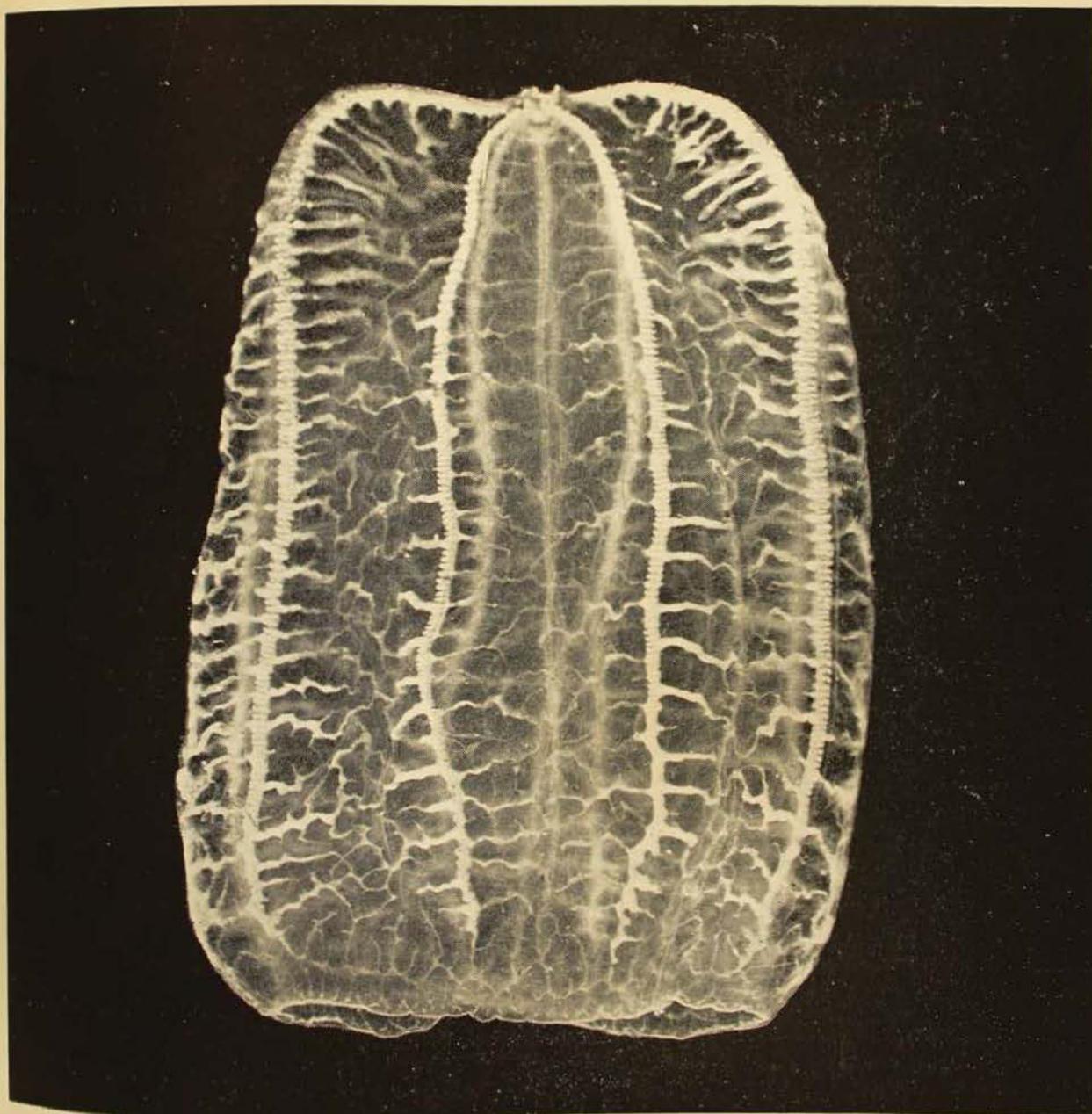


*The*  
AUSTRALIAN  
MUSEUM  
MAGAZINE

Vol. VIII, No. 10. DECEMBER, 1944-FEBRUARY, 1945. Price—ONE SHILLING.



A Comb-Jelly.

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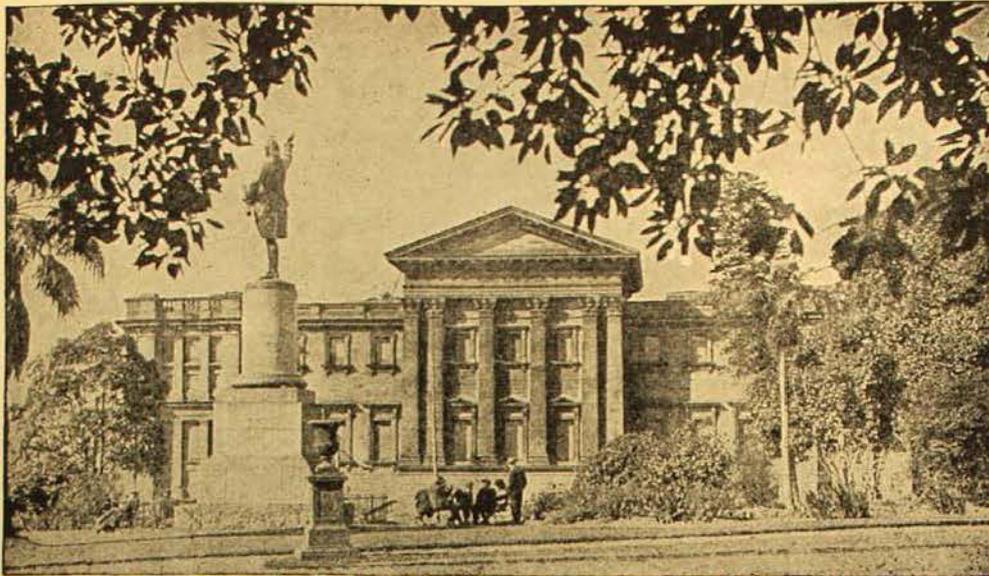
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# THE AUSTRALIAN MUSEUM MAGAZINE

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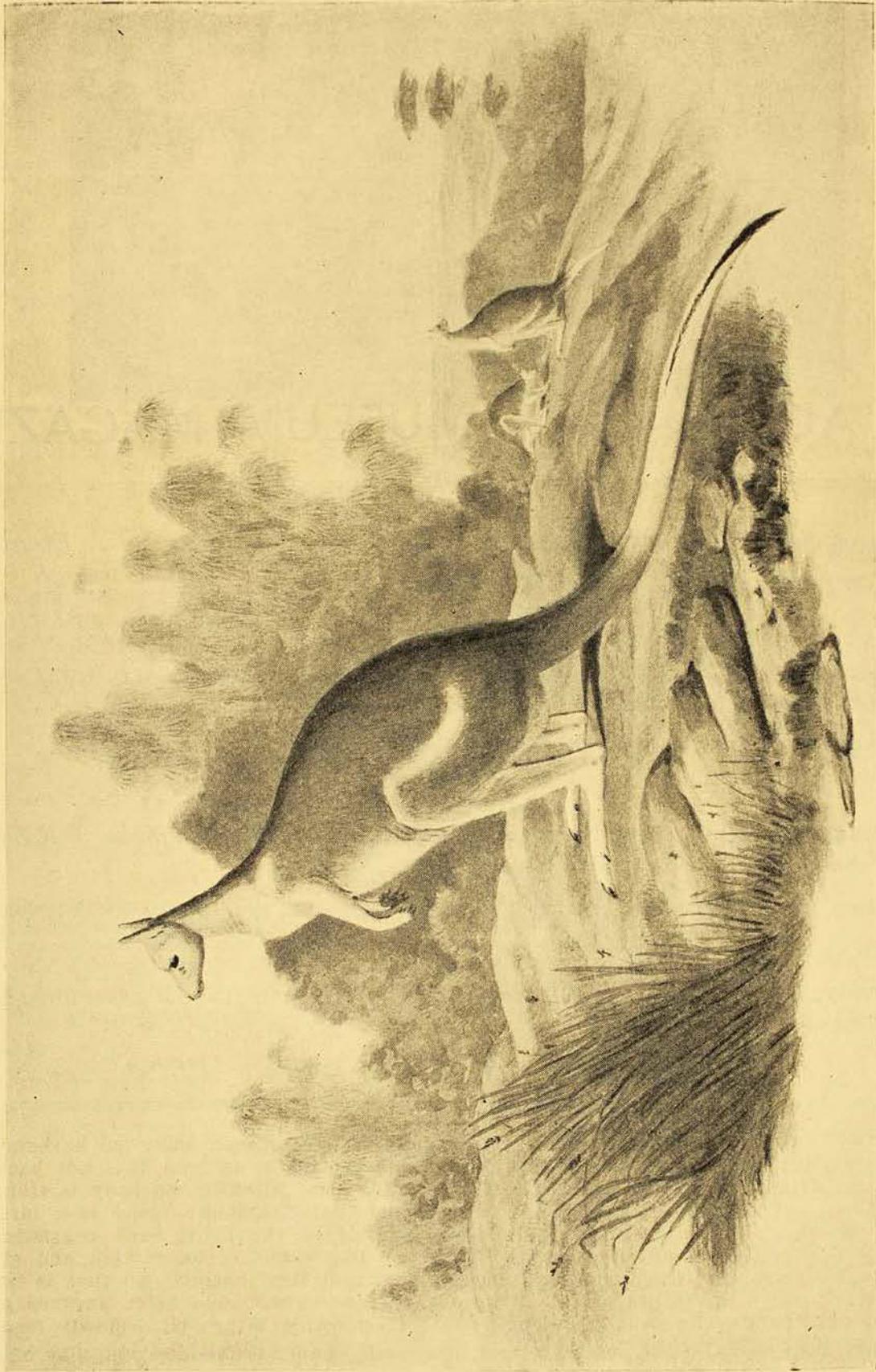
(Photography, unless otherwise stated, is by G. C. Clutton.)

● OUR FRONT COVER. This little-known Comb-Jelly, *Neis cordigera*, visits our harbour waters in Port Jackson between the months of March and June, when it is seen in quiet backwaters swimming and drifting with the currents. While not a true jellyfish, the body is transparent like that of conventional bell-shaped types and is somewhat flattened. There is a large wide opening at one end. Eight prominent paddle-ribs run along the body, each consisting of a succession of tiny plates, shaped like combs. They are the means of locomotion and give this group of animals its name. Each comb is raised quickly and then lowered, so that it beats the water, fluttering like a miniature eyelid. Those in each row beat one after another and the combs in all eight paddle-ribs beat in unison so that their owner is propelled slowly forwards.

The rapid movements of the combs refract light and produce a kaleidoscopic play of colours. Beautiful as is the sight of the swimming creature by day, it is far surpassed by the flashing, phosphorescent displays produced at night when the animal is disturbed.

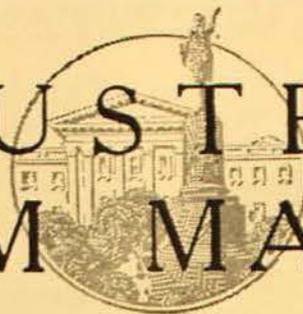
When swimming, the animal has two distinct forwardly directed lobes which, unfortunately, are only faintly indicated in this photograph of a preserved specimen. Natural size.

E.C.P.



Northern or Sandy Nail-tail Wallaby.  
Of the three nail-tail wallabies this is the largest. Not strikingly marked, its colour resembles that of its surroundings. Its length, overall, is about four and a half feet, half of which is the length of the tail. See page 348.  
After Gould.

# THE AUSTRALIAN MUSEUM MAGAZINE



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DECEMBER, 1944—FEBRUARY, 1945.

## Australian Poisonous Snakes\*

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

THERE are more than one hundred Australian venomous snakes, but the great majority of these are small species which never exceed twenty inches in length, and cannot be regarded as dangerous. Amongst these are such well-known forms as the Bandy Bandy, the Salt-bush snake, the White-lipped snake, and the Red-naped snake.

Of the larger kinds there are about four species of *Demansia*, three *Pseudochis*, and two *Notechis*, all of which may be regarded as extremely dangerous. Detailed notes on the frequency and treatment of snake-bite appeared in the last issue of this MAGAZINE.

### SEA SNAKES.

There are a large number of sea snakes, all of which are poisonous, and some extremely so. They are not included in the dangerous kinds described here because they are unlikely to cause casualties. Almost all the sea snakes live entirely in the water, and are specially built for this life. The body is somewhat flattened vertically and keel-like below—the tail being shaped like the blade of a paddle. They live on fish and mostly frequent shallow sheltered waters not far from the coast and river mouths in tropical regions. They may be caught on a fisherman's line or be entangled in nets,

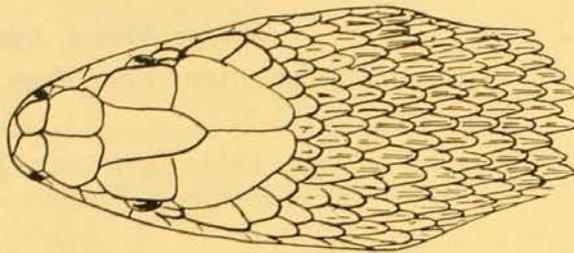
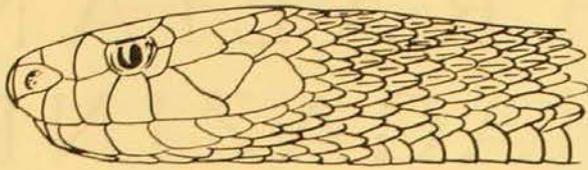
\* With notes on venoms by C. H. Kellaway, M.C., M.D., F.R.C.P.

and in such cases should be handled with great care. If seen basking on the surface or washed up on a beach, they must be treated with circumspection. Nearly all of them are extremely awkward on land and they are generally loath to bite unless handled roughly or otherwise annoyed. The venom of some species is extremely potent, having a powerful poisoning action on the nervous system, but their biting apparatus is poor, and it is doubtful if they could inflict a fatal bite except on an unclothed or thinly clothed part.

### TAIPAN OR GIANT BROWN SNAKE. (*Oxyuranus scutellatus*)

The taipan has been recorded from the Fly River district, New Guinea, and possibly may be found along the coastal belt east and west from that point, though it should be regarded more strictly as a North Australian species, being well known from the Cape York Peninsula westwards to Arnhem Land and perhaps the vicinity of Darwin.

It is often difficult to distinguish the taipan from a large brown snake, as both have the caudal scales in two rows. The taipan has from 21 to 23 rows of scales round the body and these are keeled (the brown snake may have as many as 19 or even 21 rows of scales, but these are smooth). In the taipan the anal scale is single. The taipan has one or two small



Taipan (*Oxyuranus scutellatus*).

J. R. Kinghorn, del.

teeth following very large fangs, whereas brown snakes have from 7 to 15, following quite small fangs.

When fully grown the taipan attains the enormous length of eleven feet. Because of its large fangs and the quantity of venom ejected, it should be regarded as the most dangerous snake in Australia.

The only samples of venom which have been investigated had deteriorated somewhat, but even so proved to be extremely potent. It has a powerful action on the nervous system and also destroys red blood cells and coagulates the blood. Fortunately bites by these snakes are rare. They must almost invariably be fatal.

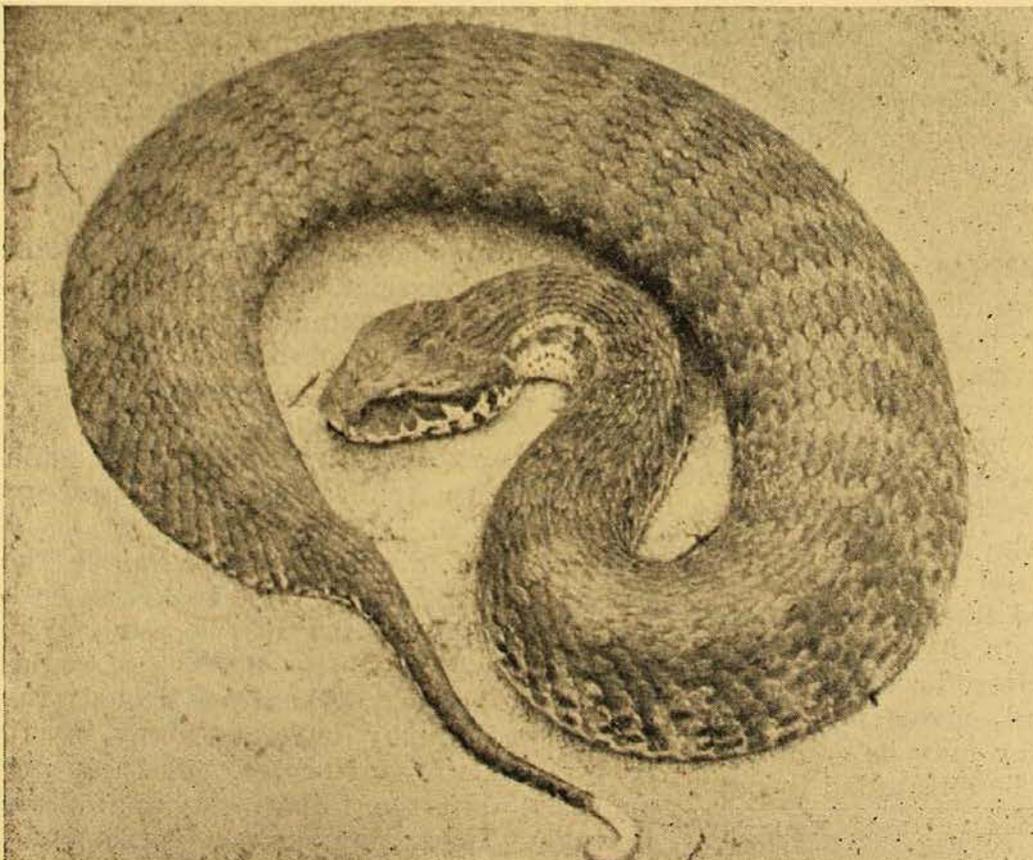
#### DEATH ADDER.

(*Acanthophis antarcticus*.)

This snake occurs throughout Australia generally, and from New Britain through New Guinea to Ceram and probably many of the smaller islands off the coast of New Guinea.

