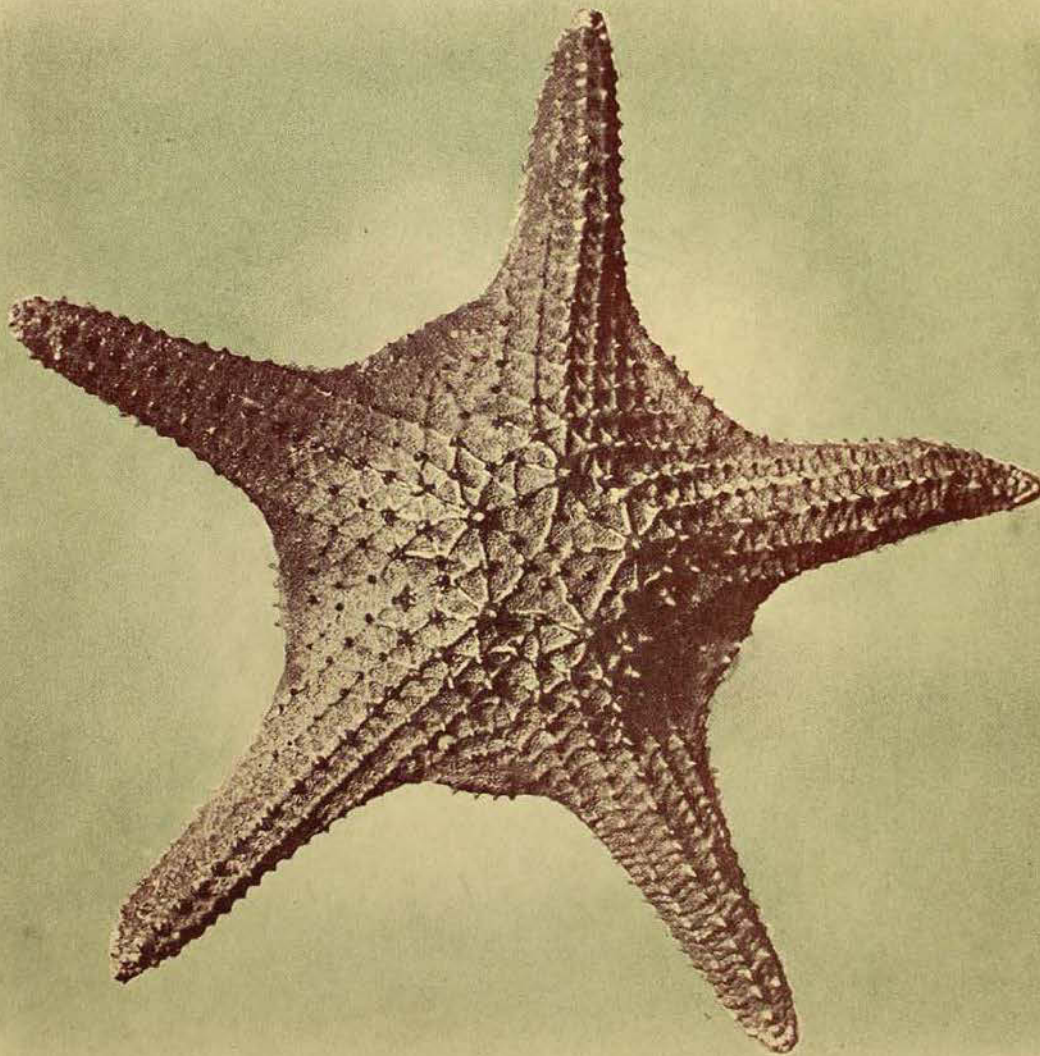


The
AUSTRALIAN
MUSEUM
MAGAZINE

Vol. VIII, No. 5.

JULY-SEPTEMBER, 1943.

Price—ONE SHILLING.



The Ornamented Seastar.

