk almost a quarter of a mile into the lake. As the water was only a few inches deep and did not appear to get any deeper, no attempt was made to float either of our boats. After getting a number of water samples for the Melbourne University, we returned to Maree.

#### LAKE LETTY.

Hearing from residents of Maree that a large number of birds were to be seen at Lake Letty, a freshwater lake about fifteen miles from the town, we decided to make an excursion there. Getting provisions for a week's stay, we made arrangements with the camel team



On the shore of South Lake Eyre. The foreground is salt, not sand.

[Photo.—S. M. R. Sharland.

that was leaving for Muloorina next morning, to drive us as near Lake Letty as possible. Rising at daybreak next morning we reached the outskirts of the town with our luggage, fully expecting to see the camels harnessed up waiting for us, as the driver had told us that he would be making an early start. But, owing to the absence of feed, the camels had wandered to the far end of the paddock, where he had found them feeding on some coarse herbage that was growing along the sides of what was once a water hole. As the "paddock" was fifteen miles across, it is not to be wondered at that it was almost four o'clock before we moved off. There were fourteen camels in the team and they kept up the one steady pace, three miles an hour, with clockwork regularity, whether it was over soft sand or over the harder gibber country, where the huge wheels of the waggon would not sink in and so impede progress.

By the time it was dark we had arrived at a place called Box Hole, where there are a few welcome trees and here the night was spent. Leaving the camel team next morning we set out for Lake Letty, and, after a hard morning's walk across soft sand, arrived there to find bird life in profusion.

Camping that night under the mulga trees that surround the lake, we were awakened at daybreak by the chattering of thousands of birds and a loud whistling, which would almost deafen one. This was put down to the Whistling Eagles, which were seen in large numbers during our stay there. After walking down to the water's edge we watched and identified a number of water birds; Avocets, with their long turned up bills were there in the largest numbers, parading around in the shallow water, with the White-necked Herons, and spoonbills intermingling with them in their quest for food. Hoary-headed Grebes were seen swimming lazily and diving, whilst flocks of Black Ducks and White-eyed Ducks would rise from the water with a rush when startled, and, after flying the length of the lake several times, would alight once again. Over-



On the way to Lake Letty. This is typical of the sandy country travelled over.

[Photo.—H. O. Fletcher.]

head circled dozens of hawks and eagles swooping and gliding, ever on the alert for some hapless small mammal which might delay in the open too long. Hundreds of skeletons and pelts bore mute testimony to the large toll these birds take of the rabbit. Pushing our way through the overhanging trees and entangling vines we would often startle a hawk as he waited tirelessly on a low bough with his beady eyes concentrated on the ground, knowing that sooner or later his prey would pass through on its way to drink. Crows were there in thousands and used to assemble on the trees surrounding our camp, watching every movement we made for hour after hour, until one of the party, resenting their sinister aspect, would arise with a shout, and, picking up the nearest object would hurl it with all his strength at the black fiends, as he called them. Although temporarily scared away, they would soon come back and take up their old position, once more awaiting their opportunity to swoop down and gather a few of the scraps that were lying about.

Flying from one tree to another were



Aboriginal carvings at The Haunted Shack, representing the tracks of emus, kangaroos, and human beings.

[Photo.—H. O. Fletcher.]

seen hundreds of the Chestnut-eared Finch, and another frequent, but noisy, visitor was the White Eyebrowed Babbler. Numerous other birds were seen and identified during our stay there, and we were very downhearted when we had to bid farewell to this pleasant spot, an ideal place for bird lovers, and start on our fifteen mile tramp back to the township. As the heat was too great in the daytime for travelling, we left at dusk, and arrived back at Marree early next morning.

Another short excursion was made to a place locally known as The Haunted Shack, situated about seven miles

S.W. from Marree, where an interesting discovery was made in the form of a large number of aboriginal carvings. Almost all the rocks on one side of a hill had been carved, but the marks could be discerned only when looked for closely, as they had not been very well done. Situated about half-way up this hill, on a piece of smooth quartz-like stone we found a number of carvings which were distinct and very well done; these included the tracks of emus and kangaroos, and also the imprints of human feet.

Following the course of a dried-up river bed, we came across the mud nests of the Fairy Martin, plastered in great numbers on the overhanging rocks and caves. It is worthy of note that the Fairy Martin was almost the only bird that was found in this district.



The mud nests of the Fairy Martin (*Petrochelidon ariel*).

[Photo.—H. O. Fletcher.]

Recently requests have been received for the loan of lantern slides, of which the Museum now possess an extensive collection, illustrating various branches of natural history. Slides have been

lent to several schools and to the Workers' Educational Associations of Newcastle and Goulburn. We shall be glad to assist in this way as far as possible.