The death adder is easily distinguished from other snakes in this area by its broad, flat body, constricted neck, wide head, and short thin tail terminating in a spine, which is merely a modified scale and is not a poison apparatus.

The colour varies according to the general colour of the surrounding country, and may be grey in some, brown in others, with irregular cross bands of a darker hue.



Death Adder  
(*Acanthophis antarcticus*).  
Photo.—Dr. C. H.  
Kellaway.

The death adder is terrestrial, somewhat sluggish in disposition, and seldom attempts to move out of the way of an intruder, but will strike quickly and without provocation. It moves about in search of food at night.

Its average adult length is two feet, though the record is 34 inches.

The venom is more potent than that of the Indian cobra. It produces very little effect at the site of the bite. Its main action is upon the nervous system, causing paralysis and death by failure of respiration. It causes only slight damage to red blood cells and to the lining of blood vessels and slightly inhibits the coagulation of the blood. The snake has a well developed biting apparatus and large venom glands, and its bite when untreated has a considerable mortality.

#### TIGER SNAKE.

(*Notechis scutatus*.)

The tiger snake is found throughout Australia generally, and in some offshore islands.

The head is broad, but hardly distinct from the neck. The frontal shield is much broader than those over the eyes

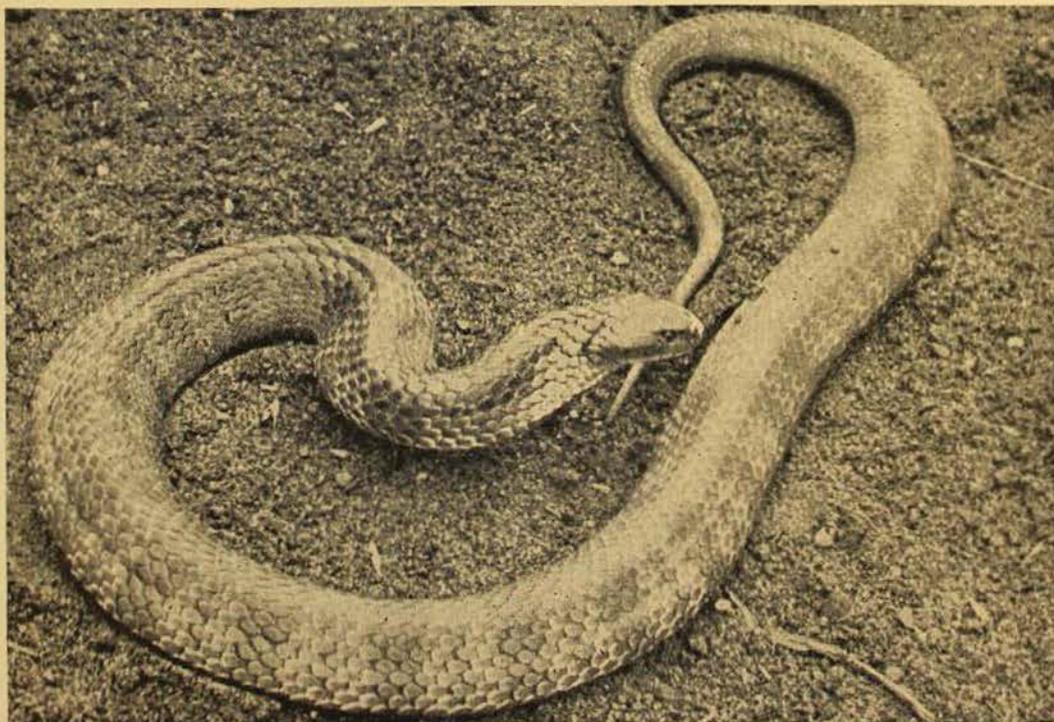
(supraoculars). The body scales, which are in 19 rows, are more pointed and more obliquely arranged on the sides than in other closely allied species. The anal is single and the caudal scales are in a single row.

The colour may be almost any shade of tan or brown to olive, depending a good deal on the colour of the surrounding country. The dark cross bands on the body are often indistinct. The belly scales are creamy-white, without the spots or blotches which are typical of the brown snake.

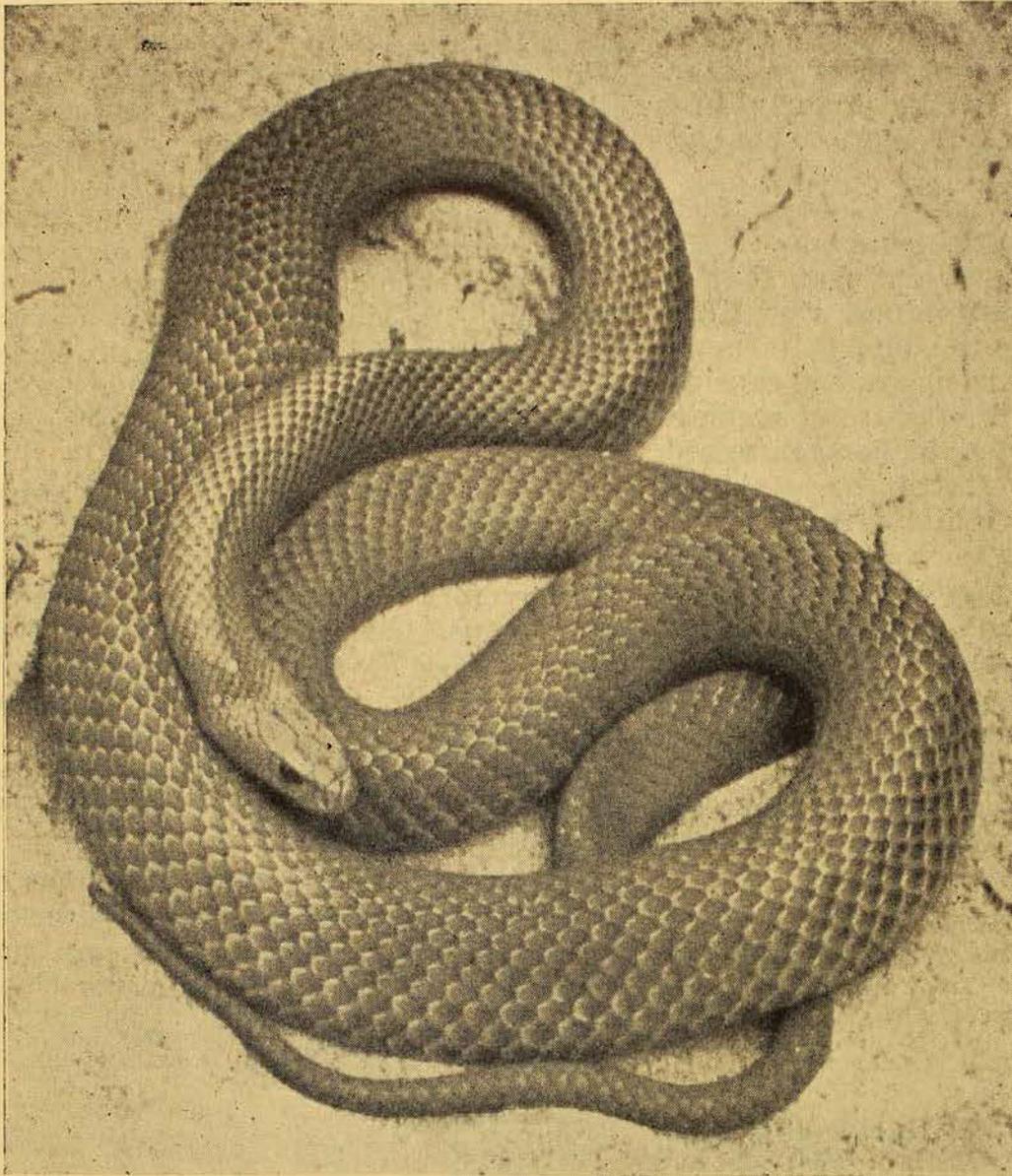
It prefers dry land to swampy areas, and frequents the burrows of rabbits and other animals, hollow logs and crevices between rocks. It also is found under wood heaps. Though terrestrial, it often takes refuge in the branches of small shrubs. It is an aggressive and dangerous snake.

It does not grow much longer than five feet, and an average adult specimen is four feet.

The venom is more potent than that of any other land snake. It has a powerful action on the nervous system, but coagulates the blood if it enters a blood



Tiger Snake  
(*Notechis scutatus*).  
Photo.—Dr. C. H.  
Kellaway.



**Brown Snake**  
(*Demansia textilis*).

Photo.—Dr. C. H.  
Kellaway.

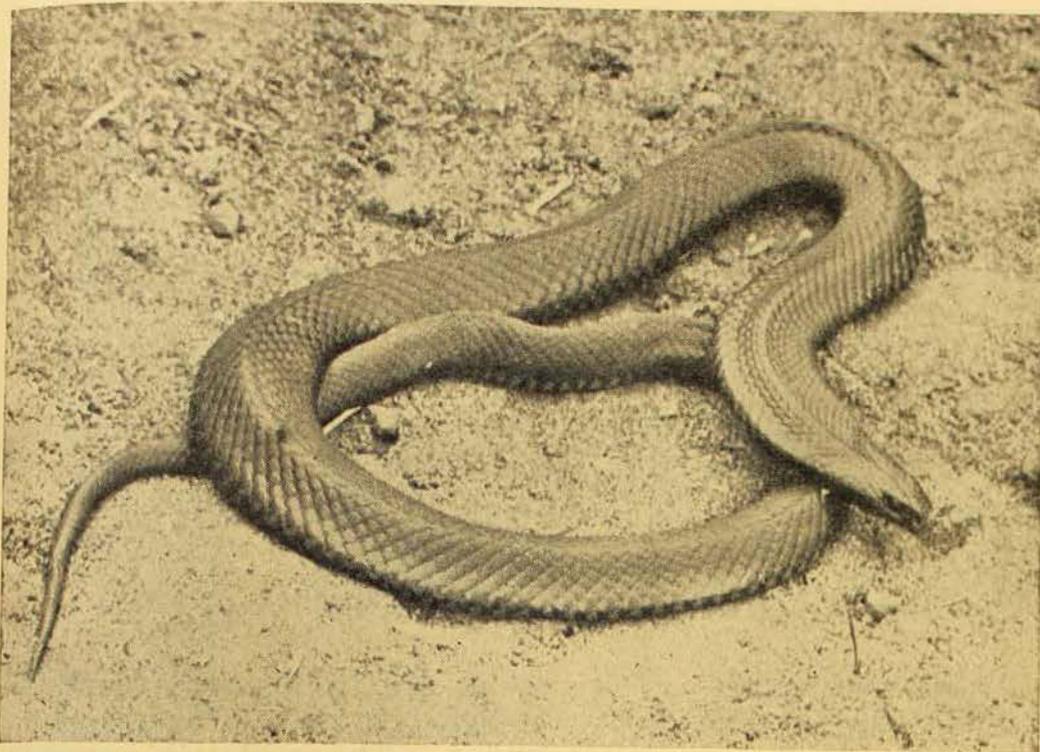
vessel. It has only a feebly destructive action on the red blood cells and on the linings of small vessels. There is no local reaction at the site of the bite, and the symptoms are chiefly nervous, but may be complicated in the late stages by some degree of shock. If by remote mischance the fang enters a vein or other vessel, death may occur with extreme rapidity by coagulation of the blood.

**BROWN SNAKE.**  
(*Demansia textilis*.)

The common brown snake is not found outside Australia, but it and its varieties are widely distributed throughout the continent.

The head is hardly distinct from the neck; the frontal shield is much longer than broad, the caudal scales are all paired, and the forepart of the belly is covered with conspicuous spots or blotches. These characters serve to distinguish a banded variety from a tiger snake, in which the caudals are single, and the underparts creamy without spots or blotches. The anal shield is paired, and this would help in separating the brown snake from the taipan in which this shield is single.

Whilst fully grown specimens vary from pale tan to dark brown or olive, some young specimens, even up to three feet in length and from the same batch of eggs,



Black Snake (*Pseudechis porphyriacus*) showing how the neck is expanded when the snake is angry. This action is as common to Australian snakes as it is to the cobra.

Photo.—Dr. C. H. Kellaway.

may have dark cross bands on the body, and often have been mistaken for tiger snakes.

Brown snakes prefer dry country and are seldom found in swampy places. They hide in burrows of animals, hollow logs, cracks in the soil and crevices in rocks. Occasional specimens up to seven feet in length have been found. They are extremely agile and large specimens are often very aggressive.

The venom of the common species has been studied. This is extremely potent, resembling that of the tiger snake in its powerful action on the nervous system. It contains a coagulant and even when injected into the skin or subcutaneously may get into the blood vessels and cause clotting. The symptoms of bites by this snake are chiefly attributable to its action on the nervous system, but are complicated by haemorrhages, possibly caused by clotting in small vessels. Like most of the Australian snake venoms it has little local action at the site of the bite. Most of the recorded bites are by smaller specimens and less than 10% are fatal. A six foot specimen is, however, a deadly snake.

#### BLACK SNAKE.

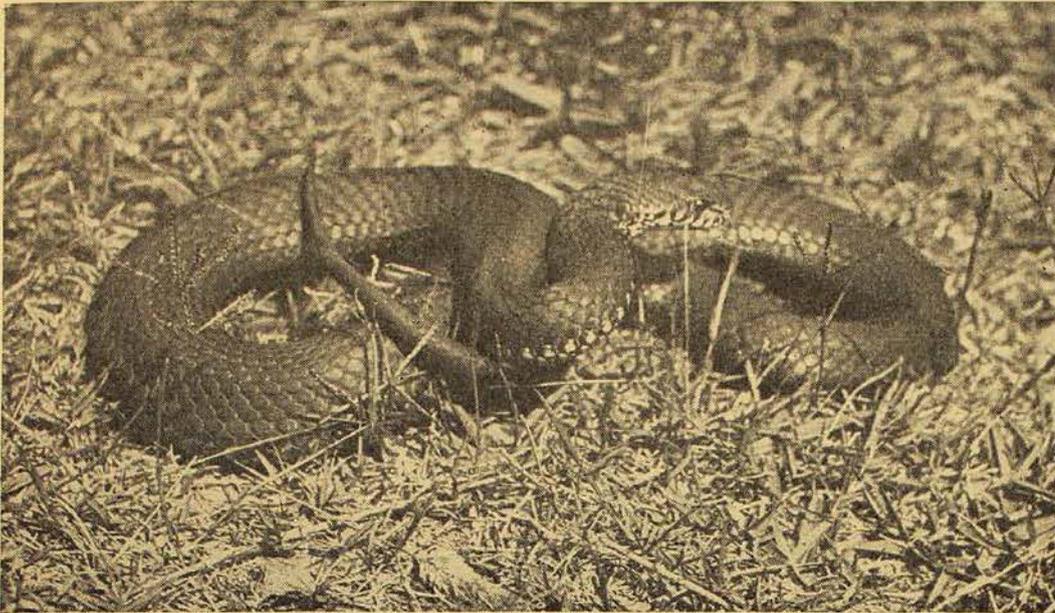
(*Pseudechis porphyriacus*.)

*Pseudechis* includes the common red-bellied black snake, another with a slate-coloured belly, a white-bellied form from New Guinea and several brown coloured species.

The genus is widely distributed throughout Australia, the black types being restricted more or less to coastal areas and inland rivers and swamps of eastern Australia, whilst the brown types are typical of the interior and far north.

The head is not distinct from the neck, the frontal shield being small in comparison to the surrounding shields. Copper coloured pseudechids may be distinguished from the true brown snakes (*Demansia*) in having the anterior caudal scales single and the remainder, to the tip, in pairs. In brown snakes the caudals all are paired.

They are black or copper coloured above, the copper ones having creamy underparts without spots or blotches so common in *Demansia*. Black species may have red, whitish, or slate coloured underparts according to the species concerned.



**Superb Snake, or  
Copper Head (*Deni-  
sonia porphyriacus*).**  
Photo.—J. R.  
Kinghorn.

The copper-coloured species are aggressive by nature, whilst the black species are more timid and retiring.

Black snakes have been recorded up to seven feet in length.

The venoms of only three of these species have been studied. None of them are as potent as those of the other groups of Australian snakes described here, having relatively feeble action on the nervous system. They cause some swelling and discoloration of the tissues at the site of the bite, destroy the blood corpuscles, and attack the lining of small blood vessels; some are coagulant and others not. Though they may cause severe illness with haemorrhages and symptoms of shock, the bite is unlikely to be fatal.

**COPPERHEAD OR SUPERB SNAKE.**

(*Denisonia superba*.)

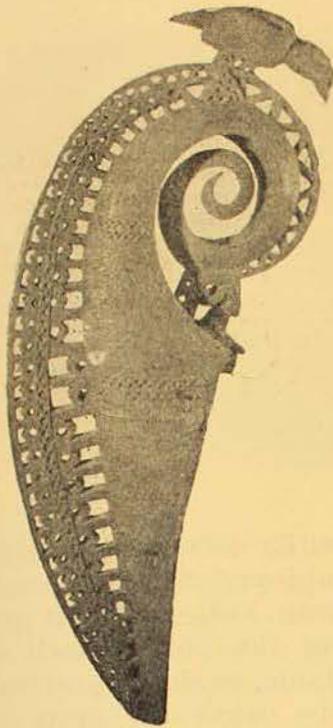
This snake is found in Tasmania, Victoria and the highlands of the southern half of New South Wales.

The scales are in 17 rows round the body, the last few rows being very large and rounded. The scalation generally resembles that of the tiger snake, but with the frontal shield longer than broad, and the large rounded lateral scales, it should be fairly easy to distinguish the copperhead from that snake.

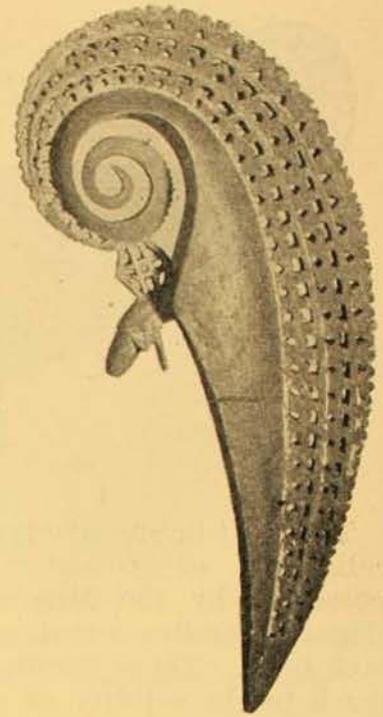
It may be brown or black, and often has a coppery-coloured head and a light vertebral stripe. The most outstanding features are the black and white triangular markings on the upper and lower lips, and the orange or red and black row of scales adjoining the abdominal plates.