THE AUSTRALIAN MUSEUM

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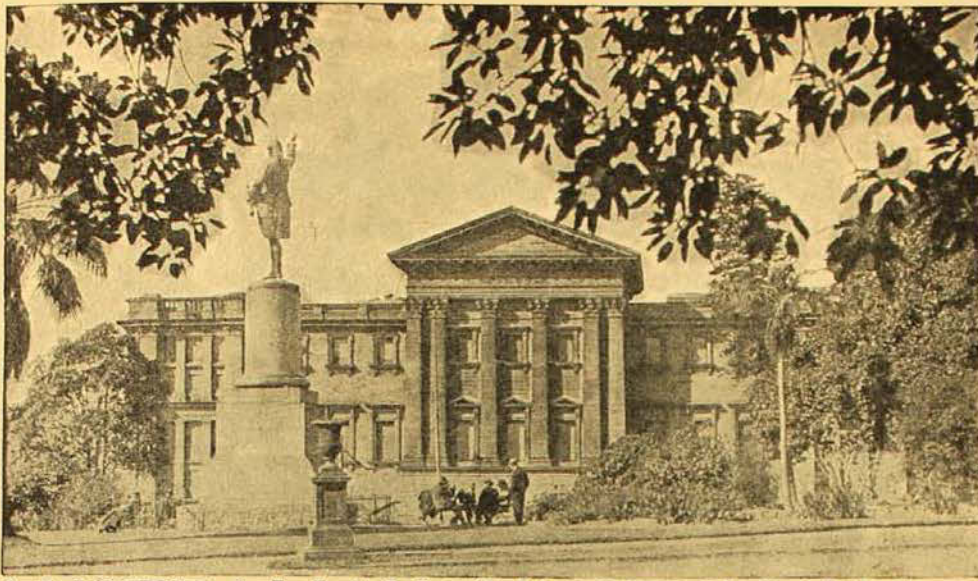
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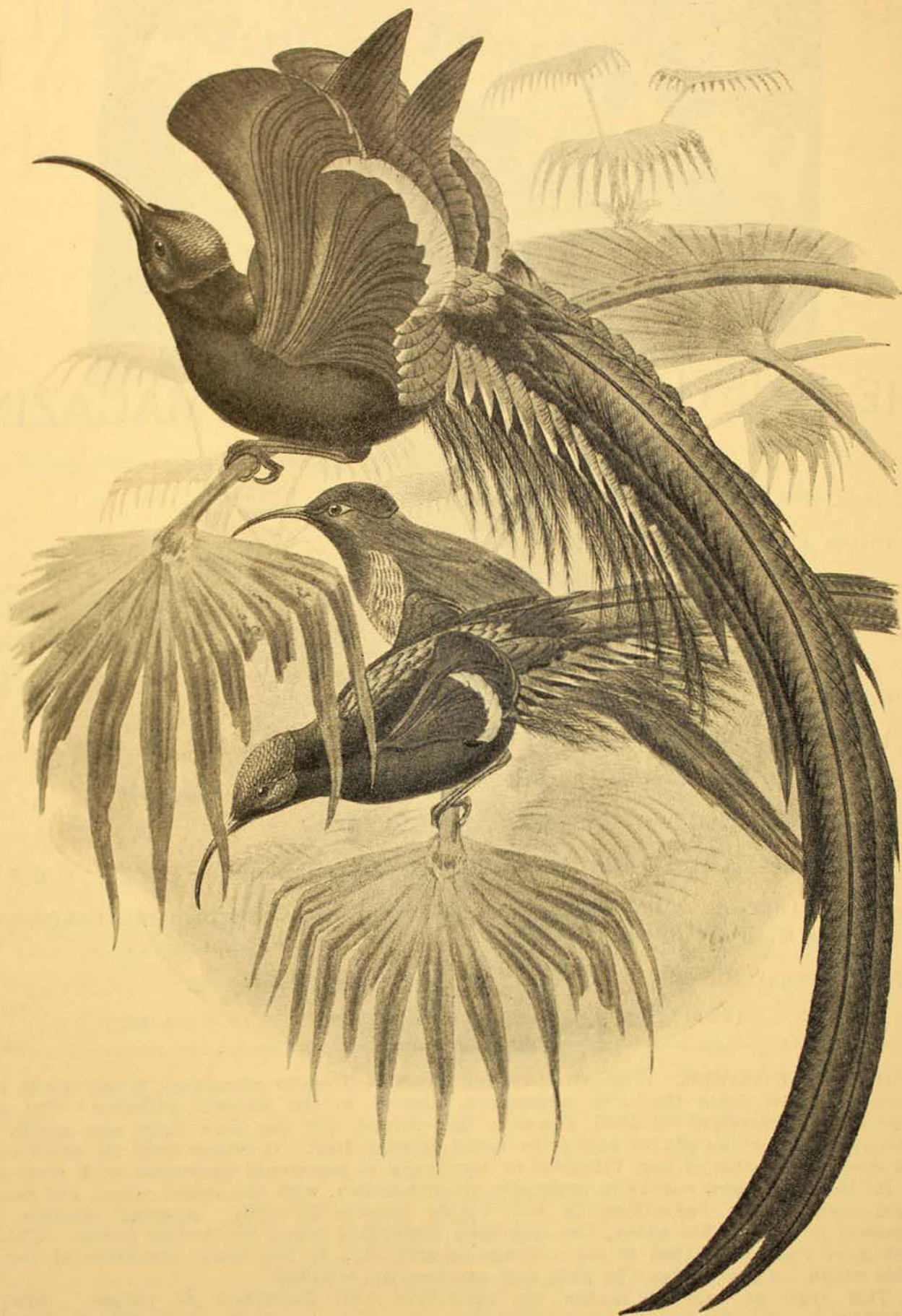
(Photography, unless otherwise stated, is by G. C. Clutton.)

• OUR FRONT COVER. The Ornamented Seastar, *Oreaster alveolatus*, is one of the specially coloured exhibits from the new echinoderm display in the Museum galleries. The specimen illustrated was dredged in Port Denison, Queensland, but the same form also occurs in New Caledonia and various places along the Great Barrier Reef. It ranges from the shallows of reef flats down to depths of ten fathoms or more and is commonly associated with coral growths.

In life the ground colour is generally reddish-brown, with the raised ridges and bumps of a bright orange hue; variations in this colour scheme do occur. Amongst seastars, *Oreaster alveolatus* is a veritable giant, the specimen illustrated being ten inches across. The body is much more rigid than that of the average seastar, due to the heavy structure of the skeletal plates which lie just under the skin and are heavily calcified.

This type of seastar makes an attractive wall decoration or plaque. After proper preservation and drying, colours may be painted on, and the specimen given a life-like appearance. The solid skeleton ensures the retention of the correct shape of the living animal.

Some confusion exists as to the true name of the seastar, and it has been claimed that *Oreaster alveolatus* and *O. australis*, which is more common in north-eastern Australian waters, are in reality two growth phases of one and the same species—*O. australis*.



THE GREAT SICKLE-BILL BIRD OF PARADISE.

This handsome Bird of Paradise (*Epimachus speciosus*) has an overall length of about three feet. It is velvety black, with metallic feathers of iridescent green on the head and middle of the back. On each side of breast are fan-like, sickle-shaped plumes of velvety black, edged with a broad band of steel-blue. Markings of purplish blue and metallic bronzy-green combine to make this one of the most handsome of the thin-billed Birds of Paradise. (See page 148.)

After Gould.

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The Child and the Museum

CHILDREN are naturally interested in all that goes on around them, and in their outdoor life they have the opportunity to develop habits of observation that will stand them in good stead in later life. In encouragement of their interest in all that pertains to the animals and plants the museum can play an important part. Ways in which such a museum service can be developed are admirably described in an account* recently published of such activities in Tasmania. The best results need special officers who have been trained not only in science but also in the teaching of children.

The service may be available in the museum itself or it may be taken to the children in their schools. Even when the museum officer is not able to visit schools, specially prepared cases may be sent on loan, with prepared notes from which the school teacher may give the lesson. This loan service has been used extensively by a number of museums in the United States of America and has proved a very popular type of educational activity, and one to which the children respond.

The importance of making specimens available for the children to handle was shown by the replies to a questionnaire given to 400 children, aged 10½ to 14½ years, in Tasmania. These replies indicated a very decided preference for handling exhibits as opposed to having them demonstrated.