## The Red-whiskered Bulbul.

By J. R. KINGHORN.

IN the July issue of this *Magazine*, page 157, I wrote a note on the habits and distribution of this introduced bird, concluding my remarks by raising the question of its food, *i.e.*, whether it is destructive or otherwise. In other countries, especially in its native habitat, India, much controversy exists as to whether it eats more fruit than insects, or *vice versa*. Some hold the opinion that it is a fruit eater, and therefore destructive, while others assert that it eats orchard insect pests, and is therefore to be encouraged.

In Australia we have not as yet had a very long acquaintance with the Bulbul, or Top Knot, as some have locally named it, and I am endeavouring to gather as much information as possible regarding its food habits.

To this end readers are requested to observe it carefully, with field-glasses if available, *carefully*, because a big economic question is involved, and to make available the results of their observations. It matters little how short the note may be providing that it is faithful. Assistance of this nature is essential, for only with it, and an analysis of the stomach contents, can a true estimate of the bird's habits be obtained. A few reports have already been received, but there is need for many more.

A full description of the bird will be found in the issue above referred to.



The Bulbul.

[Photo.— J. R. Kinghorn.]

Mr. E. Wunderlich, trustee, recently returned from an extended European tour. During his absence he paid particular attention to matters of museum interest.

A short collecting excursion to Upper

Colo, led by Mr. J. R. Kinghorn, assisted by Messrs. H. O. Fletcher and J. H. Wright, added valuable material to the collection. A number of interesting field notes and photographs were also obtained.

## The Palolo Worm.

BY W. W. THORPE.

THE Palolo, or Balolo (*Eunice viridis*) is a ringed sea-worm common to the Fijian, Samoan and Tongan Islands; it lives in crevices of the coral reefs and interstices of other encrusting growths.

This worm has an interesting life-history, showing the change of habit often adopted by animals during the breeding season. On the approach of maturity, the eggs and sperm ripen in the female and male respectively, and a curious metamorphosis takes place in the anatomy of the worms themselves. Each sex develops lateral paddle-like processes and a number of body-eyes, and the animal turns end-for-end in its coral home. The tail-end, now outwards, revolves violently for some time and then floats off, while the head portion remains in the reef. The headless bodies contain the eggs and sperm, which either break through the abdominal walls, or exude through the open end, and in their myriads they form a milky substance in the water. These eggs and milt, now set free, coalesce while drifting about, pairing takes place, and a new palolo is born. This in its turn takes up its abode in the coral reef, and awaits its nuptial voyage. The head-ends in the burrow must not be overlooked. These soon recover from the rupture of the parts, and forthwith begin to grow a new body, and in the fulness of time the same process is repeated.

According to an observer "the palolos rise out of the reefs just before daybreak, first in small numbers, but just about sunrise in such masses that the sea looks more solid than liquid." The natives of the islands evince considerable interest in the natural phenomena, but their concern is purely gastronomic. They marvel not at this provision of nature for the perpetuation of the species, but are quick to turn it to account as provision for the inner man.

In Fiji the months of October and November have from time immemorial

been known as the palolo moons. When the appearance of the palolo is imminent, a period like our Easter, governed by the phases of the moon, the natives set out in their canoes with nets and other devices and wait patiently for the uprising. Suddenly, one calls out "A palolo! a palolo!" as he draws the much prized worm into his hand net. The cry is taken up, and everybody is on the alert, nor is it a false alarm, for shortly the whole surface of the water is a vermicelli-like mass. All efforts are now put forth to obtain a heavy draft of these squirming delicacies.

The natives work with a will, for the visitation lasts only for about two hours, then twelve months must elapse before nature will be so kind to them again. As the sun rises they dissolve, and by about eight or nine o'clock they have practically disappeared. Those tail ends that escape the nets and are not immediately eaten by fishes or sea-birds, melt away in the sea. This rapid disappearance led to the former incorrect assumption that they had returned to the reefs, it not being known at that time that the drifting palolo was only a tail end.

These tail ends are collected in such quantities by the natives, that the canoe gunwales are often awash as they turn shorewards with their wriggling freight. The folk on shore are both delighted and excited on the return of the worming-fleet, and for several days there is a season of festivity.

It takes some time to cook them all, a job which must be tackled at once, for they rapidly deteriorate. Small parcels are made by wrapping them in bread-fruit leaves. These are placed in the ground ovens and steamed for twelve hours or more, and then eaten.

The early European navigators refer to these palolo events as times of ceremonial activity amongst the natives, but these old rites are no longer celebrated.