The copperhead grows to about four feet in length and is a muscular though sluggish snake, rarely adopting an aggressive attitude.

The venom is extremely potent; it has no coagulant effect on the blood, but on the contrary is powerfully haemolytic. It is a strong neurotoxic poison, having a paralysing effect on the nervous system, and death may occur through failure of respiration.



## The Wood Carvers of the Admiralty Islands



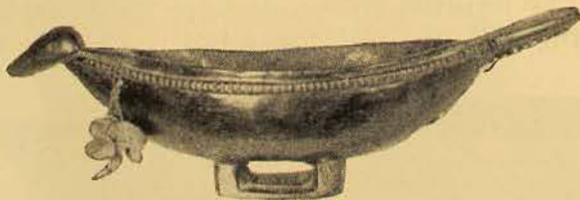
By FREDERICK D. McCARTHY

**S**OME excellent timbers grow on the Pacific islands and the craftsmen of the Admiralty Group have fully exploited their limited forests for the best woods from which to shape their magnificent carvings. In this regard the Matankor tribes, who live on the smaller islands to the south and east of the Great Admiralty Island, are justly famous. In a previous article,<sup>1</sup> the smaller carvings and the motives and the principles of Admiralty Island art were dealt with; in this one the bowls, slit-gongs and beds will be described.

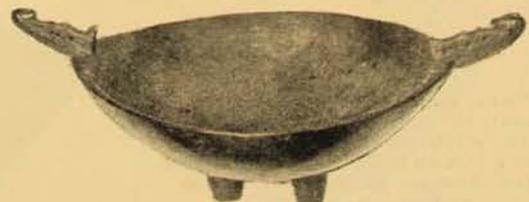
### BOWLS.

The bowls are one of the highest technical achievements of Melanesian woodworkers. Besides being articles of domes-

tic utility, they also have ceremonial and other uses. The large ones, now no longer made, serve as containers for food at feasts and as gifts between families and individuals. Finely finished bowls are hung above the doorways inside dwelling houses. These hold skulls of deceased members of the family; their ghosts or spirits play an important part in the social and religious life of the people. The bowls were made principally on Lou and Balowan islands and were traded throughout the group for numerous commodities. The natives are very keen traders and will accept only the finest products; to their discrimination is due in a large measure the high quality of workmanship characteristic of their crafts, and especially of the wood carvings such as bowls and slit-gongs.

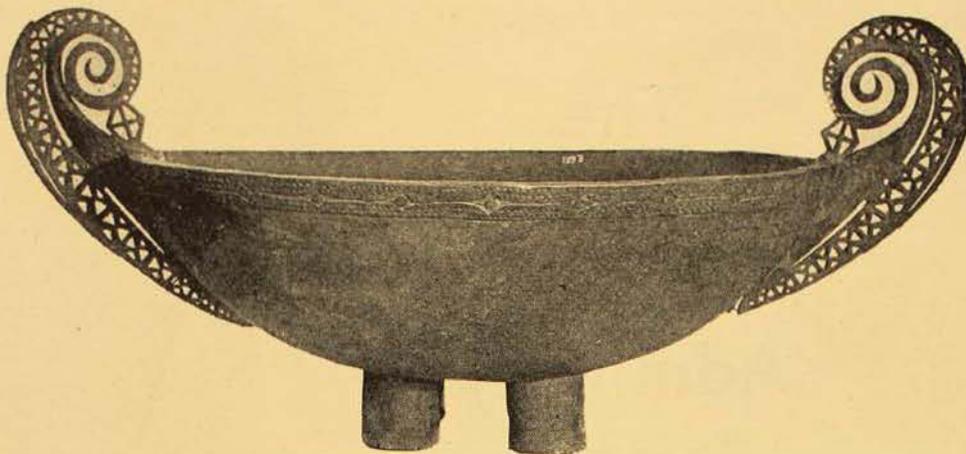


A slender bowl, eighteen inches long, which represents a well-posed sea-bird. The large seeds suspended from the neck are cut in halves, and a dog's tooth is attached to the bunch which served for magical purposes.  
Photo.—W. L. Necker.



The handles of this bowl, fourteen inches long, are in the form of a human figure and are cut out of the solid.  
Photo.—W. L. Necker.

<sup>1</sup>THE AUSTRALIAN MUSEUM MAGAZINE, Vol. viii, No. 9, September-November, 1944, pp. 290-94.



One of the large bowls, forty-three inches in diameter, displaying perfectly the grace and symmetry achieved in their work by Admiralty Island craftsmen. Note the lizard carved on the outside of the beautifully designed filigree handles.

The most impressive type of bowl in the collection of seventy old specimens possessed by the Museum is that with elegant handles fitted and gummed on each bowl. These handles add a delicate touch to the solidity of a bowl and thus enrich the composition. From a technical point of view it is well worth while perusing the measurements of the largest specimens, which, incidentally, form probably the finest series in the museums of the world:

Diameter. Inches.	Depth. Inches.	Length of legs. Inches.
54	19	7
50	16	6
43	16	5
42	15	5
32	14	4
28	14	4

The smaller examples range from 11 to 15 inches in diameter and from 3 to 4 inches in depth. The larger bowls are cut out of a solid section of the trunk of a tree, the wood of which is hard and tough, but a lighter timber serves for the smaller bowls. Unfortunately, as with many other Melanesian crafts, details of the methods of making the bowls have never been

recorded. Apparently adzes and obsidian choppers were employed for the shaping and the inside was hollowed out principally by burning the core. Shell and obsidian cutting tools, and stingray-spine awls, were used to carve the decorative designs. The surfaces of the bowls are either polished, or dulled with a coating of Parinarium nut gum.

Symmetry and perfect form are characteristic of these bowls. Their circular shape is remarkably accurate, a point demonstrated by taking two diameters at right angles and observing the small degree of variation between them. It is of interest to note also that they are usually from two and a half to three times wider than deep, excluding the legs, proportions which appear to be more or less maintained in bowls of all sizes. This comparative exactness is not carried to the legs, which are of uneven length and are either round or lozenge-shaped in cross-section. Generally speaking, these bowls possess a refinement and grace that only the finest craftsmen can embody in their work.

The handles are added for their artistic value and are not intended for lifting the

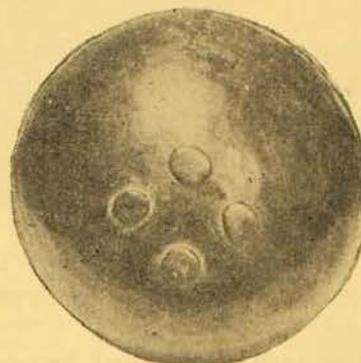
A fine example, thirty-five inches in diameter, of the bowls without handles. The motive hanging from the border design is derived from buffalo horns.

Photo.—W. L. Necker.





A large example, nineteen inches in diameter, of the softwood bowls without handles and legs.  
Photo.—W. L. Necker.



Some of the bowls stand on rounded bases.

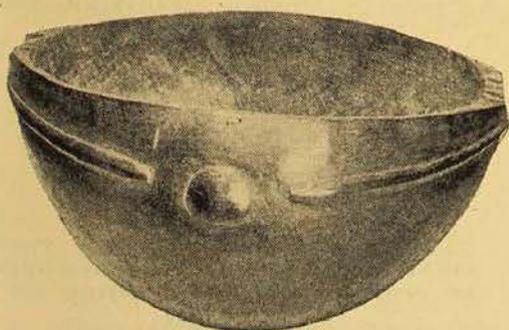
Photo.—W. L. Necker.

bowls. Most of them consist of a spiral of two and a half turns, the outer turn tapering into a pointed shaft. The spiral is joined to the rim of the bowl by a small lozenge or coiled open-work panel, and on some specimens there is a bird or fish-like figure. On one large bowl a realistic bird is perched on top of each handle, and on two others large *ovulum* shells are bound in the same position. Two of the smaller bowls have a double spiral design in their handles, and one has them in the form of a pig looking into the bowl.

On one group of four oval bowls the handles are cut out of the solid and the two ends of the bowl are thickened as a result. The motive is a human figure lying on its back, with bent arms and legs, a rounded face, and a hood which extends from the top of the head down the back of the handle. On one of these figures the hands are holding the sides of the mouth.

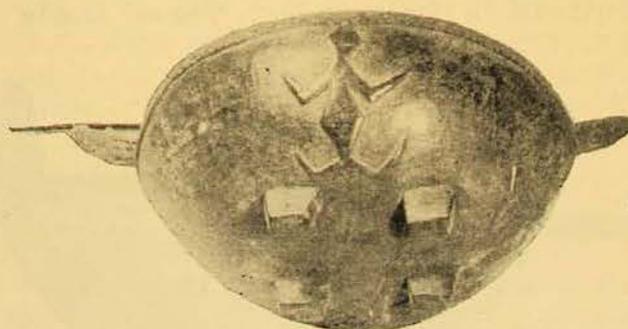
Another variety of bowl has no handles, and the legs are short and stumpy, often only rounded bosses up to an inch high. Two specimens have a circular ridge in place of legs. The light wood is painted black, but the grain is revealed as a soft but luminous red pattern which adds a pleasing effect to the sombre black surface.

The bowls described bear rather crudely cut borders of secondary design motives in relief just below the rim. These borders consist of zigzag lines, crosses and triangles in various combinations, broken at regular intervals by bosses and lozenges, or by small panels of hourglass, scallop and other shapes, some of which resemble an open-winged bird. One has a rounded incised panel and another a



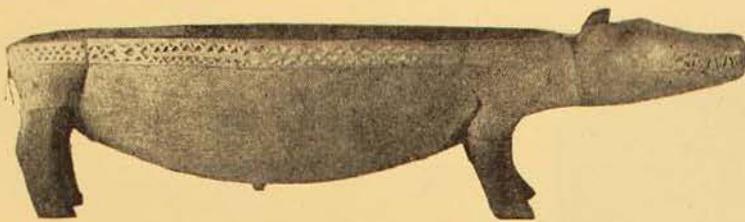
A hardwood bowl, fourteen inches long, with a simple but effective type of rim decoration.

Photo.—W. L. Necker.



This small bowl, sixteen inches long, bears a lizard carved in high relief on both halves of the outside surface.

Photo.—W. L. Necker.



This bowl, thirty-three inches long, represents a dog or a pig. The tail is missing.

Photo.—W. L. Necker.

lizard on opposite portions of the outside surface. A common additional motive, extending downward from the border, is a shaft of rounded bosses terminating in two horns. The only other attempts at decorating the outside comprise lines of rounded bosses on one large bowl, and an extensive panel of lines of crosses on another one.

One of the most graceful types is that carved in the form of a bird. They are

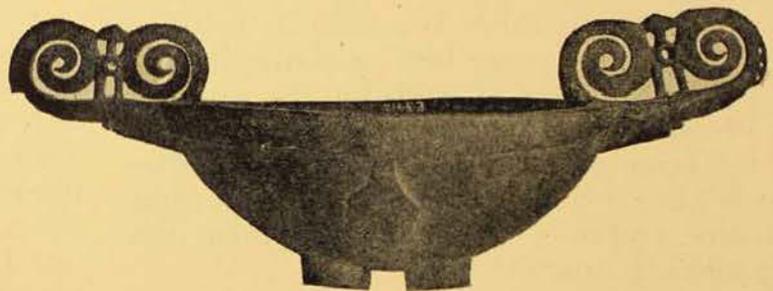
although well made, are not as vital in posture and feeling as are the inlaid bird-bowls of the southern Solomon Islands.<sup>1</sup>

The final series consists of oval and round bowls with neither legs nor handles. Some have a raised boss on the lip at each end, but otherwise the only one decorated has panels of raised chequers on the lip and bosses on each side.

Many of the bowls bear a criss-cross pattern of pairs of broken lines lightly

The handles bearing the double spiral are shown on this bowl, which is fifteen inches in diameter, and twenty-six inches in total length.

Photo.—W. L. Necker.



round and stand on four short legs. The light wood of which they are made is highly polished to an attractive shade of brown. On the head the upper bill is hooked at the end, as with many sea-birds, and the eye is a circle. The wings, which are decorated with a zigzag line pattern, project outward and bend sharply to form an elbow as they lead back to join the end of the bowl as a low ridge. The tail consists of from three to six bars connected by a crosspiece. These bowls,

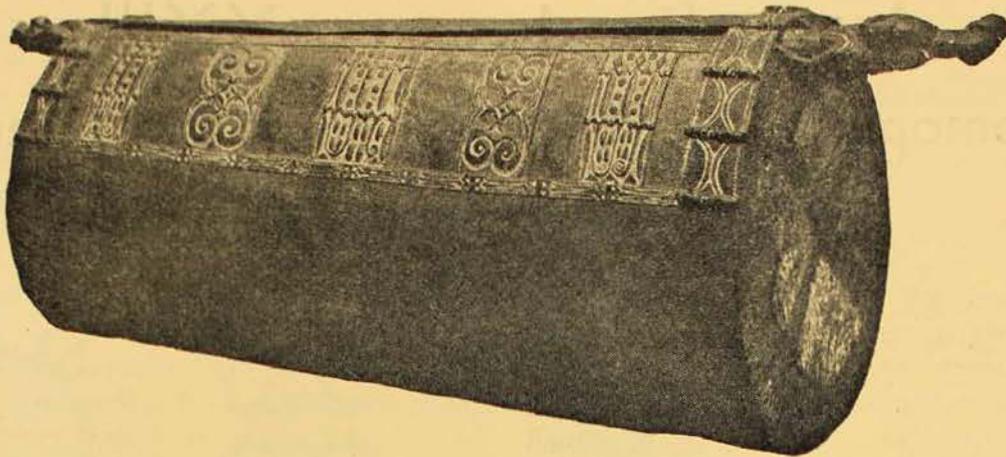
incised all over the outside, and scattered within it are rounded flower-like figures.

It will be observed by comparison that these bowls and the slit-gongs do not bear as wide a range of motives as do the smaller objects; there is a greater reliance upon the skilful treatment of the mass in graceful curves than upon lavish embellishment, a choice in which excellent aesthetic taste is displayed.

<sup>1</sup>THE AUSTRALIAN MUSEUM MAGAZINE, Vol. viii, No. 5, July-September, 1943, pp. 154-59.



This bird-shaped bowl is twenty-eight inches long. The pose appears to represent a bird resting on the water.



This magnificent drum is a hundred and twelve inches long, and the ends are forty-nine inches high and thirty-four inches wide. The slit is from one and a half to two inches wide. On three panels are pairs of lizards with conjoined tails, on two panels a double spiral, and on the central panel a double spiral and a diamond-shaped figure. Round this large panel is a border of toothed scallops and hour-glass motives. The ends bear a large red cross painted on a white field. The smaller gongs are from thirty to forty-three inches long and from twelve to seventeen inches in diameter.

#### SLIT-GONGS.

The slit-gongs of Melanesia represent another good example of the wood-carver's skill. Five examples from the Admiralty Group illustrate this point very well. They are all painted red and bear decorative designs in black and white.

One of the specimens is perhaps the largest slit-gong from Melanesia in any museum. It was cut out of a solid trunk by working inwards from each end to form a hollow interior, then large disks of wood were gummed in each end to cover the holes. It represents the body of a man whose head and shoulders project eighteen inches from one end and his legs eleven inches from the other end. He is wearing a headdress capped by two knobs, his body is decorated with lines of zigzags in low relief and on each of his cheeks are three circular incised bosses. His hands rest on the end of the gong. Below the lower edge of the slit, and running the full length of the gong, is a broad design divided into a number of evenly spaced, carefully balanced and admirably carved panels.

The other four gongs bear decorative designs of the usual Admiralty Island

motives arranged in various ways. One is of the human figure type, the others have rounded projections at each end on which diamond and zigzag patterns are incised.

The decoration of the slit-gongs illustrates perfectly the love of repetition and the regular spacing of design elements so characteristic of Admiralty island art.

#### BEDS.

The finest beds appear to be made chiefly on Rambutchon Island at the eastern end of the group. They are placed end to end in a series along the walls of the houses. Each one consists of a rectangular frame, a broad plank extending down the middle from end to end, a head-rest about five inches high at one end, and four legs about fifteen inches high. The frame and legs are fitted together by means of crudely cut tongue and mortice joints. On one of the two beds in the Museum collection the legs are plain; on the other they are carved in the form of a human body and each one has a series of human heads in relief round its base. Panels of various decorative designs are carved on the legs and sides of the frame.

# Australian Insects. XXIII.

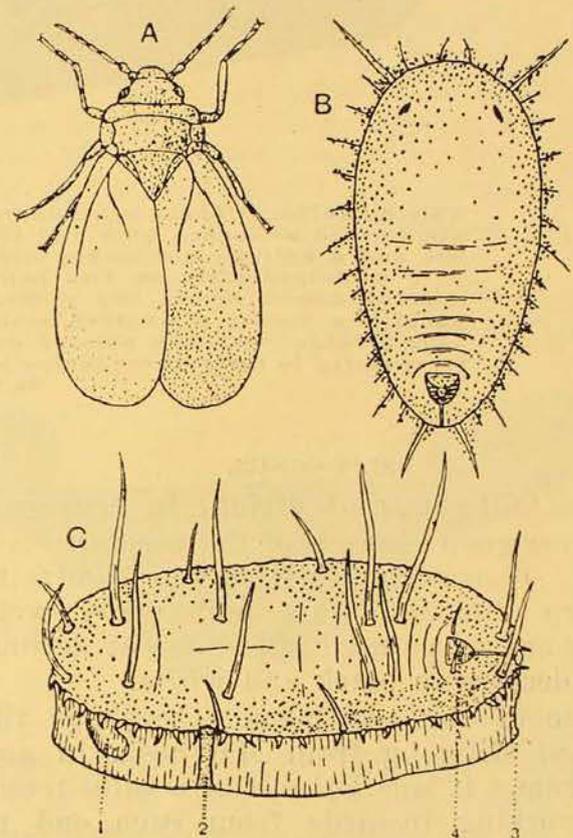
## Homoptera 4—Snow-flies and Scale Insects

By KEITH C. McKEOWN, F.R.Z.S.