Service to schools rendered by the Australian Museum includes regular series of lectures throughout the school year, attended usually by nearly 300 pupils per lecture, talks to groups of pupils from individual schools, and occasional lectures or demonstrations to teachers. The appeal of the Museum to the children can be appreciated by observation of the crowds of them that visit it during school vacation.

There is a tendency in some quarters to advocate educational activities to the serious restriction, if not exclusion, of research work. This is wrong: the research work of museums is playing an immense part in the present conflict—a fact borne out by the numerous and varying demands made upon them in ever so many directions.

We look forward to the day when we may be able to give full service to the schools which can only come by the appointment of one or more special officers who can give their full time to the improvement of the children's education in nature study.

The appointment of such special officers, with a training in science, to engage in the extension work is essential, and it is equally essential that these should come under the direction of experienced and trained museum officers. The Tasmanian Education Department is to be commended for its realization of this.

* Museum Educational Activities in Tasmania. By J. Somerville, B.Sc., Supervisor of Nature Study, Education Department. 16 pages, 3 plates. 8vo. Hobart, 1943. 6d.

A Paradise for Birds

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

FOR more than 160 years the bird fauna of New Guinea has attracted naturalists from all parts of the world, and those who have been fortunate enough to gain a glimpse of the bird life along the coastal areas have looked forward to the time when they might be able to explore more deeply into the jungles and mountains of the interior.

In most tropical countries the bird life is both abundant and varied, but New Guinea, with its many species of birds of paradise, and the remoteness of some

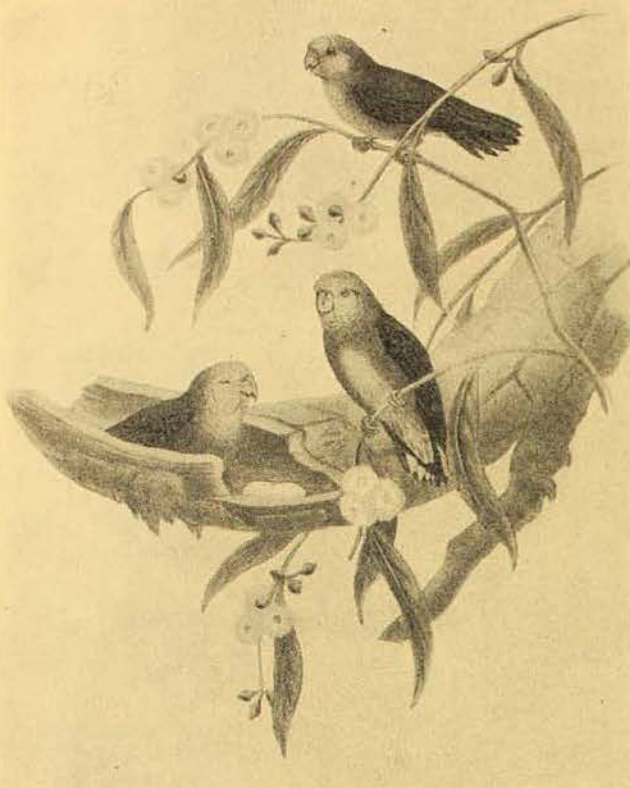
of the rarer and most extraordinary kinds, always will be the focal point for ornithologists.

During recent years, expeditions from American museums and scientific societies have led the field collecting rare and interesting birds, together with much valuable information as to their habits, but in bygone years European, British and Australian museums played a big part in collecting and introducing new species to the amazed ornithological world.

This beautiful Bird of Paradise (*Diphyllodes guillemi tertii*) has an overall length of ten inches. The upper-side, or back, is of varying hues of a reddish colour. The breast is green and this and the violet coloured fans are edged with metallic green. The under-side is violet and the elongated tail-shafts green.

After Gould.





The Pygmy Parrot is about the size of a sparrow. These small parrots are noted for their large bills and the structure of their feet, the outer hind toe being very prolonged. The coloration of this species (*Micropsitta chloroxantha*) is green, the head is yellowish, the middle of the abdomen red, and the tail feathers are tipped with blue, black or yellow.

After Gould.

Some of the earliest explorers and naturalists included the Frenchman Sonnerat, who, in 1771, secured the finest birds of paradise the world had ever seen. Additional valuable collections were made by French naturalists during the explorations of the ship *Uranie* in 1824, and later others in the *Coquille* spent several weeks in north-eastern parts and added considerably to the knowledge of the birds of New Guinea.

About this time the scientific world was realizing the possibilities of extending its knowledge and researches to the Moluccas and New Guinea generally, and there followed a succession of visits by Dutch, German, Italian and Spanish ornithologists to the mountain ranges of coastal areas, thereby adding greatly to the knowledge previously gained. Among the exploration ships that achieved

scientific prominence in these parts were H.M.S. *Fly*, H.M.S. *Rattlesnake*, and H.M.S. *Bramble*.

Towards the latter part of last century British collectors, explorers and missionaries, including Forbes, Goldie and the Rev. Macfarlane, added many hundreds of beautiful and rare birds to the ever growing collections overseas, and then Australia took a hand and, in succession, Messrs. G. Masters, A. Morton and Broadbent, collecting for the Australian Museum, thoroughly combed sections of the south-eastern parts from Port Moresby to the Owen Stanley Ranges, thereby laying the foundation of the present collection of New Guinea birds in this country.

Perhaps the most interesting account of the difficulties to be met with collecting specimens in south-eastern New Guinea, and the Solomons, is that given by A. S. Meek in *A Naturalist in Cannibal Land*. During his wanderings in the year 1898, Meek visited the now famous Milne Bay district and later set out from Port Moresby with sixty native carriers into the Owen Stanley Ranges, passing through, or doing good work in, many of the villages recently visited by Australian troops in their drive through to Buna.

In Meek's days the natives were not so used to the white man as they are today, and at Inawa Village they were greatly alarmed at his approach, having suffered considerable depredations at the hands of the hill tribes, but on learning that his visit was merely to collect birds, they turned to and caught many rare species that otherwise would have been missed. From Inawa he went through tortuous country to Okuma, describing the journey as a switchback, climbing mountains 2,000 feet high only to have to descend on the other side to face another climb. Eventually he reached Bwoiduma, 3,000 feet up in the Stanleys, where he found an excellent climate and helpful natives who collected many birds of paradise for him. Meek observed that these mountain natives were wearing gorgeous head-dresses made from the

New Guinea is the home of the Cassowary, though one species ranges to Australia. There are approximately sixteen different forms. The handsome bird (*Casuarius claudii*) illustrated here is a dwarf species which stands about three feet high (there are taller species about twice this height). The general plumage of the bird depicted is black, but the colours of the head and neck are vivid. Whilst the side of the face is black, between the gape and the ear is a patch of deep plum colour. The upper half of the back of the neck is electric blue, which shades to violet on the sides and forepart of the neck and throat, and below this are patches of orange-chrome and magenta.

After Grönvold.



plumes of several kinds of birds of paradise, more especially the long streaming tail feathers of one of the rarer species known to them as Finema. Other natives were wearing the golden feathers of "Goroworo" or Bower Birds, and the scarlet feathers of one of the gaily coloured parrots. A count of the feathers in one of these head ornaments disclosed that at least twenty-three parrots were sacrificed in the manufacture of each adornment, and yet so plentiful were the birds that the jungle seemed filled with them. The bird collections made by Meek were mainly for British museums, though, by exchange later, some of these were distributed to other museums in different parts of the world. Meek also travelled along the north coast and collected extensively at

Collingwood Bay, and from that district extended his explorations to Buna Bay, collecting quail, cuckoos and fly-catchers along the Kumusi and Giriwa Rivers and the swamp areas apparently a little south of Sanananda Village. From this point he went inland again as far as Kokoda Village, where, unfortunately, the natives killed one of his boy carriers only half a mile from the Government Station. Round about that locality Meek described the bird life as a kaleidoscope of brilliant plumage flashing through the forest.

As the result of past explorations and expeditions in New Guinea, some six hundred species of birds have been made known to science, and of these approximately eighty are birds of paradise, a group of extraordinary and most beautiful birds, closely related to the bower

birds and not far removed from the common black crow.

Whilst there may be comparatively few of these birds in the neighbourhood of Port Moresby today, they certainly were plentiful in days gone by, and the best known was the swamp-frequenting Twelve-wired Bird of Paradise, so called because of twelve wire-like shafts extending irregularly for about eight inches beyond the tail. A close relative of this bird is the Rifle Bird, two species of which are known from Cape York and several from New Guinea.

The very mention of the name Bird of Paradise conjures up visions of those delicately plumed birds generally figured in picture books, and illustrated here as the plumed bird. This species is not alone, for it has very close relatives with golden plumes, others with white, and still more with intermediate variations between red, yellow or orange. It is the golden and the red plumed species that are much sought after for hat adornment, and, before they were protected by law, tens of thousands were slaughtered annually for the world's markets.

Perhaps the most attractive of the birds of paradise is the King Bird, not much larger than a sparrow, with crimson shining feathers on head, neck and entire back, and with a metallic-green band outlined with gold across the breast. But that is not all—the most extraordinary feature is the two wire-like central tail feathers, each ending in a green disk the size of a sixpenny piece. The King Bird of Paradise is very widely distributed throughout New Guinea. It is a mountain form, and is well known in the Owen Stanley Ranges.

The most sought after is Prince Rudolph's or the Blue Bird of Paradise which, until a few years ago, was considered extremely rare. Originally found in the Horseshoe Range, Forbes discovered it at high altitudes in the Owen Stanleys and in very difficult country. Some years ago Mr. J. E. Ward, of Sydney, when collecting living birds for



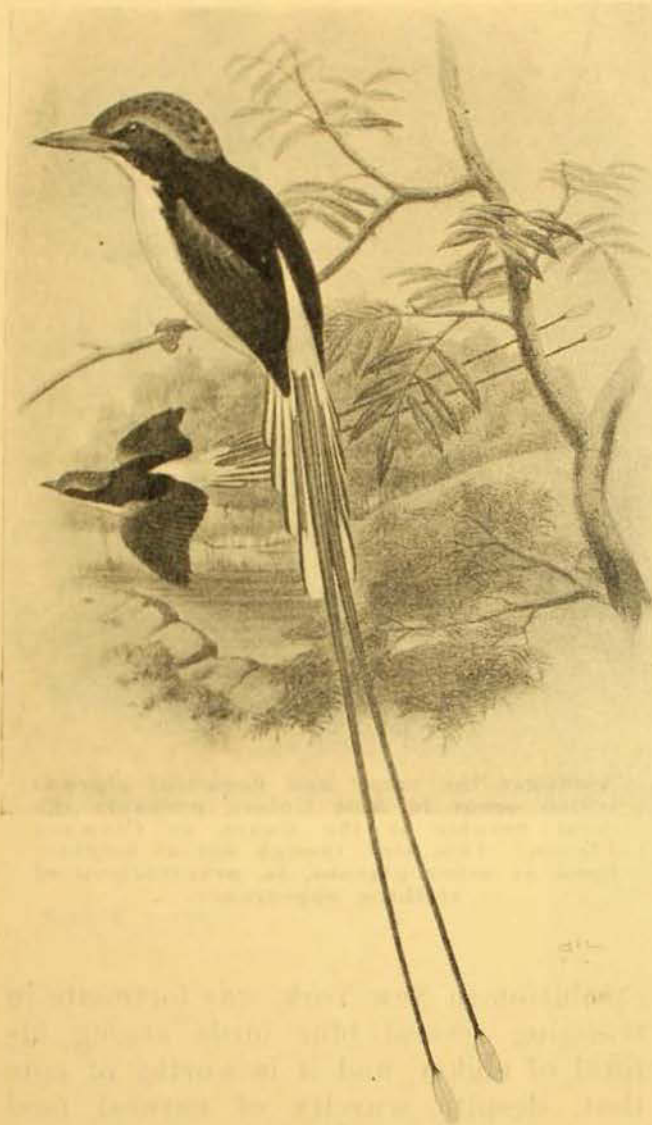
Amongst the many and beautiful pigeons which occur in New Guinea probably the most notable is the Goura or Crowned Pigeon. This bird, though not as brightly hued as other pigeons, is, nevertheless, of striking appearance.