TO round off the chronicle of the Homoptera, two families only remain for consideration, the Aleurodidae, the Snow-flies, and the Coccidae, or Scale-Insects. The former is a small group in which the Australian species have been little studied, the latter, a large assemblage of many species, containing a great number of forms which are among the most destructive pests of vegetation. So little is known concerning many of them that an account of the species is liable to degenerate into a mere catalogue of names.

The Snow-flies, or White-flies, as they are also called, are tiny insects with broadly rounded wings in both sexes, held roof-like over the body, thickly covered with white mealy dust. The eggs are deposited on the under surface of the leaf. The larvae and pupae are fixed to the host-plant, and while the former may be naked, the pupae are covered with a flat, glassy scale, or test, of a waxy nature. The newly hatched larvae are active little creatures, but their legs and antennae are lost in the first moult, to be regained when the pupal skin is cast, and the perfect insect emerges. In the larval and pupal stages these little insects suck the sap from their host-plants. Some eight species only have been described from Australia, but a number of fine undescribed forms live on native shrubs and trees. The family is one which should well repay study. *Aleurocanthus banksiae* Mask. infests the Bottlebrush (*Banksia*), and *Trialeurodes vaporariorum* Westw., an introduced species, is a pest in green-houses.

About four hundred species of Scale-Insects (Coccidae) have been described from Australia, but the field is far from exhausted, and much research is neces-



A White-fly (*Trialeurodes vaporariorum*).  
(1) Adult, (2) larva, and (3) test covering pupa.

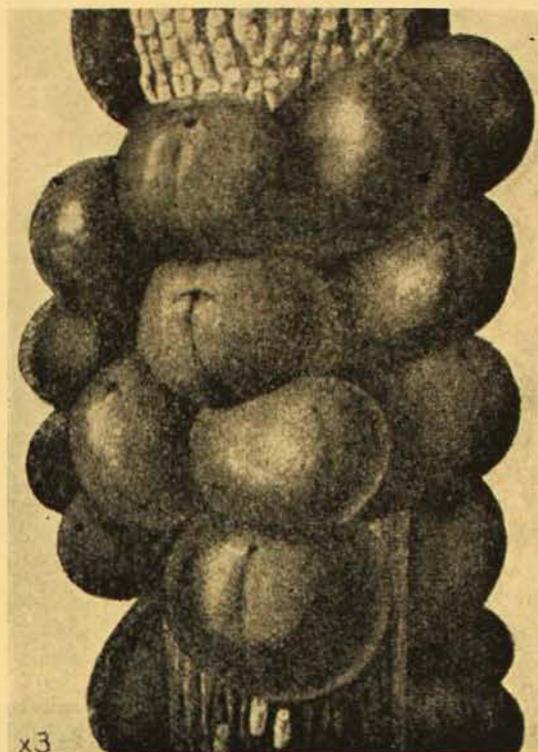
After Lloyd.

sary before there is unanimity of opinion on their classification. In addition, many species have been introduced from other lands, and these form the majority of our pest species. The delicate adult males alone develop wings, and these have a very reduced venation. The females are large and fleshy, and the legs and antennae, originally possessed by the larvae, degenerate once they fix themselves to the host-plant. The larvae, which may hatch from eggs or be produced alive by the female, are active little creatures which run rapidly over the foliage, and may be carried to fresh fields upon the feet and feathers of birds or the

clothing of man: wind, too, acts as a distributing agent. After a short period of active life the little larvae settle down to suck the sap, and soon cover themselves with a scale of wax or silky material, or lie naked protected by their own toughened skin. The gall-making forms become enclosed in a stout woody cell which protects the occupant from hot, drying winds and the attentions of all but specialized enemies. The subfamily Diaspinae, the Hard or Armoured Scales, members of which cover themselves with a hardened waxy test, is notorious, for it includes such species as the Red Scale of Citrus (*Aonidiella aurantii* Mask.), one of the most important pests with which the citrus fruitgrower has to contend, and the San José Scale (*Aonidiella pernicioso* Comst.), destructive to deciduous fruit trees. The scales of these species are rounded in outline, rising to a raised boss in the centre like a shield. The genus *Lepidosaphes* contains the Mussel Scale of apples and pears (*L. ulmi* Lin.), which forms an elongate, curved and shell-like scale. The control of these pests in Australia alone must cost a great sum of money annually. A number of native species infests our trees and shrubs, but very little is known concerning them; the only information is, in most cases, a name, a technical description, and a record of the host-plant—an extremely barren field to the non-specialist.

The Soft Scales—the Coccinae (Lecaniinae)—also include a number of introduced pest species. Perhaps the best known is the Brown Olive Scale (*Saissetia oleae* Bern.), a species which finds the foliage of the oleander and citrus trees also to its taste. It is a rounded box-like scale, fairly readily distinguished from its relatives by a raised H-shaped marking upon the back; but even more commonly found upon citrus is *Coccus hesperidum* L., a much flatter and paler-coloured species. Both these insects gorge themselves to such an extent upon the sap that the surplus is sprayed out from the digestive organs in the form of 'honey-dew' and covers the foliage in a glistening, sticky coating much relished by

B

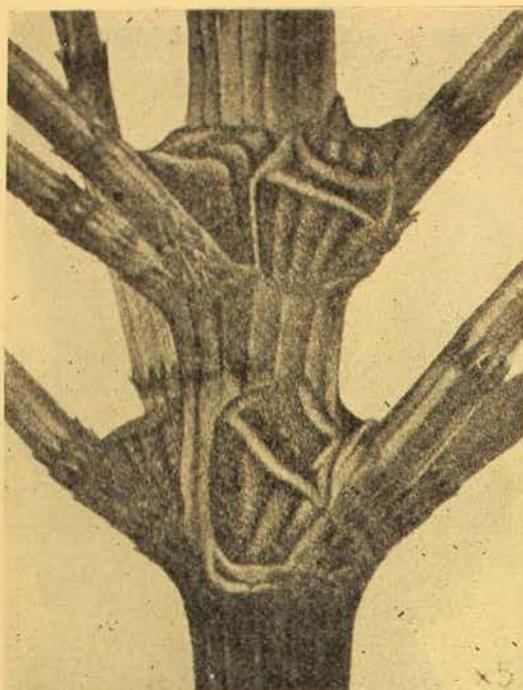


The large purple scales of *Cryptes baccatum* upon the branch of a wattle. The small tile-like male scales above.

After Dept. Agric., N.S.W.

foraging ants, and which frequently forms a breeding ground for a sooty fungus, the spores of which clog and blacken foliage and fruit. The species of Wax Scales, so common in gardens, cover themselves with shapeless blobs of wax, white in *Ceroplastes destructor* Newst. and *C. ceriferus* Anderson, and pink in *C. rubens* Mask. Among the native species, one of the most remarkable is *Cryptes baccatum* Mask., which forms close-packed masses on the branchlets of Wattle (*Acacia*). When fully grown, the female scales are striking, pale-bluish, egg-shaped objects about the size of a large pea; the scales of the males are small, flattened and tile-like. Tillyard, in his *Insects of Australia and New Zealand*, incorrectly referred to these insects as 'galls'.

The Dactylopiinae are a group in which the insects may form protective scales or lie naked like the Coccinae. A very striking species of *Rhizococcus* is *R. mancus* Mask., a strange saddle-shaped



Scales of *Rhizococcus mancus* on *Casuarina*. These strange saddle-shaped coccids are a rich red colour.

After Dept. Agric., N.S.W.

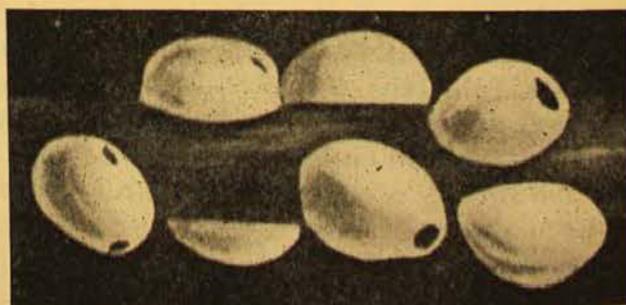
creature that sits astride the thread-like foliage of the *Casuarinas* where it forms an angle with the branch. This is a fine red insect, and is fairly rare, but I have found it in some seasons occurring in great numbers in the Wagga Wagga district, New South Wales. In this subfamily are placed the 'Gum-tree Scales' (*Eriococcus*), which are enclosed in a tightly-fitting sac of felted silky or cottony material. Most of the species cluster tightly upon the twigs of eucalypts (some frequent other trees) and secrete honey-dew in great quantity, encouraging the attendance of ants. In *Eriococcus coriaceus* Mask. the covering ranges from white to reddish-brown in colour; it is possible that some, at least, of this reddish colouring is due to staining. This insect was accidentally introduced into New Zealand, where it caused considerable damage to Blue Gum plantations until controlled by ladybirds. In the genus *Dactylopius*, sometimes popularly called 'Mealy Bugs', up to the time of egg-laying the insects are active, flattened creatures covered over with white, waxy meal, but when adult they become covered

with a felted mass of cottony or waxy secretion.

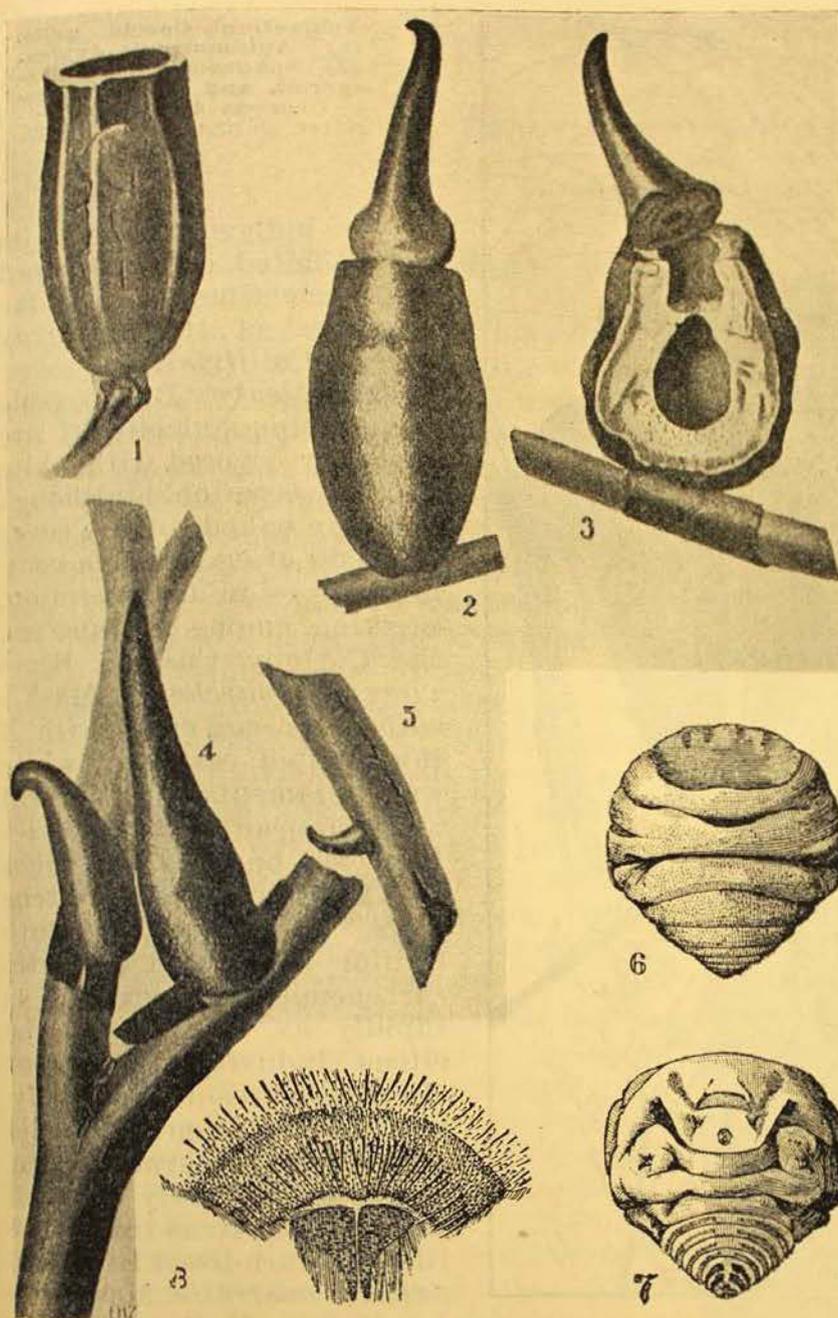
The most amazing of the Coccids are the members of the subfamilies Aphiomorphinae and Idiococcinae, the gall-making coccids. Froggatt writes of the Aphiomorphinae: "This division of the Coccidae contains the typical gall-making coccids, within which galls the males and females develop with the growth of the aborted woody tissue. In most cases the male and female galls are distinct structures, but in a few the males and females are found within the same gall. The active, flattened, oval larvae attach themselves to the bark of the branch or twig, or to the surface of the leaf, and through the irritation set up the woody tissue swells up around them until they are perfectly enclosed in a box-like gall. There is usually an apical orifice at the anal extremity, but this opening may be on the upper or under side of the leaf.

"The adult female is top-shaped, irregularly rounded, or elongate, sometimes attached to the inner surface of the gall, in others fitting closely into the gall chamber, but perfectly free and not attached to the woody tissue by the rostrum. The legs and antennae are usually more or less aborted, sometimes wanting. While the members of the genus *Apiomorpha* only infest the stems and foliage of *Eucalyptus*, others are more general in their habits."

The causes responsible for the formation of the gall and its often complex shape are obscure. The male gall in *Apiomorpha* is usually slender and tube-



The Gum-tree Scale (*Eriococcus coriaceus*). Each insect is enclosed in a felted sac.  
After Dept. Agric., N.S.W.



The strange galls of *Apiomorpha hilli*. 1. Seed-capsule of *Eucalyptus miniata*, showing resemblance to gall. 2. Female gall with apex becoming detached from base. 3. Gall in section. 4-5. Immature female galls. 6-7. Female coccid removed from gall, from above and below, and (8) extremity of body.

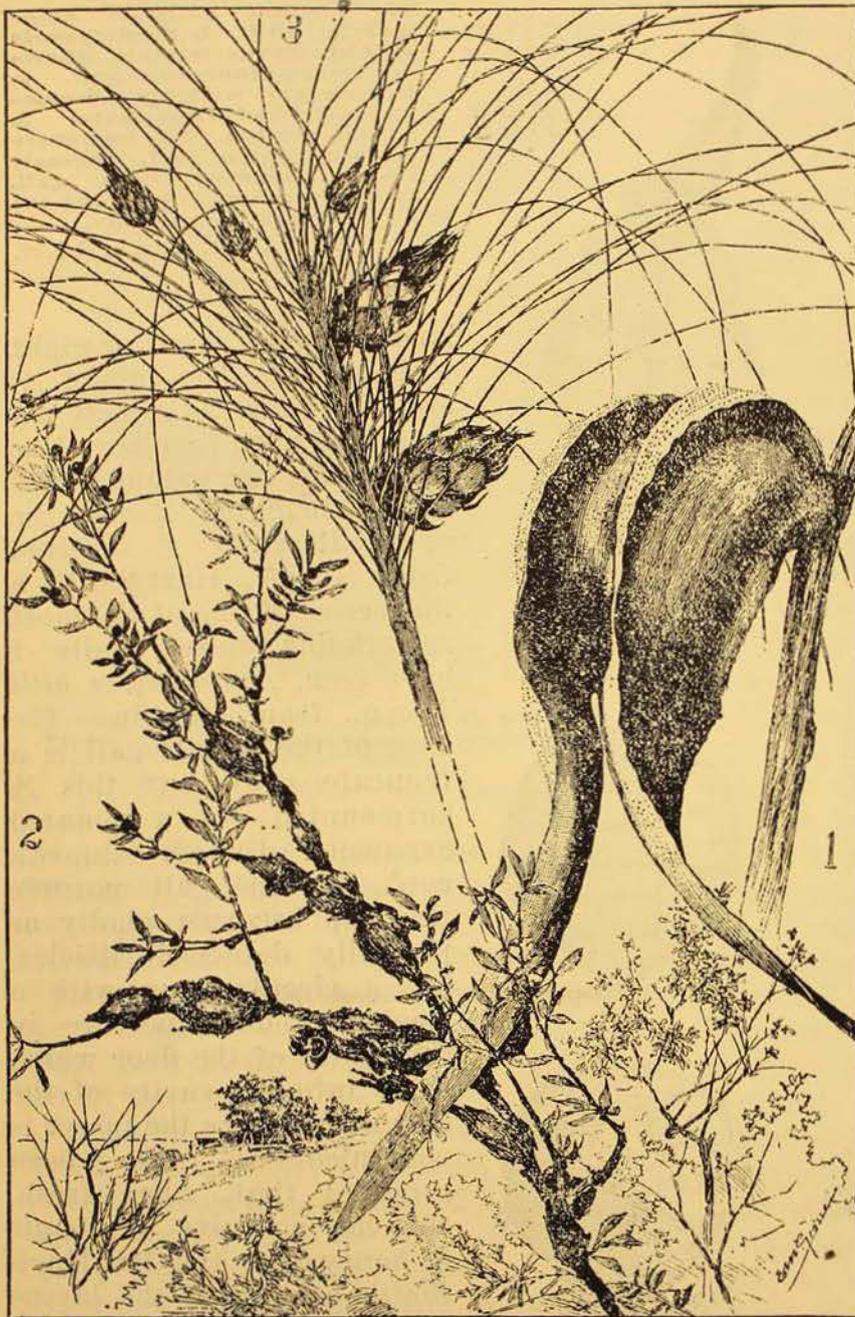
After Dept. Agric., N.S.W.

horns may be seven or eight inches long. The gall of *A. munita* Schr. is about an inch long with four horn-like extensions, two to four inches long, springing from the apex. Recently I received from Mr. W. Hart-Smith a fine series of one of the most remarkable insect galls I have seen, *Apiomorpha hilli* Frogg., from Darwin. The base of the female gall is a truncate oval, but this is surmounted by a pointed expansion like a 'dunce's cap'. As the gall matures this cap becomes wholly or partially detached, disclosing a circular cup with a small rounded aperture in the centre of the floor which leads into the cavity of the gall itself where the insect is concealed. It has been reported that, when fresh, the cup contains a globule of honey-dew, and Mr. Hart-Smith has found the larvae of a Sawfly (*Pterygopherus* sp.) sheltering in the cavity.

like, open at the end to permit the escape of the winged insect. These male galls are often closely massed together into coral-like growths. While many of the female galls are merely woody swellings of the branch, several species form galls of really remarkable shape; that of *Apiomorpha duplex* Schr. springs directly from the branch and is roughly four-sided and ridged at the angles, and terminates in two long leaf-like extensions; the gall itself averages one and a half inches in length, but the leaf-like

The illustration gives a better idea of the appearance of this strange gall than any amount of description.