After Finsch.

exhibition in New York, was fortunate in trapping several blue birds among his total of eighty, and it is worthy of note that, despite scarcity of natural food during transportation to the coast, and considerable sickness and fever among his native carriers, the whole eighty birds eventually arrived in New York in a healthy condition.

Some of the most extraordinary of the birds of paradise, approximately the size of a starling, wear a cape of straw-like feathers on the back, a dark green "shirt" front of velvet, and a central stripe of pale blue resembling a tie. Other small birds, wonderfully coloured, but not exactly beautiful, have bare heads "painted" blue, crossed with several narrow lines of black velvety feathers.

A few years ago quite a new bird of paradise was discovered, and it was remarkable for its two white ribbon-like tail feathers, measuring about thirty-eight inches in length. Later this was redescribed and figured in colour in this



The Port Moresby Racket-tailed Kingfisher (*Tanysiptera minor*). This beautiful bird has an overall length of about fifteen inches, the colours ranging from black through varying tones of rich cobalt and blue to white, with a red bill.

After Gould.

MAGAZINE under the name McNicoll's Ribbon-tailed Bird of Paradise.¹

It is quite impossible adequately to describe the beauty of these birds without coloured illustrations, but they may be seen in all their glory in the special group, and other exhibition cases, in the Museum gallery.

It is always a matter of wonder to the naturalist as to why such seemingly delicate birds, with such glorious plumes and sometimes ribbon-like tails, should be

tucked away in the thick forests and jungles of New Guinea, and how they stand up to the tropical rains and general wear and tear of such country.

New Guinea is a land not only of birds of paradise, but of many gaily-coloured parrots, pigeons, pittas or ground thrushes, of honeyeaters, green and scarlet, of fly-catchers, ducks, herons and a host of others. Between east and west, north and south, over six hundred and forty different kinds of birds abound, and these again can be divided into fifteen hundred different forms.

Of the parrot tribe the largest is the black Palm Cockatoo, a bird much larger than our common White Cockatoo, and the smallest is a pygmy parrot, not as large as a sparrow. Between these two extremes in size are many and varied forms, the colours of which are perhaps even more brilliant than those of Australian species.

New Guinea has some very beautiful pigeons, the most extraordinary of which is the Crowned or Goura Pigeon, a ground bird larger than a domestic fowl, slate coloured on the back and under parts, the eye and legs are crimson, and the feathers of the head are long and delicate, standing up form a crest or crown. The most gaily coloured are the fruit pigeons, mostly green with purple caps, and large areas of yellow or purple on breast and abdomen.

One of the best known groups of ground birds are the Pittas or Ground Thrushes, peculiar stumpy-tailed, long-legged, fat birds, varying in colour from black ones with scarlet breasts to rainbow coloured species, which are probably the most brilliant of New Guinea birds.

Bee-eaters and Kingfishers vie with each other in coloration; there are more varieties of Kingfishers in New Guinea than in Australia, the largest being a brightly coloured species which may be regarded as a Kookaburra, but without a laugh, and the smallest a tiny blue bird found mainly along the streams. As with the birds of paradise, the tail feathers of some species are long and ribbon-like, being either white or blue.

¹ Kinghorn: THE AUSTRALIAN MUSEUM MAGAZINE, Vol. vii, No. 4, March-May, 1940, pp. 130-131, coloured plate.

The largest of the New Guinea birds are the Cassowaries, of which there are several species. These birds are very closely related to Emus, but differ mainly by having a large casque or helmet on the head, a bare neck which may be very gaily coloured with crimson, blue and yellow, and a particularly long sharp claw on the inner toe. Cassowaries inhabit the more densely wooded areas, and are shy and inquisitive in disposition. They are

not aggressive birds, and become quite tame in captivity.

Among the six hundred and forty different kinds of birds in New Guinea are families that are found throughout the world, including hawks, owls and eagles, ibis, herons and ducks, honey-eaters, finches, wrens and robins—in fact, all the species that one might expect to make a complete bird fauna. New Guinea is certainly not only a land of birds of paradise, but a paradise for birds.

Review

DIGIT DICK ON THE BARRIER REEF. By Leslie Rees. (John Sands Pty. Ltd., Sydney.) Sq. 8vo, pp. 40, profusely illustrated in colour. Price 2/6.

Mr. Leslie Rees's book, *Digit Dick on the Barrier Reef*, is one of the most delightful Australian books for children yet published. Mr. Rees has done for the animals of the Barrier Reef something of what Norman Lindsay has done for our well-known land animals in his *Magic Pudding*, and he is to be greatly congratulated on his enterprise in pioneering this difficult field. One can tell immediately that Mr. Rees has both seen and understood the lives and habits of the animals of which he writes. Somehow he seems to imbue his animal characters with just the types of personality that suit them. The account of Mr. Crab's sea-party should thrill any small child. It is complete with all the usual trappings of a proper birthday party. The substitution of inflated Toado fish for balloons is quite a brilliant touch. Music is provided by two prawns, ceaselessly playing violins, and anyone who has observed the delicate movements of feeding prawns can appreciate the appropriateness of their occupation. A big sponge growing on the wall of the cave washes Digit Dick's face and hands for him. A sponge that did a song and dance at a sea-party to amuse the assembled company would, we feel, be unconvincing, but Mr. Rees and his illustrator have collaborated to make this particular animal have a definite personality and yet remain natural. There is an account of a fight between ill-mannered hermit crabs over the possession of a shelly home.

While he tells correctly of this habit of the crabs, Mr. Rees yet manages to retain the simple rudeness so common to childish arguments.

Digit Dick also has adventures with many of the larger inhabitants of the Barrier Reef. The giggling Cuscus, the green turtle weighed down by excessive cares of motherhood, the dreaded shark and kindly Currawong are just a few of the animals that find a place in the story.