The subfamily Idiococcinae contains a number of gall-making forms which dwell in more or less irregular excrescences on the branches of trees and shrubs; the males live within the female gall and do not form separate shelters. The most striking is *Cylindrococcus spiniferus* Mask., found on the branches of She-oaks (*Casuarina*). It is formed of overlapping bracts and resembles a seed



**Australian Coccid galls.**  
 (1) *Apiomorpha duplex*,  
 (2) *Sphaerococcus leptospermi*, and (3) *Cylindrococcus spiniferus*.  
 After Dept. Agric., N.S.W.

to be indigenous, and its brown, fluted, cushion-shaped tests sometimes crowd the branches of the 'Murray Pines' (*Callitris*).

The Mealy Bugs (sub-family Monophlebiinae) are generally covered with white waxy secretion, although some are naked; others cover the mass of eggs with a coating of similar secretion. Striking among the species, the Cottony Cushion Scale (*Icerya purchasi* Mask.) covers its egg-mass with a thick fluted casing of white waxy filaments. Its natural hosts appear to be Wattles (*Acacia*), but it is sometimes found on roses and citrus trees. When introduced into California without its natural enemies it increased so rapidly as to threaten the citrus industry there, but the importation of a lady-bird beetle from Australia restored the natural balance, and it is now rarely recorded as a pest of citrus trees. The Bird of Paradise Fly (*Callipappus australis* Mask.) is more generally known from

vessel—so like is it, that on one of the plates in Scott's *Australian Lepidoptera and their Transformations* the artist has drawn a branch of *Casuarina* bearing these galls, apparently under the impression that they were the seed-cones of the tree.

The Tachardinae, or Lac Insects, are represented in Australia by few species. The Indian forms are the source of commercial lac. The commonest and most widely distributed in Australia is *Austrotachardia decorella* Mask. It is believed

the beautiful male insect than from the female, with which it is rarely associated. The male is a delicate little insect with transparent wings of a purplish tint, and the extremity of the abdomen with a tuft of fine filaments like spun glass. The female coccid may measure up to an inch in length; she is obese and of a dark blue-black colour. The bulky females crawl about over the bark of eucalypts, where they are sought by the dainty and disproportionately small males.

# Lights Under the Sea

## Jewelled Squids

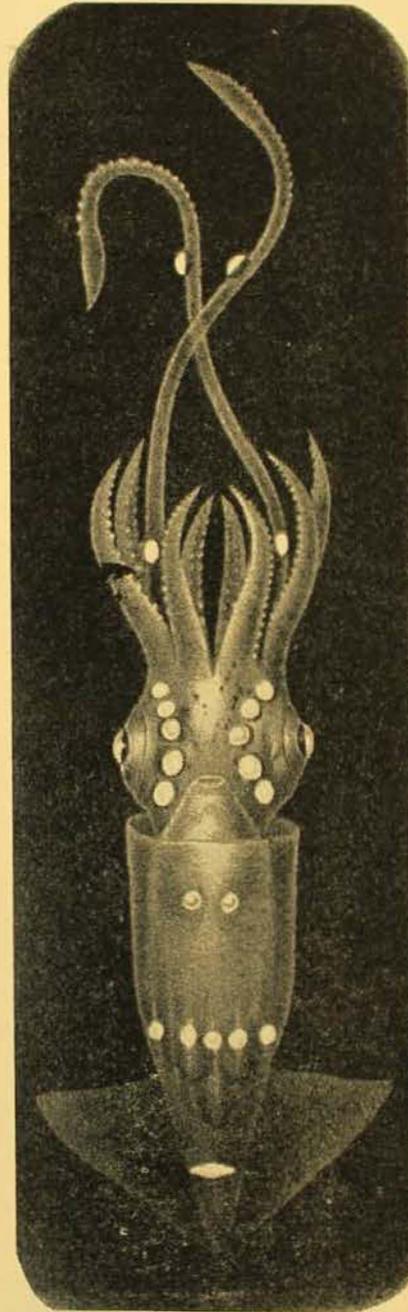
By JOYCE ALLAN

**A** FASCINATING story of the ocean depths is told by Dr. William Beebe in the account of his adventures in a bathysphere "half a mile down" off Bermuda. The bathysphere is a spherical steel diving chamber fitted with oxygen tanks and telephone communication with the surface and large enough to contain an observer sealed within by a four hundred pound door. He describes how, from the surface to 800 feet down, the red, yellow, green and blue light as seen by the human eye, vanishes in turn, leaving the faintest tinge of violet and finally a cold whitish-grey. As the bathysphere descends still further the eye sees only a blackish blueness which darkens until at 2,000 feet every trace of light disappears. There is no plant life and all is cold and black. Fishes, squids, worms and crustaceans have assumed grotesque forms to suit their environment.

The only source of illumination in the gloom of these ocean depths is from animal life. Here many are adorned with light organs or photophores which shine, as they dart through the inky blackness, like brilliant lamps or glowing portholes along the sides of ships.

As he gazed through the fused quartz window of the bathysphere, Dr. Beebe noted that at times flashes from unknown organisms were so bright that his vision was confused for several seconds. Often the abundance of light was so great that its comparison could only be likened to that of major stars on a clear moonless night.

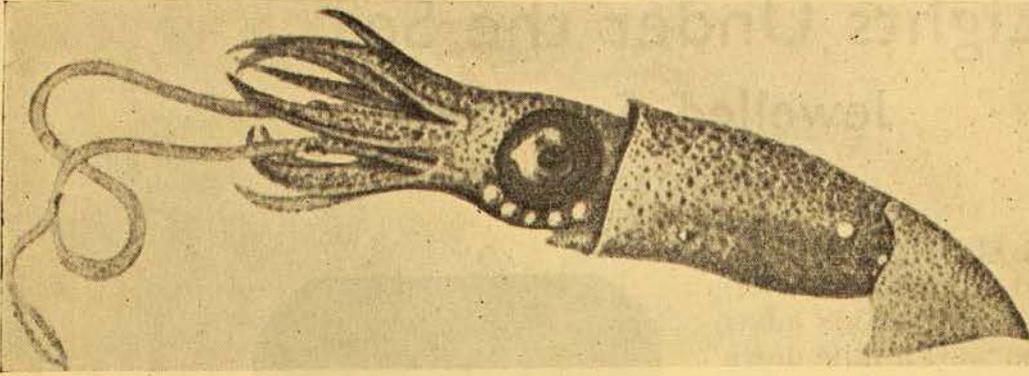
This extraordinary luminescence exhibited by members of the animal kingdom is not dependent upon production of heat. It is a most efficient, though cold, form of illumination. A few prawn-like crustaceans, for instance, have been known to give sufficient light to enable



The Diadem Squid as it appears in the darkness of the ocean depths it inhabits. Pigmentation as seen in daylight is now indistinct, the squid has a gelatinous, transparent appearance, and from the conspicuous light organs issue vivid rays of ruby - red, snow - white, pearly and sky blue lights.

After Chun.

one to read, for a few seconds, the newspaper on which the jar containing them was placed; and light from luminous mucus given out from the siphons of certain squids has continued to glow

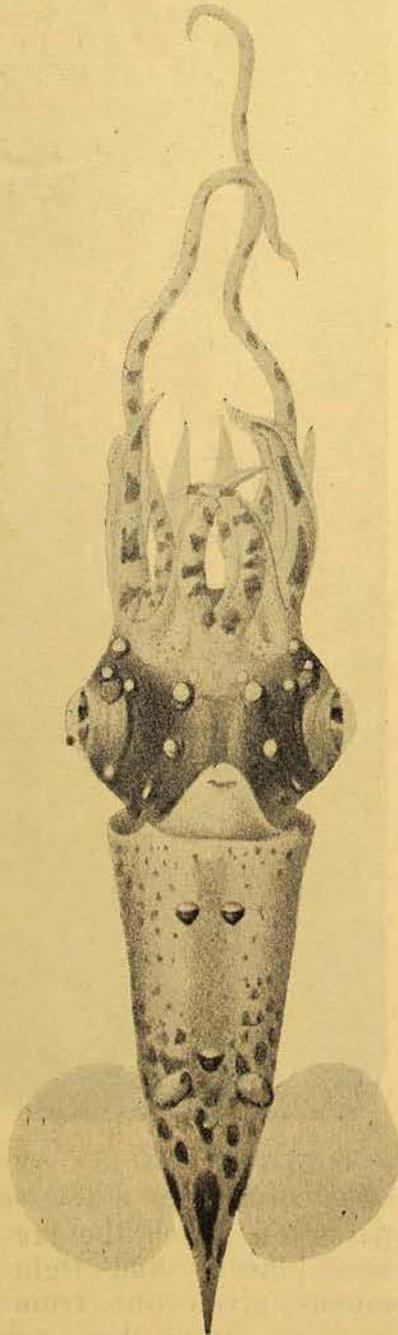


**The Diadem Squid.** A deep-sea squid (*Lycoteuthis diadema*) as it appears in daylight. From five powerful light organs on the under side of both eyes and scattered organs over the body, multi-coloured brilliant rays will issue when it is removed to the dark.

After Chun.

**This very attractive little stream-lined squid (*Pterygioteuthis giardi*) has numerous light organs scattered on the under side of the eyeballs and within the body. The transparency of the animal in the darkness enables light from the last-mentioned organs to shine brightly out into the water.**

After Chun.



brightly for three to five minutes, after which it suddenly dies out. Mr. G. P. Whitley,<sup>1</sup> writing in this MAGAZINE some years ago of material brought up from the depths off our east coast by the Danish research ship *Dana*, states that many fishes in these catches gave out ghostly flashes and prawns ejected phosphorescent puffs as they were hauled to the surface. If a prawn were lifted from the water, part of the luminous puffs would drop into the water, breaking into lambent flames, and float away. Luminescence of all the creatures captured in this haul was generally blue, of indescribable beauty. Luminosity, however, is by no means confined to blue; in some animals it has been observed as a silvery glow, in others green, black, or ruby-red.

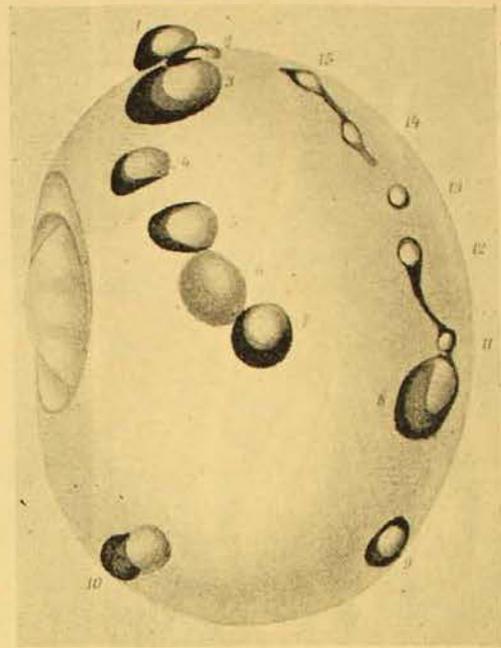
Many squids inhabiting a zone from 600 feet down have light organs—blue, red and green—scattered over the body or surrounding the eyes. Their general body colour varies in depths to 2,000 feet from white and pink to red and reddish-brown. Perhaps few classes in the animal kingdom can compare with the Cephalopoda (squids, cuttlefish, octopods, etc.) in diversity, brilliance, or high specialization of light organs, but by no means all cephalopods are luminous. Only a few octopods, for instance, are known to possess photophores; the pearly nautilus is free from them; among the Decapoda (ten-armed cephalopods) roughly two-fifths of the genera, principally the squids, are light producing.

<sup>1</sup> Whitley: THE AUSTRALIAN MUSEUM MAGAZINE, Vol. iv, No. 1, 1930, pp. 22-27.

The stream-lined, luminous squids are a triumph of adaptive development—active, delicately balanced and exquisitely adjusted to an environment where it is next to impossible to observe the actual production of light except under exceptional conditions. Like brilliantly lit, swift-moving arrows, these inhabitants of the deep are extremely difficult to catch or to maintain alive under artificial conditions and therefore, unless brought to the surface in fishermen's nets or in scientific hauls, they are rarely seen.

The light of some species exhibits remarkable brilliance. Photogenic organs may occur in almost any portion of the body, but the outer integument, the eyeballs, and the pallial (gill) chamber are the situations most favoured. They are often internal and able to function only because of the transparency of the body. These organs are generally situated on the stomach and vary, even in the one species, from comparatively simple bodies of luminous tissue to highly complex searchlight types. In some groups they are usually of the type known as discharging; in others they are entirely enclosed or ductless. The presence of luminous bacteria is a characteristic of a few squids. The number and variety of the known luminous forms reach their highest degree in three families of squids—Enoploteuthidae, Cranchiidae, and Lycoteuthidae.

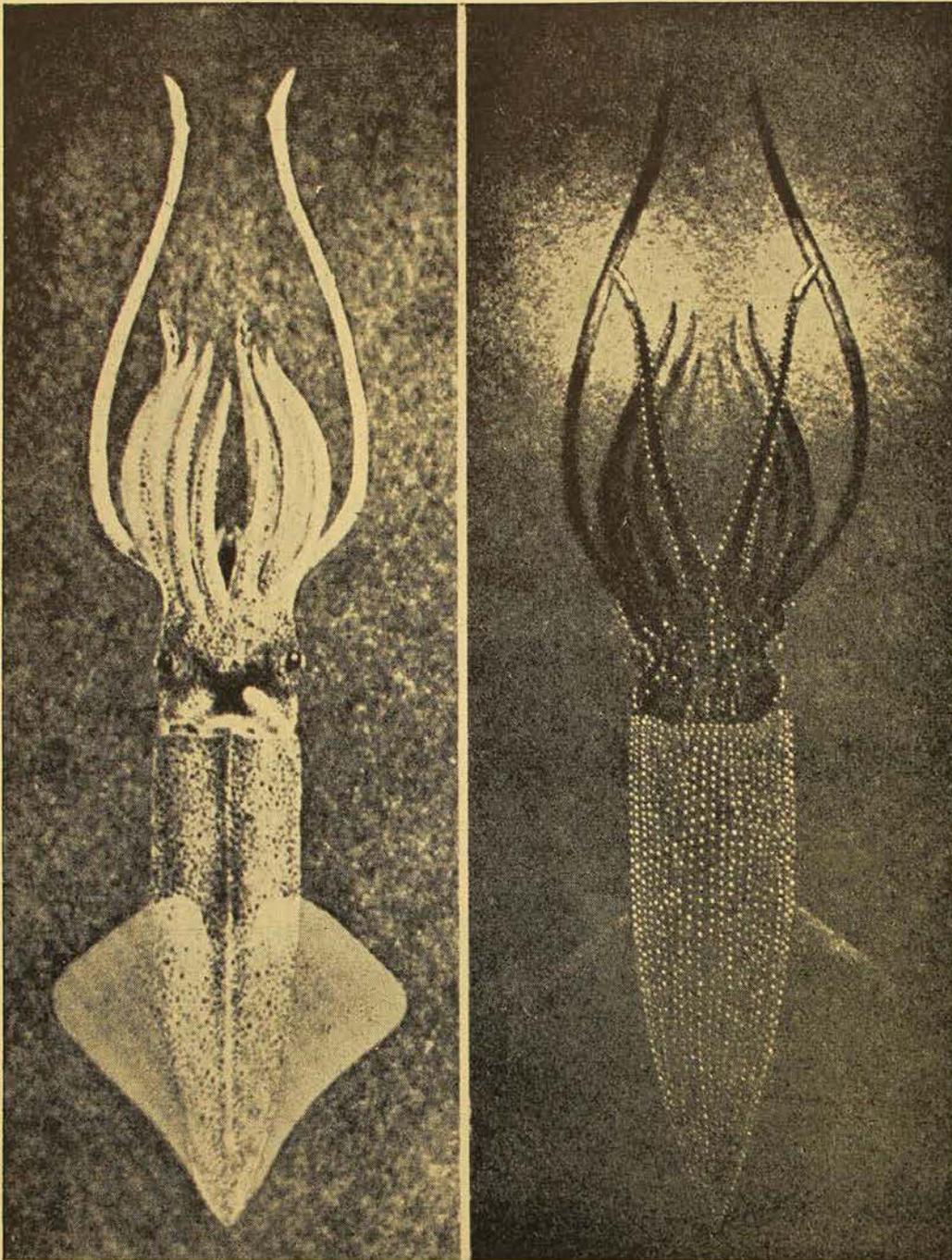
Amongst examples *par excellence* of luminous cephalopods is a beautiful little species, first specimens of which were taken from a considerable depth in the South Atlantic by the German research ship *Valdivia* towards the end of the last century; a specimen was kept in iced water long enough to be photographed by its own light. The body of this squid "shines as though adorned with a diadem of brilliant gems" due to the presence of large light organs emitting ruby-red, snow-white, pearly and sky blue lights, whilst from the eyes shine rays of ultramarine blue. Another small squid from the Kermadec Islands has been found to possess no less than ninety light organs



The right eyeball of the squid *P. giardi* removed to show irregular distribution of large and small light organs on the ventral surface. After Chun.

scattered over the arms, round the eyeballs and within the body, but as it has been described from a preserved specimen, its brilliance in life can only be imagined.