With regard to the accuracy of the book from the natural history point of view, we can say that Mr. Rees is in the main correct. In view of this, it is unfortunate that the popular error of regarding the whale as a fish should be allowed to creep in. This may seem a trivial criticism, but it is a misconception which we have been striving for years to correct through the medium of school broadcasts or lectures. Walter Cunningham has managed to retain a nice balance between caricature and the correct appearance of the animals he illustrates. So successfully has he done this that any child should be able to recognize, at once, any of the book-characters should they be encountered in real life—no mean achievement in a group of animals so difficult to portray. We must forgive him, therefore, for the one or two slight lapses from correctness in posture or anatomy that may be laid at his door.

Most of these under-sea animals are completely unknown to the average child, and by bringing them so naturally into his story Mr. Rees opens the door to a new wonderland for young children.

E.C.P.

The Shell-Inlay Decoration of the Southern Solomon Islands

By FREDERICK D. McCARTHY

THE southern islands of the Solomon group are the centre of a well developed craft of inlaying shell which is, paradoxically, the product of fierce head-hunting Melanesians in whose life art plays an important role. The islanders renowned for this work live on San Cristoval, Guadalcanal, Malaita, Uji, Santa Isabel, Ulawa, New Georgia, and a few other small islands. The Australian Museum possesses a splendid series of this material, embracing human and animal sculptures, canoes, food troughs and bowls, weapons, staffs and combs.

METHOD.

The preparation of the shell sections involves considerable time and labour. Nautilus, Conus and Pearl shells are cut (formerly within a stone knife) or broken into pieces of the required shape, and these are rubbed smooth on the edges and polished on the inside with pumice stone. The opercula of Turbo and other shells are cut in halves and ground all round the edges to a flat face. The range of shapes includes triangles and double triangles, circles and semi-circles, Z, M and V shapes, crescents, ovals, rectangles, anvils, birds and fish. The edges are serrated or incised with short narrow grooves. Each shape is named as shown in the illustrated set from Rubiana Lagoon, New Georgia.

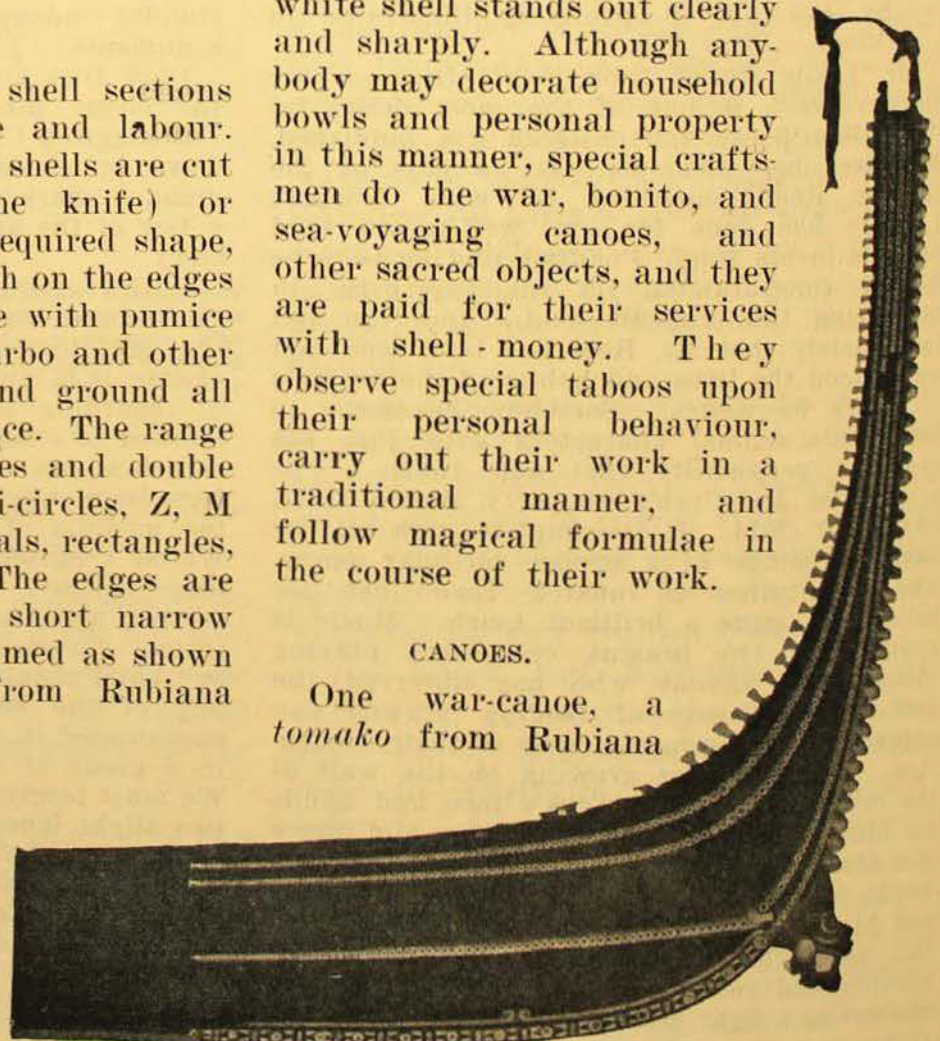
The gum-cement used is a putty compound of the black resin from the *Parinarium* nut, sometimes mixed with red ochre and plant juices for colouring purposes.