The Firefly squid of Japan, the hotarika, is perhaps the best known of all luminous cephalopods. Extremely abundant in certain seasons and localities on the shores of Japan, it lives during the day in a depth of about 100 or more fathoms and in the evening, moving as much as possible in deep water, approaches the shore in vast numbers to spawn, after which the schools return to the deep. During the fishing season, masses of these small squids are caught in the nets after sunset when, it is said, they emerge as soon as lights appear inshore, as though attracted by their brightness. This attraction to light is well known amongst shore-living cephalopods, especially the octopods, but to what degree it applies to deep-sea species is at present uncertain. Contrarily, Dr. Beebe noted, as he sat coiled in his bathysphere more than half a mile down, the failure of his powerful beam of light to attract organisms of any kind



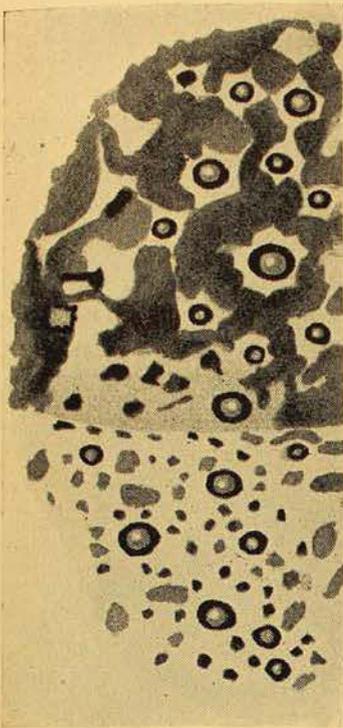
On the left is seen the Firefly Squid (*Watasenia scintillans*) as it appears by day, and on the right its appearance at night or in the darkness of ocean depths. Notice the many light organs shining from the body, head and arms, and the three bull's eye lanterns on the tips of the ventral pair of arms. The light issuing from these, which is said to penetrate to the space of a foot, can be clearly seen.

After Sasaki.

—some fled at its appearance, others seemed wholly unconcerned.

The most powerful light organs on the Firefly squid are three swellings, bull's-eye lanterns, at the tips of the ventral pair of arms. These shine so brilliantly in dark water, so reliable eye-witnesses say, that one only sees two effulgent bodies moving like the glow of an electric contact, their light penetrating to the space of about a foot, whilst the lively

oscillations of the invisible arms produce a weird effect. Hundreds of small spots scattered over the body shine in the dark with an unbelievable brilliance. When the animal wishes to produce this light, the pigment cells or chromatophores covering the light organs contract and open a way for the light which appears like a sunbeam shot through a tiny hole. When the "Firefly" wishes to shut off the light, the chromatophores expand and



A small portion of the skin of a deep-sea squid showing the pigment cells or chromatophores contracted, exposing the light organs and thus opening a way for the light to shine out. The chromatophores in this instance would in life be reddish-brown patches of colour and the globular light organs can be easily distinguished amongst them.

After Chun.

cover the spots. This ability to control light is a fundamental characteristic of luminous animals.

For what purpose are squids furnished with these light organs? It has been suggested, in the case of fishes equipped with similar structures, that the luminous lure may serve as an attraction or bait for prey; that the regular arrangement of lights may serve as recognition marks for fishes of the same species for mating purposes; that the luminous organs of secretion may distract an

enemy and allow the pursued to escape; or that they may illuminate surroundings in search of food. Any of these reasons may be suggested for luminosity in cephalopods, since the field for investigation on this subject is almost untilled. In the Firefly squid luminosity seems uniform in male and female and therefore does not appear, in this species, to serve as a sex distinction.

Whatever may be the functions of the luminous organs, light production amongst cephalopods is considered by most authorities not to be an essentially primitive or ancestral function, now lost in many members, but rather a system exhibiting physiological reactions, the varied pelagic environment favouring the development of light-producing factors. Their occurrence certainly is a feature of considerable importance and yields valuable clues as to relationship and classification of genera and species.

Among minute pelagic cephalopods brought up in hauls from ocean depths off our coast in recent years are several forms exhibiting light organs. Although the complete animals are often less than half an inch long, light organs round the eyeballs, on and within the body and on the arms are in most cases very conspicuous. The knowledge that such types of squids exist in Australian waters gives rise to the hope that with further hauls many hitherto unknown forms will come to light.

CITIZENSHIP FOR THE ABORIGINES: A NATIONAL ABORIGINAL POLICY. By Professor A. P. Elkin, M.A., Ph.D., Sydney, 1944. 8vo, 109 pp., 1 map.

This booklet is not only a fund of information, but it is a critical and constructive consideration of the situation in which the aborigines have been forced both in the past and today. Attention is drawn by Professor Elkin to the progressive changes that have taken place since 1930, and an appeal is made for a unified positive policy to replace the existing one of protection and prohibition that has been such a dismal failure. As a basis for a national policy ten general principles are discussed, and these deal with community life, health and diet, care of mothers, progress in citizenship, effective education, justice on a democratic basis, security, and spiritual life. The policy advocated is set out clearly and concisely. Its aim is full citizenship rights for the aborigines, recognizing the gradation from

the town-dwellers to those living on reserves in marginal and remote areas. It is proposed that there be government and missionary institutions on the reserves, which are to be administered by properly trained persons given power and authority to work out and develop sound methods. There is a chapter on the administration of such a policy, either by the present six government boards or by a single Commonwealth department, the latter system being regarded as preferable, for the whole of the continent. Another chapter discusses the rôle of subsidized missions in the religious, health and education spheres, and a final one deals with the need to establish common standards in defining what is an aboriginal. The appendices contain valuable tables of the aboriginal population and of expenditure on its welfare, the question of franchise, and a summary of a recently published policy of the Methodist missions.

F.D.McC.

# The Kangaroo Family

## The Nail-tail Wallabies

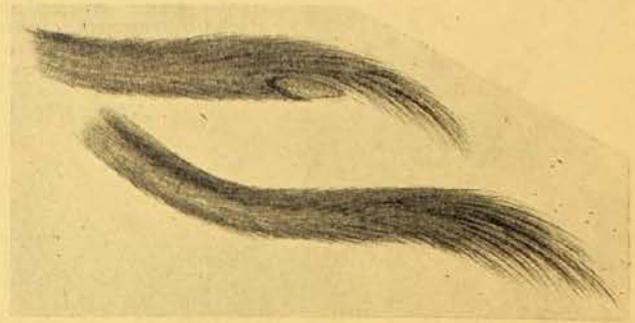
By ELLIS TROUGHTON, F.R.Z.S., C.M.Z.S.

**T**HIS article of the kangaroo series<sup>1</sup> deals with three beautiful silky-haired small species of wallabies which are grouped in the genus *Onychogalea*. The generic name is derived from the Greek, and, like the popular name, alludes to the unusual horny spur or "nail" at the tail-tip. Amongst the marsupials this feature is present only in these wallabies and in rabbit-bandicoots, or bilbies; in other mammals it occurs in the lion. The function of the tail-spur has never been satisfactorily explained, and opportunity for close observation of the small wallabies is rapidly slipping away as the range of the two southern species is shrinking to the verge of extinction.

Unlike the rock- and tree-wallabies, the small nail-tails dart swiftly about tussocky plains or rocky scrubs, so that the tail acts as a lever on the ground, much as with the ordinary wallabies and kangaroos. It seems quite likely that the horny spur is of some use in the swift movements and also in the scratching together of material for the "seats", or shallow nests, in which they rest during part of the day.

A characteristic feature of the hopping action of nail-tails is that the arms are carried at an awkwardly acute outward angle, almost suggestive of deformity. Also, the arms move with a kind of rotary action which has suggested the name of "organ grinder" in some localities. Another distinguishing feature of the genus is the slender form of the three upper front or incisor teeth which, unlike those of all other wallabies, decrease in size evenly backwards. This peculiarity of dentition indicates some variation in diet, said to consist mainly of roots of various species of coarse grass. However,

the lengthened and very sharp central nails of the hands would suggest that the food is very similar to that of the rat-kangaroos, as is the habit of hollowing out a place for the hare-like "seat".



The tail tip of the Sandy Nail-tail Wallaby. The nail is well developed, but flat. After Gould.

According to the great naturalist John Gould, the nail-tail bounds away with remarkable fleetness when startled from its shelter beneath a tussock or small bush, giving the best of dogs a sharp run, and frequently makes its escape by gaining thick brush or the hollow of a decayed tree. One, sharply pressed, mounted inside a tree to an opening almost fifteen feet from the ground; it leapt from there, finally being taken from a fallen log. It has been stated also that a female, disturbed with a well-grown "joey" in the pouch, will make for a nearby hollow log into which the young one may scramble when dropped, the mother returning later if fortunate enough to survive the chase.

### THE BRIDLED NAIL-TAIL WALLABY.

The popular name of this delicately built species refers to the suggestion of a bridle formed by the light greyish marking on the head and shoulders. It was once very plentiful over inland New South Wales, extending south to the plains of the lower Murray, and north over the

<sup>1</sup> The first of this series appeared in THE AUSTRALIAN MUSEUM MAGAZINE, Vol. viii, No. 1, June-August, 1942, p. 17.



**The Bridled Nail-tail Wallaby.** Once very plentiful it is now seldom seen, settlement and the fox causing its depletion. A sanctuary, however, for it exists at Bulba Island, near Newcastle. Its size is about that of the hare.

Darling Downs as far as the Rockhampton district of south-eastern Queensland. Specimens are in the Australian Museum collected from as far south as Wagga, in 1896, where it was popularly known as "Flash Jack", quite an apt name because of its swift actions; also from as far west as Cobar. The most recent specimens reached the Museum from the Manilla district, north-east New South Wales, in 1923, as a donation from the Taronga Zoological Park Trust.

In the sixties, Gerard Krefft, a past Curator of this Museum, found it to be the most common of all the smaller kangaroos around the plains of the Murray and Darling, where it was often seen in daytime, though captives were much more active at night. Its disposition was described as extremely shy and timid, while the hearing, as indicated by the large ears, is extremely keen, so that it was difficult to observe or capture. Various white collectors shared the blacks' high opinion of the nail-tail wallabies as meat, Krefft saying it was "white and well tasted", and Gould, that the flesh was excellent, like that of other

small kangaroos, and eaten by him in preference to other meat.

Gould found the Bridled Nail-tail, which he named *Onychogalea frenata*, inhabiting the more barren inland ranges, where it seemed to be independent of water, possibly owing to its liking for bulbous roots. Aborigines were often observed hunting with dogs and killing the wallabies with spears, boomerangs and other weapons. At Gundermein, on the lower Namoi, Gould accompanied a tribe capturing them with nets, rudely constructed but well adapted for the task. Arriving at a "Brigaloe Brush", in which the Nail-tail and the Black-striped Wallaby (*Wallabia dorsalis*) were often associated, the oldest tribesmen separated, each two taking a net about twenty-five yards long by three and a half feet wide, which they erected where the wallabies' runways were thickest. The shouting of the tribe drove the wallabies towards the nets, providing all Gould required in a single afternoon and probably stocking the larder as well.

Sadly enough, great numbers of this beautiful marsupial, which survived

thousands of years of such hunting by aborigines and the dingo, were exterminated in less than a century by the advance of settlement, with the vastly changed conditions caused by stock and rabbits, and the ravages of the wily fox, most foolish of all intentional introductions. A worthy effort to conserve representatives of the species was made by the controlling Trust in releasing this wallaby on Bulba Island near Newcastle. Such action was taken none too soon and it is fervently hoped that in the event of overstocking, surplus populations will be transferred to some equally secure sanctuary, and that the excellent example of the Trust will be followed regarding other species of marsupials threatened with rapid extinction.

#### CRESCENT NAIL-TAIL WALLABY.

Although very similar in coloration to the Bridled species, this wallaby (*O. lunata*) is smaller and more delicately built, the length from tip to tip barely exceeding two feet six inches. Both the popular and specific names allude to a difference in marking, in which the white shoulder stripe does not extend over the head to give a bridled effect, but is restricted to a crescent or moon-shaped mark behind the shoulder. It is known by the aborigines' name of "Wurrung" in south Western Australia, where the habits appear to be similar to those of the eastern Bridled species.

According to Gould, nests are not made, but in soft ground beneath a thick bush a hollow is formed in which the animal lies during the heat of the day. The habits are like those of rat-kangaroos in that the nail-tail shelters in hollow logs and burrows when pursued. It was noted that when this species was quietly cleaning its fur, there was a constant upward twitching of the tail, not observed with other kangaroos. Gould's collector, Gilbert, was never close enough to decide if the peculiar action had anything to do with the tail-spur, but he considered that it was quite possible.

Originally collected about the Swan River, this beautiful little wallaby is believed to be verging upon extinction in settled districts of the south-west which

were once its stronghold. It is said to occur in isolated places west of the lower section of the Great Southern Railway, and further east towards the Great Victoria Desert, in Western Australia. The first South Australian specimens were sent to the British Museum by an early State Governor, Sir George Grey. The Elder Expedition found it in the Everard Ranges in 1891, while the Horn Expedition obtained two at Alice Springs in 1894. In 1924, according to Wood Jones, who knew of no South Australian observations since 1894, the animal had probably vanished from all but the remotest regions of that State.

According to that well-known collector, the late J. T. Tunney, whom I visited during a Museum expedition to Western Australia in 1921, the Crescent Nail-tail had disappeared from its most favoured haunts, and would inevitably become extinct under advancing settlement and the spread of the fox, then but a new menace in the region of the south-west. One can only hope that the various efforts of the State authorities to conserve representatives of the unique fauna have included special provision for the survival of this lovely wallaby, possibly by establishing colonies on some suitable islands, as was done with the eastern species on Bulba Island.

#### NORTHERN OR SANDY NAIL-TAIL WALLABY.

This nail-tail (*O. unguifer*) is the largest of the three species, of which it is the least strikingly marked, though the most brilliantly coloured as a reflection of its different habitat in the sandy or limestone country of the hotter northern region. Its vast and almost entirely coastal range extends from the Broome district of Western Australia, along the Northern Territory, to the Normanton district of the "gulf country" of Queensland. The original specimen was collected at King Sound in the West Kimberley region early in 1838 by Surgeon Bynoe, R.N., during the surveying voyage of the *Beagle*.

By a coincidence, the only sub-species of the northern nail-tail was described by De Vis, past Director of the Queensland

Museum, from a place called Kimberley, on the Norman River on the Gulf of Carpentaria. The wide separation of localities would seem to support the recognition of this geographical race, named *annulicauda*, in reference to some dark grey rings around the paler grey middle part of the tail. Other features include a dark line down the back, blackish muzzle, and definite traces of a shoulder stripe. A characteristic of the northern species is that the peculiar tail-spur is most strongly developed, being likened to the nail of a man's little finger.

The popular name "organ grinder", referring to the quaint rotary action of the arms while hopping, is often applied to this wallaby in the Kimberley region of Western Australia. It is a rather solitary animal, making its usual resting-place amongst tussocks. But as the sandy coloration would indicate, it is often associated with the Agile or Sandy Wallaby in plains and open timbered country

between the sandy or limestone ridges. It is occasionally found at long distances from water, but also enjoys the shady undergrowth of running streams.

The main hope for survival for the nail-tail genus rests with this widely ranging northern species. But the fox, unfortunately, has been reported as spreading rapidly northward, being recorded as occurring about the Hughenden district of central Queensland several years ago. It is unfortunate that the nail-tails do not inhabit the extreme coastal brushes where the presence of ticks helps to keep the fox at bay. There is real cause for anxiety as to whether the wily and adaptable "Brer Fox" may not soon establish himself in the hotter regions of the far north, to continue the fell work of extermination. The sole safeguard against such depredations lies with the establishment of colonies of the smaller marsupials on island or peninsular sanctuaries which can be effectively segregated from the destructive activities of the rabbit and fox.

## Conservation of Wild Life

TOTAL PROTECTION FOR ALL WALLABIES IN VICTORIA.—In an article on Rock-Wallabies, in the preceding issue of this MAGAZINE, reference was made to the possible extermination of the beautiful Bar-tailed species of South Australia, because of past exploitation. It was stated also that competition with introduced enemies, and interstate marketing of protected animals, had eliminated many exploitable species of marsupials from the natural haunts which had favoured their ultimate survival.

In a recent letter, the Chief Inspector of the Department of Fisheries and Game of Victoria (Mr. F. Lewis) drew attention to the fact that for some time now all wallabies have been afforded total protection within that State. The extreme urgency of such protective action is emphasized by his statement that a species of rock-wallaby was living in the heavily timbered country of north-eastern Victoria fifty years ago and is probably now extinct!

It is therefore most satisfactory to acknowledge such progressive action for conserving the more fortunate kinds of Victorian wallabies. At the same time, it is to be hoped

that elsewhere some colonies of rock-wallabies will survive in their mountainous strongholds, or in primitive sanctuaries, from which foxes and wild dogs can be eliminated.

Regarding the marketing of skins of native animals, Mr. Lewis expressed the opinion that the system now operating between the various States of the Commonwealth had worked very successfully for many years and could not be improved by Federal control. But conservation of wild life is not merely concerned with an agreeable form of marketing, as shown by my reason, international as well as national, for advocating a major Federal control of fauna and flora. Such reasons were covered in my Presidential Address to the Linnean Society of New South Wales in March, 1944, and were also summarized in this MAGAZINE, Volume viii, No. 7, March-May, 1944, p. 217.

Therein it was shown that Federal co-ordination of the survey and control of fauna had been the subject of recommendations by the Australian and New Zealand Association for the Advancement of Science since the Presidential Address of Sir Baldwin Spencer in 1921.

E.T.

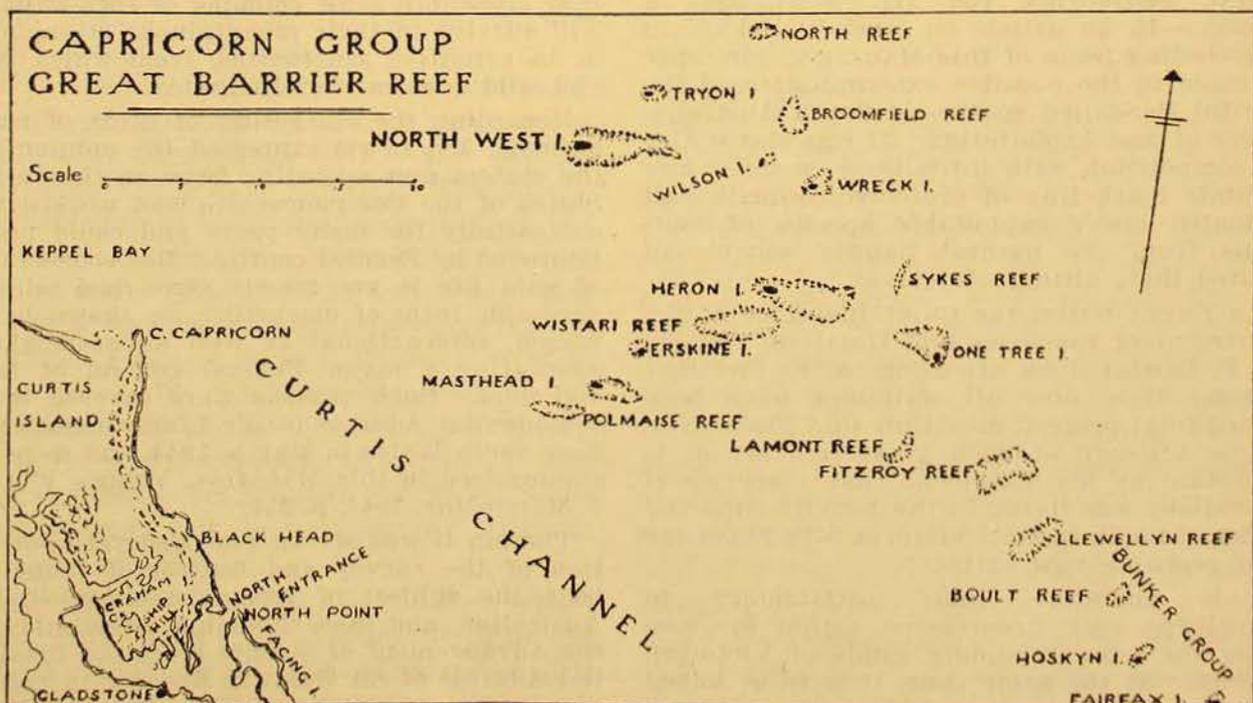
# Tropic Island Memories

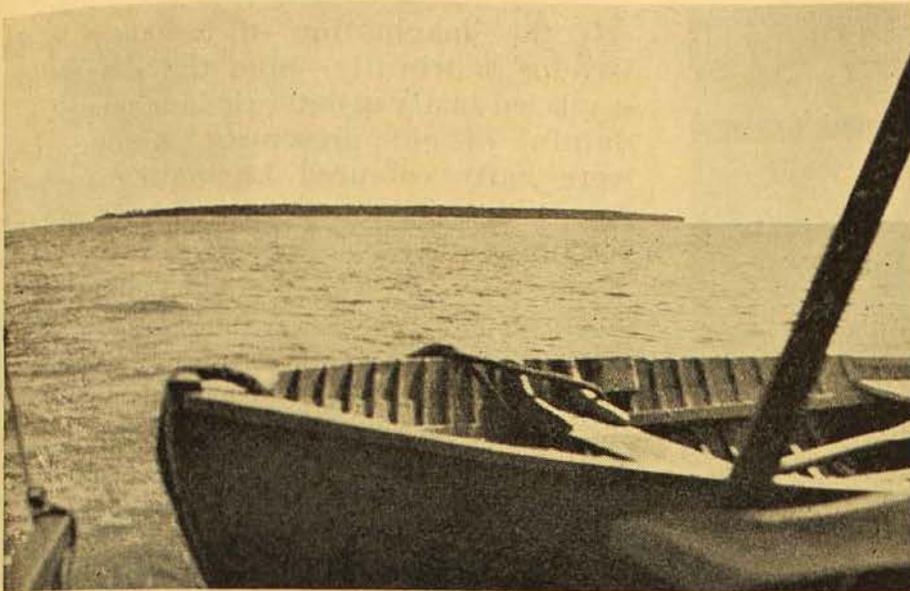
By FRANK McNEILL

REMINISCING is a grand occupation. To sit pensive sometimes and hearken back to days of rare experiences is both comforting and inspiring. But what is the use of such things if they are to be selfishly retained? Confession is good for the soul, and one can always tempt readers by writing of an unusual place—somewhere off the 'beaten track' where you are at one with nature and where the tang of adventure is in the air. Just such a place is a tropic isle—a spot where the coral grows rife and beautiful, where the sea-bird legions hold undisputed possession, and where the shy turtles come ashore to lay their eggs. I speak of Nor'west Islet, one of a number of coral-formed specks surrounded by an expanse of intense blue sea. The group they form is known as the Capricorn Islands, for they lie almost athwart the tropic of that name. You probably will not find Nor'west in an ordinary atlas, so I had better tell you it

is some thirty odd miles east and a little north of the southern Queensland town of Gladstone, in Port Curtis. I can never forget the first summer trip I made to Nor'west Islet. It was like being transported into a different world—a world where one rarely remembered city life and the bustle of crowds.

Our skipper was a man of experience, and his staunch forty-five foot yawl-rigged auxiliary was a trusty craft. Aboard were provender and camping equipment for twenty people for a whole month. To have assembled this was quite a task, for every detail has to be considered when the destination is an uninhabited part. Then there were the hazards of the journey over the open sea and the tricky approach to land at the end of it. A trip to any of those isles of Capricorn is always a gamble, no matter what time of the year. The group is almost at the southern extremity of the Great Barrier Reef. Here the overlapping and inter-





Long and low, like a raft of bushes afloat on the sea, Nor'west Islet in the Capricorn Group, viewed from the north-west over three to four miles of sea.

Photo.—W. Boardman.

lacing wide system of reefs known as the 'outer' Great Barrier has undergone a change. Coral formations are more scattered and isolated, with plenty of seaway between them. Unlike the area further to the north, there is no continuous coral rampart to baffle the long ocean swells, and being bucked by a fresh southeaster for a solid five hours is none too comfortable an experience. Therefore it may be inferred that the smooth oily swell and bright sunlight which blessed my initial crossing to Nor'west Islet was far from unwelcome. Not that any one of the party was entirely a land lubber. All were husky or in bounding good health and all inveterate worshippers of the sun. Once aboard, everyone stripped to the scantiest possible garments and remained practically in this state of undress during four short weeks.

While one is thus relaxed, time passes blithely by. I vividly remember how splashed with sunlight and how new and blue were the sky and the sea. This was my first introduction to tropical parts. Never before had I feasted my eyes on those rich and varying turquoise and cobalt hues of the sea—changing hues that are a faithful index to changing depths. Nor had I ever imagined a firmament of such intense and unbroken blue, so different from the one I knew further to the south.

Wrapt in the wonder of it all, I searched the horizon from a vantage point in the bow for some faint sign of our destination. Hours passed as we plugged steadily on. The coastline receded from sight astern and our little ship seemed just to be heading east across a trackless ocean. At last I detected a sign—a mere spot, the slightest irregularity—breaking the line of the far horizon. Slowly this grew in height and width. Even as yet only some tree tops were in sight. Merely by dropping to a crouched position on my haunches I could play hide and seek with my island. It was another new experience to observe that to drop one's eye level a mere three feet could cause the clearly visible island speck to drop below the horizon. Here indeed was impressive proof of the curvature of the globe.

From this stage on, everyone aboard watched Nor'west Islet as we bore down upon it. Gradually it took shape as a narrow, horizontal black bar on the skyline—long and low. A little nearer it assumed the character of a raft of bushes afloat on the sea. Then ultimately a beach appeared below the level of the trees, a steep beach glistening white in the midday sun. Soon after this we arrived at the edge of the surrounding reef, luckily in time to view an unusual phenomenon. The waters of the receding tide were cascading over terraced coral banks dropping steeply towards the sea



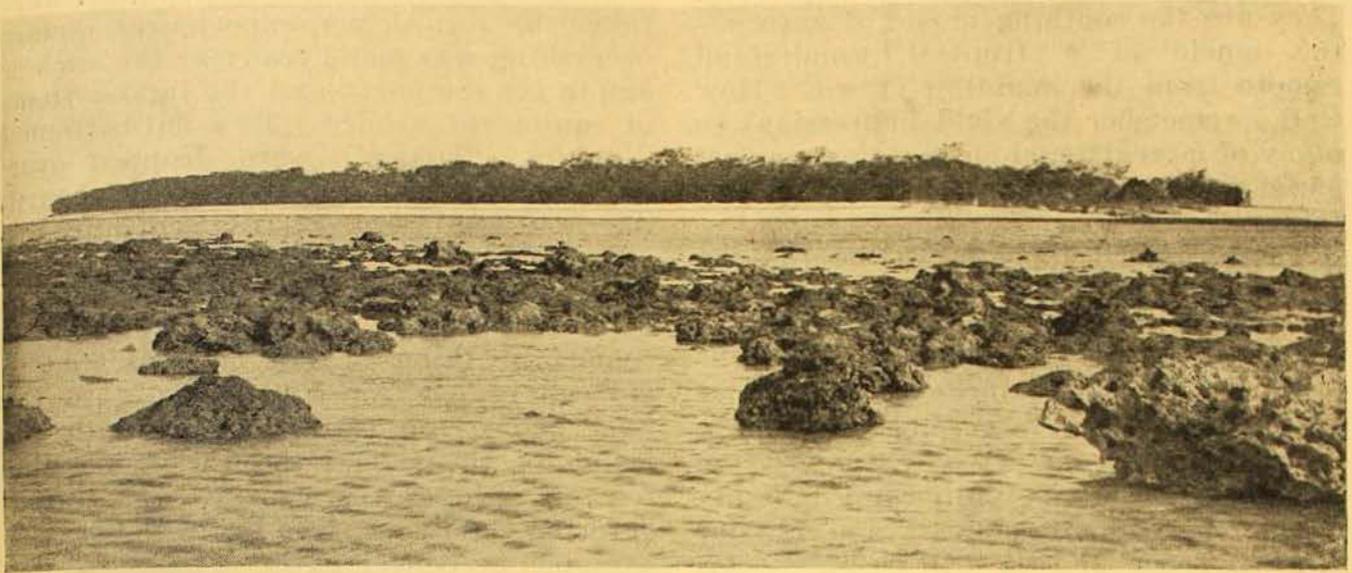
Cascading waters flowing over terraced coral growths along the edge of the reef at Nor'west Islet. Commonly the tide drops at too fast a rate for the water draining from the huge expanse of reef to keep pace with it.

Photo.—A. Embury.

floor. We marvelled at this—marvelled at the obstructing power of the coral growths at reef level which could hold back such a volume and be so out of accord with the fast falling tide. It was hard to believe we were anchored in eight fathoms, yet only a distance of one hundred feet or so lay between us and the ledge from where we could wade ashore. Thinking back to that scene, I can remember how I gazed overside and how impressed I was at the crystal clarity of the sea. Previously I had known only from hearsay that this was a common feature of wide coral reef waters. But it needed the evidence of my own eyes to convince me that the sea floor could be clearly seen as deep down as forty-eight feet from the surface. Down there I saw great coral banks in full luxuriant growth. Where the sunlight played upon them they reflected back the dazzling hues of a variegated carpet. Shadowy parts, where deeper crevices and caverns receded from my sight, were an intensely deep purple shade. Running my eyes down the anchor chain, I could clearly see where it was attached to the heavy steel wheel serving as a mooring. I noted the devastation it had so lately wrought among the brittle coral fronds in the place where it came to rest. In such coral waters it is unwise to use a conventional forked anchor; the risks of losing it are too great. Down in that clear water, too, were fishes—fishes to

stir the imagination of the most blasé. Groups of trevally—blue and silver-white—circled lazily around the anchorage, disdainful of our presence. Among them were gaily coloured bream-like forms—ones which we were to learn bore equally colourful names such as Hussar, Red Throat and Sweet Lip. Then, passing by at intervals in twos and threes, were great Spanish or Barred Mackerels, a yard to a yard and a half long. These are the gamefish which attract many an angler to our tropical waters. They are great sport when being 'played' for fifteen minutes or so with light fishing gear. When schooling on the surface during the right state of the tide they seem readily attracted to spinning, spoon-shaped metal strikers and feather lures. Knowing that our party was destined to deliberate later on the eating qualities of all these finny denizens, I found it easier to transfer my interests to surroundings not yet fully explored. For the moment fishing could wait. There were still too many fascinating first impressions for one to register.

My eyes rested again on Nor'west Islet, standing there now so close and so bold in detail. It was fast becoming isolated from the surrounding sea as the last of the tide waters flowed off its immense encircling reef. Here at last was evidence of what I had read of cays—low coral islets of solid formation without lagoons. Nor'west was typical of the scattered group of cays dotting the sea like green jewels in that part of the Barrier Reef waters. Its features were in sharp contrast to the conventional type of rocky island—high part of a sunken land mass remaining above the sea. Here instead was something built up from below the level of the sea. It was something which had materialized from the slow inexorable work of time and the labours of countless millions of generations of coral animals—the lowly flower-like polyps which have that capacity for extracting carbonate of lime from seawater and depositing it in protective layers around their soft bodies. The islet



One of the tropic coral isles of Capricorn, with the tide waters partly submerging the reef flat. From the north-west quarter the approach at low tide is across only five hundred yards or so of more or less exposed coral reef. Eastwards, beyond the islet, is the far extremity of the reef formation, distant about five miles. A noticeable feature of the reef edge or reef crest is its characteristic elevation above the height of parts nearer shore. Strewn here and there along the crest are numbers of eroded boulders composed of coral matrix—fused fragments of dead growths. Some of the largest are seven and eight feet high, and are known as 'nigger heads'. They serve a useful purpose in navigation, for their tops show above the surface almost immediately after the tide has turned.

Photo.—F. A. McNeill.

I looked upon was obviously a cay of great antiquity. It was big by general standards—roughly two hundred and sixty acres—and carried a verdant forest growth, the billowing foliage reaching a height of sixty feet or more. Some cays I have since seen further to the north are tiny by comparison, being a mere three or four acres in area, and in some cases little more than bare mounts of coral shingle and granular coral sands. All, however, are characteristically low and flat, with the land level of none ever more than an average of twelve feet above sea level. At low tide it is easy to conjecture on the manner in which a cay is formed. Two obvious features are the huge expanse of coral reef and the islet perched on its top. Both of these tell the story of a coral reef slowly growing upwards from the sea floor, ultimately to break the surface at its highest point. Around this spot drifting masses of broken coral, shell fragments and gravelly coral sands are banked up by the wind and the waves. During the slow consolidating process chance seeds wash

ashore or are borne by birds which alight for a space on the newly formed land. Vegetation thus gradually becomes established, nurtured by phosphate from the ever increasing droppings of the sea birds and the building up of soil from its own dying and mouldering growth. The familiar rock of the mainland is something which is never seen, though it may be said to be imitated in places where a chemical action has fused the beach sands of the islet into layers of solid material. And again over wide areas of the surrounding reef flat where a similar action has caused the welding of the dead coral growths and very fine drifting débris into a mass termed reef matrix.

Earlier mention of the sea birds has been made. To them the coral cays are heaven-sent refuges. Ground nesters and tree nesters alike, they come in their hordes each summer breeding season, when, day and night, the continuous sound of their shrill and piping calls is added to the murmur of the waves and the rustling of the wind in the trees. These noises are the only ones to be

heard on the coral isles of Capricorn. They are the soothing music of nature—the music of a tropical wonderland remote from the madding crowd. How well I remember the vivid impressions so many of us registered on that day we first gazed upon all these new and bewildering things!

The birds had appeared in the air long before we reached the anchorage. We entered Nor'west's avian perimeter, as it were, almost as soon as we sighted the islet. At first a few birds wheeled above and around us, or else squatted quietly on the smooth sea. We recognized the small, slender-billed White-capped Noddy Terns, the lighter coloured and heavier Crested Terns, and the still bulkier sooty-hued Mutton Birds or Wedge-tailed Shearwaters. The closer in we got, the more numerous became the birds. Over the islet itself they literally peppered the air, at times seemingly rising in unison like a cloud and then dropping again into the trees.

It took less time, of course, than I have taken to record my experiences, before everything was made ready at the anchorage to get the party and the lighter items of equipment ashore. Two flat-bottomed dinghies ('flatties') were dropped over-side and the vanguard tumbled aboard. At last we were at the entrance to adventure-land. The succeeding weeks would provide ample opportunity to exploit this new world about us. The important thing of the moment was to get what gear we could across to the islet before nightfall. Later, with the rising of the tide, it would be possible for our skipper to negotiate the waters covering the reef and so bring the heavier equipment conveniently close to the beach. Even on a vacation work will at times have to take precedence over pleasure. Here I will postpone my reminiscences. There is still to come the story of the landing and our sojourn on Nor'west Islet, and this will be told later.

## Some Butterflies of Australia and the Pacific

### The Birdwing Butterflies, I.

By A. MUSGRAVE

THE family Papilionidae includes the largest and some of the most beautiful of butterflies, many having tailed hindwings. In the adult insects, all six legs are perfect in both sexes. In the forewing near the base there is a short vein; in the hindwing, vein 1*b*, which occurs in the Pieridae, is absent. The egg is pale-coloured, globular, flat on the base, and usually smooth in texture; it is laid singly on the leaves of the food-plant. The larva or caterpillar is cylindrical or subcylindrical and either smooth or provided with two rows of fleshy tubercles on the back; when subcylindrical the thorax is humped and two

spines are present at the end of the body. An osmeterium, or forked process, which gives off a scent, may be protruded through a groove on the thorax when the larva is disturbed. The pupa or chrysalis varies in form, the head and thorax being inclined at an angle to the abdomen. The head may bear a median horn or, sometimes, a two-humped process, and it may be ridged or smooth. The pupa is suspended in a vertical position by means of (1) a hooked cremaster at the end of the body, fastened to a pad of silk, and (2) a silken girdle about its middle.

The largest and principal genus of the family, the genus *Papilio*, has been sub-

divided by Jordan<sup>1</sup> into three groups, the *Aristolochia Papilios*, the Fluted *Papilios* and the Kite Swallowtails. It is with the first group that this article is chiefly concerned.