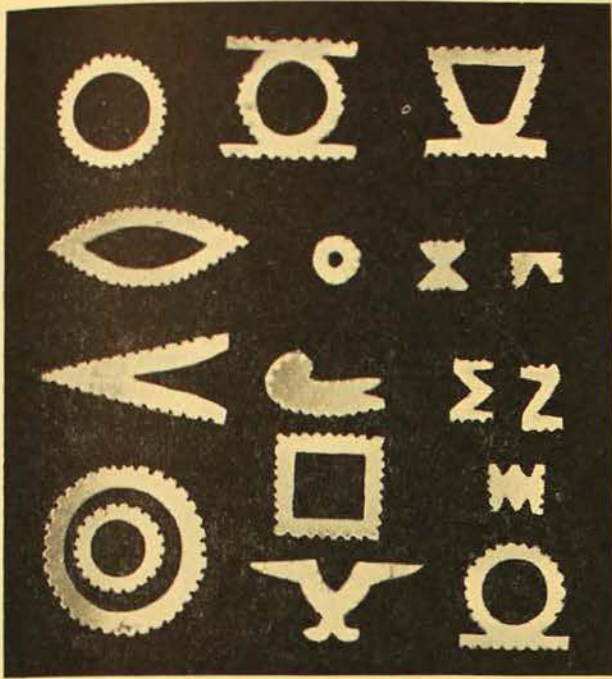
The shell sections are inlaid in straight and curved lines. A trench from half to one inch wide is cut, filled with gum-cement, and the shell-sections are pressed into the latter until level with the wood. The whole surface of the object is then painted with a mixture of *o'a* tree juice and *Parinarium* gum, and against the blackened background the glistening white shell stands out clearly and sharply. Although anybody may decorate household bowls and personal property in this manner, special craftsmen do the war, bonito, and sea-voyaging canoes, and other sacred objects, and they are paid for their services with shell-money. They observe special taboos upon their personal behaviour, carry out their work in a traditional manner, and follow magical formulae in the course of their work.

CANOES.

One war-canoe, a *tomako* from Rubiana

The prow of a large war-canoe from Rubiana Lagoon, New Georgia Island.





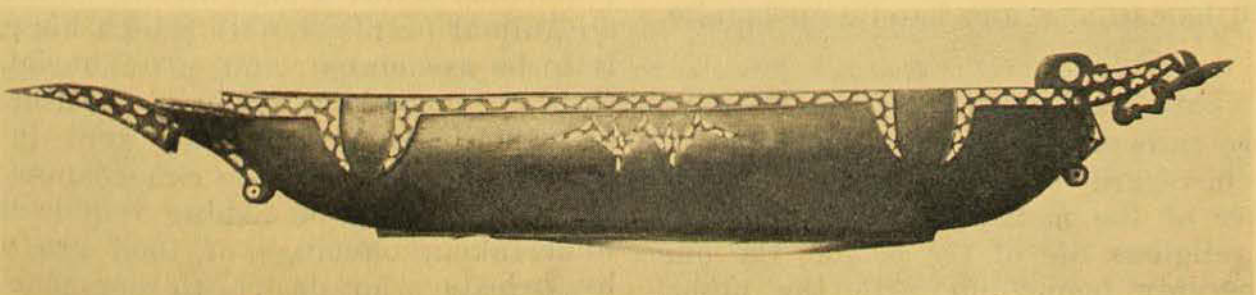
Inlay designs used by the villages of Rubiana Lagoon, New Georgia Island.

Lagoon, is forty-six feet long, with a beam of three feet seven inches, and prow and stern curving to a height of eleven feet. Its black surface is inlaid at both ends in lines following its shape; it bears, in addition, an outer row of *Ovulum ovum* shells and an inner row of serrated pieces of Clam shell on its prow, and a fringe of *Natica* shells, to denote its chiefly status, on its stern. A small human head, mounted at the water-line, represents a deity who provides protection against the evil sea-spirits who can cause high winds to blow and heavy seas to rise to endanger the vessel, or even capsize it so that they may devour the occupants; he guides the canoe safely through reefs and shoals. It is the desire of every chief to own an

inlaid canoe in keeping with his rank and prestige, because it represents the highest value in native wealth, and its design embodies as many as five thousand pieces of shell inlay. A chief, therefore, either has one built in his own village or purchases one from a village renowned for its skill in such work. When the craft is finished and handed over by the builders, it is taken on a gift-voyage round friendly communities to obtain the shell-money to pay for its construction and decoration. In olden days an unscrupulous and powerful chief sometimes obtained a canoe by raiding a village that possessed one to his liking and, to add insult to injury, brought back in their own canoe the heads of his victims as trophies. The people of New Georgia and Ulawa Islands are renowned for their fine canoes. We possess two smaller canoes of this type, each twenty-one feet long, the elaborately decorated bow and stern of another, and one bonito-canoe thirty feet long with unpainted planks; all have raised ends and are inlaid. One bears a series of star-shaped designs within circles. We have also numerous model canoes from two to five feet long, bearing various inlaid designs.

FOOD TROUGHS AND BOWLS.

Attractively decorated food troughs and bowls are used at feasts to hold puddings and other food, some of which is cooked in them by placing a succession of hot stones among the food. The larger troughs, of which we have three, are from three to ten feet long and up to two feet high. On the finest one the frigate-bird



A wooden trough twelve feet long from San Cristoval Island. It is used as a container for food at feasts.

holds in its beak a porpoise with a man's legs, the feet rest on a second bird's head, and a third bird is carved down the end of the trough.

On the majority of our smaller specimens the frigate-bird is holding a porpoise; on others it holds a bonito, groper or shark. The head and wings of the bird are on the lip of the bowl. On one a series of four birds' heads are joined together and linked to the tail of a porpoise held by the main bird above; it rests upon a base in the form of a fish. On some bowls is only a bird's head pointing downwards. The tail forms the other end of the bowl, and beneath it on almost all specimens is a reversed and highly conventionalized bird figure, but on one a normal bird is suspended below the tail. One bowl is in the form of a rooster, with comb and lugs on the head, and four arched tail feathers. The bowls are from fifteen to thirty-five inches long.