#### THE ARISTOLOCHIA PAPILIOS.

The Birdwing butterflies in the past have been variously grouped under the generic names *Troides* and *Ornithoptera*. Jordan has stated, "all the *Ornithoptera* are true *Papilio*, as is proved even by the larva, which does not differ from the larvae of other *Aristolochia Papilios* in anything except perhaps its somewhat larger size".

The Birdwings have been the subject of many works and papers, one of the most recent being that by Dr. F. E. Zeuner.<sup>2</sup> I have drawn on this paper for much of the information embodied in this article.

The male Birdwing is brightly coloured with iridescent scales, but the female, though larger in size, is usually more sombrely coloured. These are the largest butterflies and, in the larval state, they feed on the poisonous climbing vines of the genus *Aristolochia* (Dutchman's Pipe), the range of which includes Australia. The larva is velvety and bears a band of fleshy tubercles on each segment. The pupa is concave in the centre of the back, broadened at the sides at the wing cases, while its under surface is keeled. Spines occur on the thorax and abdomen. It is possible that the poisonous nature of the foodplant is imparted to the insect, for A. S. Meek has pointed out,<sup>3</sup> "I have never noticed in New Guinea any birds hunting the butterflies, and I think that these gorgeous insects can have no natural enemy. If they had they would all soon be exterminated since their colours are so striking and their powers of escape so very slight".

The Birdwings range from India and Ceylon eastwards to the Solomon Islands

and south-eastwards to northern New South Wales. Zeuner points out that the *Schoenbergia-Ornithoptera*-group, evolved in the Moluccas, Solomons and New Guinea. It has not spread westwards beyond the Moluccas and overlaps with the *Troides-Trogonoptera*-group in these islands only, if one neglects the recent arrival of a single form of *Troides* in New Guinea. Only one species of *Ornithoptera* has spread during the latest phylogenetic stages far and wide over the rain-forest areas of all these isles and of eastern Australia. The distribution of *Ornithoptera* during the earlier stages is discontinuous (Moluccas and Solomons), and the present geographical link, New Guinea, occupied by *Schoenbergia*.

#### THE ORNITHOPTERA-BIRDWINGS.

In the genus *Ornithoptera* Boisduval, the males are black with iridescent green, blue, orange or coppery colours, the golden scales, when present, restricted to the fore portion or submargin of the hindwing. A moon-shaped sex-brand is present on the forewing. The female forewing bears whitish spots between the veins, and in the hindwing veins 2-6 are dark and margined with brown.

The genus includes the *victoriae*-species-group, with which is linked *O. alexandrae* and *O. allotiei*, the *priamus*-species-group, with which is associated *O. aesacus* Ney, from Obi, and a small subspecies-group, *O. croesus* Wallace. Zeuner shows that in *Ornithoptera*,

wing-shape, pattern, shape of the cell of the hindwing and the genitalia of the male, admit of distinguishing two groups: (1) *O. croesus*, *priamus* and *aesacus* (forewings  $\pm$  [more or less] triangular, hindwings small and short), and (2) *O. allotiei*, *alexandrae* and *victoriae* (both fore- and hindwings elongate).

The females do not show such variation.

The first of these, the *priamus*-species-group, includes forms of *O. priamus* Linné, ranging from Ceram to the Admiralty Islands and New Britain, and southwards through New Guinea to New South Wales. The males are usually green and velvet-black on the upperside and green with black markings and golden spots on the underside. The green is replaced by dark-blue in forms from New Hanover, New Ireland, the Solomon Islands and Louisiade Islands. Zeuner states: "Apart from the blue and green shades of the males, differences between

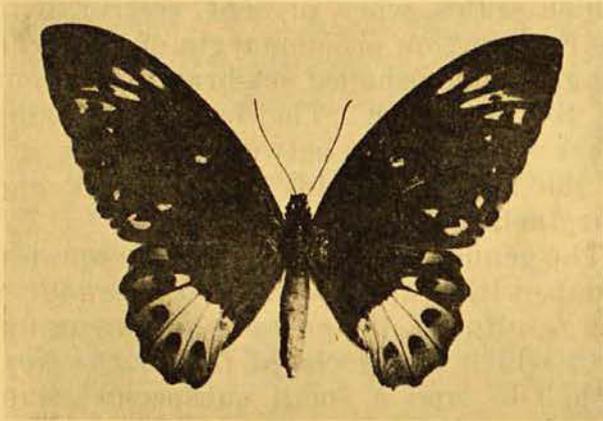
<sup>1</sup>Jordan, K.—In A. Seitz, *The Macrolepidoptera of the World, Fauna Indo-Australica*, Vol. ix (1908-10).

<sup>2</sup>Zeuner, F. E.—*Studies in the Systematics of Troides Hübner (Lepidoptera Papilionidae) and its allies; Distribution and Phylogeny in relation to the Geological History of the Australasian Archipelago. Trans. Zool. Soc. Lond.*, xxv (3), July, 1943, 107-184, tfs. 1-115.

<sup>3</sup>Meek, A. S.—*A Naturalist in Cannibal Land*, London, 1913, p. 144.

most of the races are slight", an opinion also expressed by Jordan.

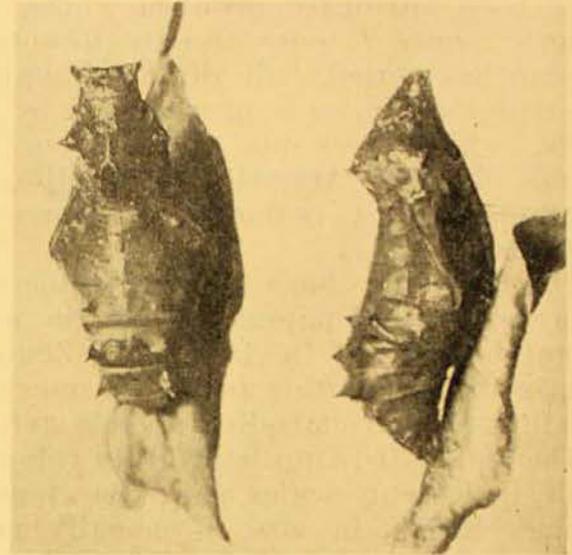
In the Solomons and New Ireland is found *O. priamus urcillianus* Guérin-Ménéville (blue race), whilst the green races, *O. priamus bornemanni* Pagenstecher, from New Britain, *poseidon* Doubleday, from New Guinea and Torres Strait, *hecuba* Röber, from the Kei Islands, and *arruana* Felder, from the Aru Islands, are very similar in general colour pattern. Fourteen subspecies or geographical races of *priamus* have been recorded, of which eight are represented in the Museum collection. The New Guinea Birdwing, *O. priamus poseidon* Doubleday, was first recorded from Darnley Island, Torres Strait, but has



*Ornithoptera priamus poseidon* Doubleday, N.E. Papua. Female. Wing-spread six inches. The dark-brown wings have greyish-white spots and, in the hindwings, these merge into a dingy-yellow about their basal ends.

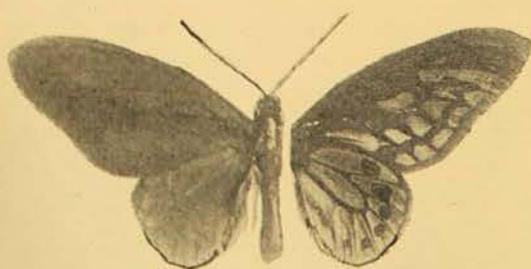
since been recorded from Murray Island and Banks Island and the coastal region of New Guinea. Three subspecies have been recorded from the Australian mainland and these link with *poseidon*, each subspecies occurring within certain geographical limits down the eastern coast. The Cape York Birdwing, *O. priamus pronomus* Gray, occurs on Cape York, Queensland, and the adjacent islands, extending as far south as the Claudie River. The male resembles that of *poseidon* in sometimes having a green streak in the centre of the forewing and the cell veins of the hindwing underside narrowly margined with black. In *poseidon*, in the male, there are large green spots on the underside of the fore-

wing and the green undersurface of the wings is tinged with gold. In *pronomus*, on the other hand, small green spots occur on the underside of the forewing, and the undersurface of the wings is tinged with blue. In this latter subspecies the abdomen of the male is yellow, that



Pupae of *Ornithoptera priamus euphorion*, Daintree River, north Queensland.

of the female grey. The second subspecies from the Australian mainland, the Cairns Birdwing, *O. priamus euphorion* Gray, ranges from Cooktown to Mackay, Queensland, and is not uncommon at Kuranda. This form is somewhat larger than *pronomus*, but in the male there is no green streak in the centre of the forewing and there are seven large black discal spots on the under-surface of the hindwing. The female differs from the other forms in having the pale spots smaller and darker. The male, too, resembles the third subspecies, *richmondius*, in having the cell veins of the underside of the hindwing broadly black. Specimens of pupae sent by Mr. C. H. Hamilton of north Queensland to Dr. G. A. Waterhouse enable me to show the form of a Birdwing pupa. These pupae were secured on the north side of the Daintree River on the sea coast, about sixty miles north of Cairns, Queensland, in November, 1944, on a Tahiti Lime Tree covered with wild *Aristolochia* vines. The pupae varied from  $2\frac{1}{8}$  to  $2\frac{1}{4}$  inches in length. The brownish pupa is golden-yellow in the flattened



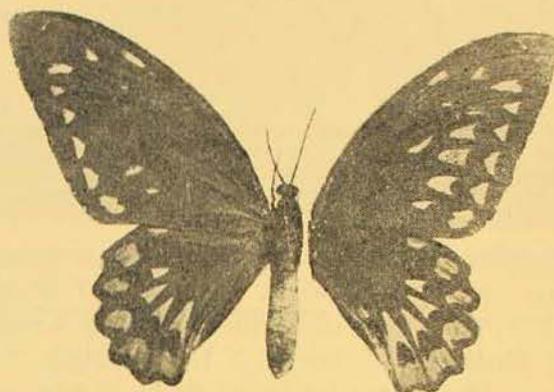
*Ornithoptera croesus*, male. Measures six and a half inches across outspread wings. Batjan.

area in the middle of the body between the eight abdominal spines and towards the back of the head. On the underside it is somewhat lighter in tone than on the upper.

The third Australian subspecies, *O. priamus richmondii* Gray, the Richmond Birdwing, is found from Maryborough, Queensland, to the Clarence River, New South Wales, but, as Dr. Waterhouse has shown, it is now rarely found at the northern and southern recorded limits of its range. It occurs in or near rain-forest areas, chiefly at such places as the Macpherson Range and Tambourine Mt., Q. The author has collected females fluttering around Lantana on the slopes of Mount Warning near the Tweed River, N.S.W. This subspecies is the smallest of all the races, particularly the female, which resembles that of the preceding race. The male has no green streak on the median vein of the upper surface of the forewing.

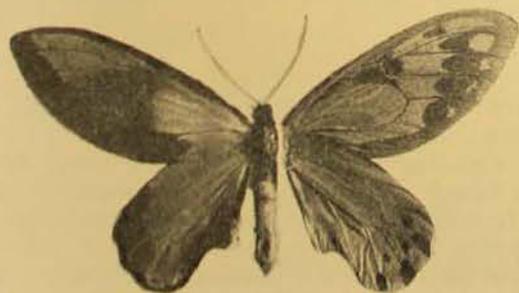
Allied to the *priamus*-group, but getting somewhat beyond the intended geographical range of this article, is the Golden Birdwing, *O. croesus* Wallace, of Batjan, and the subspecies, *O. croesus lydius* Felder, from the neighbouring

island of Halmahera. *O. aesacus* Ney, from Obi Island, south of these islands, completes this small series, of which the males have golden scales.

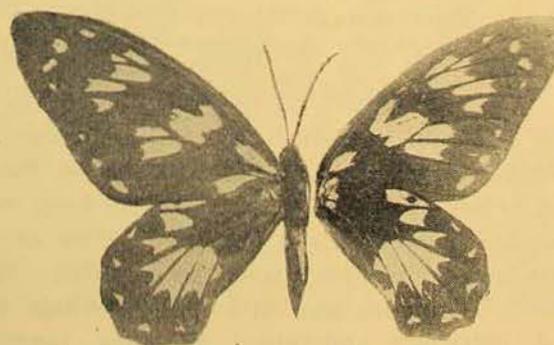


*Ornithoptera croesus*, female. Measures six inches across outspread wings. Batjan.

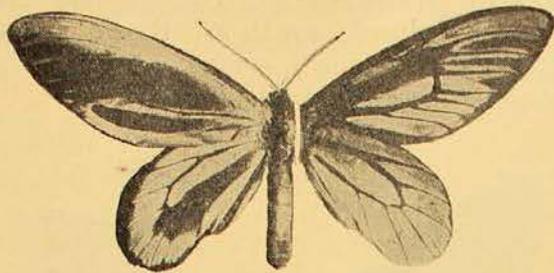
The second species-group of *Ornithoptera*, the *victoriae* Gray, including those forms in which both wings of the males are elongate, is represented by six subspecies from the Solomon Islands. In this group the golden-green scales on the forewing of the male are confined to the base and tip of the wing. The male abdomen is more greyish in colour and there is no red as in the allied *alexandrae* and the *priamus*-group. The various subspecies occur on the different islands of the Solomon Group, namely *regis* Rothschild on Bougainville, *isabellae* Rothschild on Ysabel, *victoriae* (typical) Gray on Guadalcanar, Tulagi and Florida, *reginae* Salvin on Malaita, *rubiana* Rothschild on Rubiana, and *resplendens* Ehrmann on Choiseul.



*Ornithoptera victoriae regis*, male. This butterfly measures six and a quarter inches across the wings. Bougainville, Solomon Islands.



*Ornithoptera victoriae regis*, female. This butterfly measures seven inches across the wings. Bougainville, Solomon Islands.



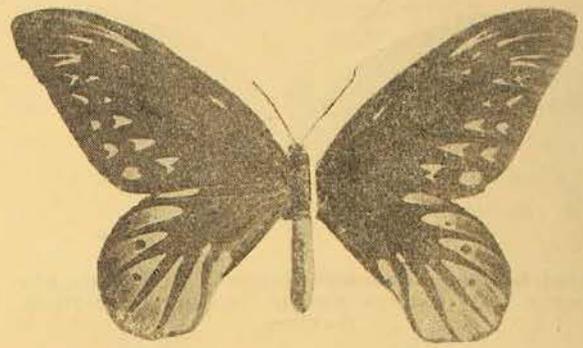
*Ornithoptera alexandrae*, male. Span measures seven and three-quarter inches. Note the long sex-brand near margin of hindwing (upper side), left of picture. North-east Papua.

Linking this group with the *priamus*-group are two species, *O. allottei* Rothschild, from the Solomons, and *O. alexandrae* Rothschild from N.E. British New Guinea, the latter believed to be the largest butterfly in the world. In his book, *A Naturalist in Cannibal Land* (1913), Mr. A. S. Meek describes how, while collecting for the Hon. Walter Rothschild in 1906, he secured the first female of *O. alexandrae* at Biagi, at the head of the Mambare River at an elevation of about 5,000 feet. About a year later he captured the first male at the Kumusi River, Owen Stanley Ranges. It was later named *alexandrae* on account of its similarity to *victoriae*. During his stay of three months he states that he

obtained several specimens of the long-winged *Troides alexandrae*, which measured eleven inches across the wings and were larger than the *chimaera*.

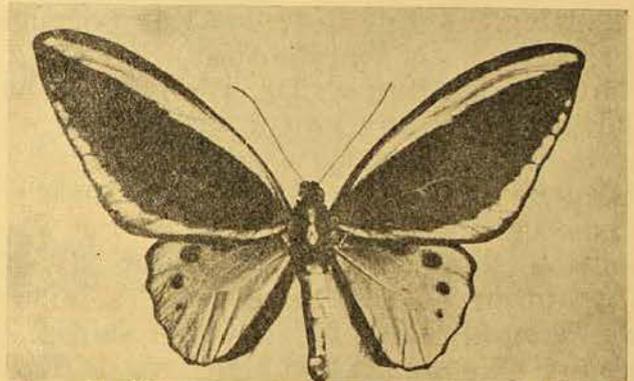
They fly very high, I noted. I also obtained about two dozen larvae of this *Troides*. These larvae varied considerably. The spines in some were all blood-red, with a white saddle and one spine on each side white and tipped with red. Others had spines of orange colour tipped with black and, lower, two rows of pure black. They had eight rows of very long spines, very similar to the larvae of the *Troides victoriae* from the Solomons. The pupae seemed, however, to be no larger than those of the common

The Museum is always seeking specimens of aboriginal arts and crafts from New South Wales to add to its collection. It has been very fortunate in obtaining a splendid series of old specimens during the past six months. Mrs. C. W. D. Conacher and Mrs. Fitzhardinge presented forty-one aboriginal weapons, together with lists of aboriginal words, all of which were collected in the Moree and the Barwon River



*Ornithoptera alexandrae*, female. Span measures eight and a half inches. North-east Papua.

ones. They feed on an entirely different vine to other butterflies. I found the first larvae by accident the first day I reached the hills, and before, even, my camp was made. To my great joy one of the larvae hatched out a



Upper: *Ornithoptera priamus poseidon* Doubleday. N.E. Papua. Male. Wing span five inches. Wings black with lighter parts of green. Abdomen golden-yellow. Thorax black with a green spot in centre.

male of a light, bright blue colour (almost electric-blue), somewhat similar to the *caelestis* of St. Aignan, with black markings.

I measured a larva of this *Troides* and it measured five inches, when lying along the vine of the food plant. This was larger than any larvae of *Attacus hercules* that I had seen. These larvae are very beautiful. The combination of jet velvety black with light ruby spines and broad cream-coloured band across the middle of the body makes a striking contrast.

districts by their father, the late Mr. C. J. McMaster, between 1890 and 1900.

Two smaller series of weapons were obtained by exchange. There are six boomerangs and clubs from Singleton, Hunter River, from Mr. D. Raymond, collected about seventy years ago, and nine specimens, including a shield, a spear-thrower, 2 Lil Lil clubs, and five examples of what appears to be a dancing wand, all from Western New South Wales, from Mr. G. Tennant.