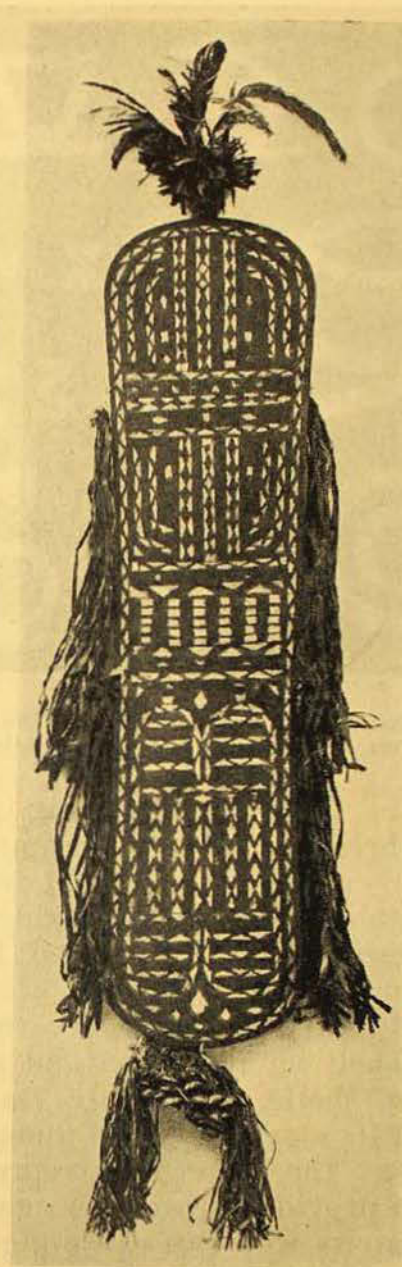
The beautiful pose of the bird, as though it were floating on water, and the graceful curves of the associated fish, display an appreciation of form and composition unusual in the art of Oceania. There is a perfect combination of the utilitarian bowl and sacred motifs, and even though stylization has intruded, the naturalism of the fish figures in particular is notable.

Another type of bowl is in the form of a model canoe. One has a porpoise projecting from each end of the base; another has a long slender fish like a barracouta attached to each side and a bird's head capping each end. Each of these is two feet long. Many of the smaller oval and round bowls, and several long platters, used for household purposes, have inlaid edges. A cup has an inlaid human arm and hand as a handle.

INSPIRATION.

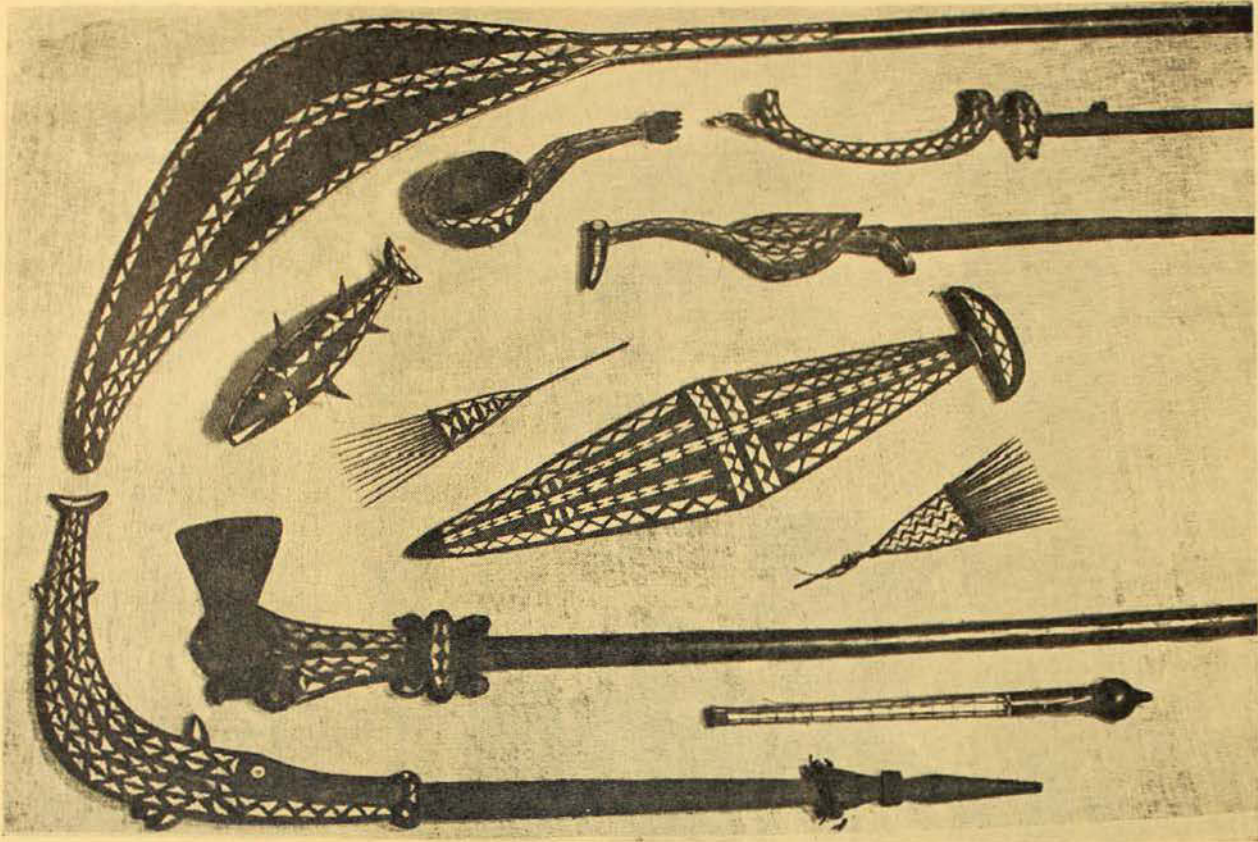
Two cults¹ are of outstanding interest, both in regard to the meaning and significance of the motifs and in the social and religious life of the people, the one inseparably bound up with the other.

¹ Codrington, R. H.—The Melanesians, Their Anthropology and Folk-lore, 1891.



A dancing shield from San Cristoval Island.

Both are expressive of the ancestor-worship which is the religious theme of the Melanesians. In the southern Solomons, before a man dies he nominates an animal or plant with which his ghost is to be associated, and, after burial, his skull is placed in a model of the fish, bird or other creature. It is kept in his family's house or in the canoe-house, and when a hunting or fishing trip is to be undertaken, offerings of food are made by priests who desire to persuade the ghost to use his *mana* or magical power to ensure the success of the expedition.



This group comprises the following objects: top—club; second row—bonito, cup and two flying-fish floats; third row—two combs and a club; fourth row—hafted metal axe and chief's baton; bottom—dancing wand.

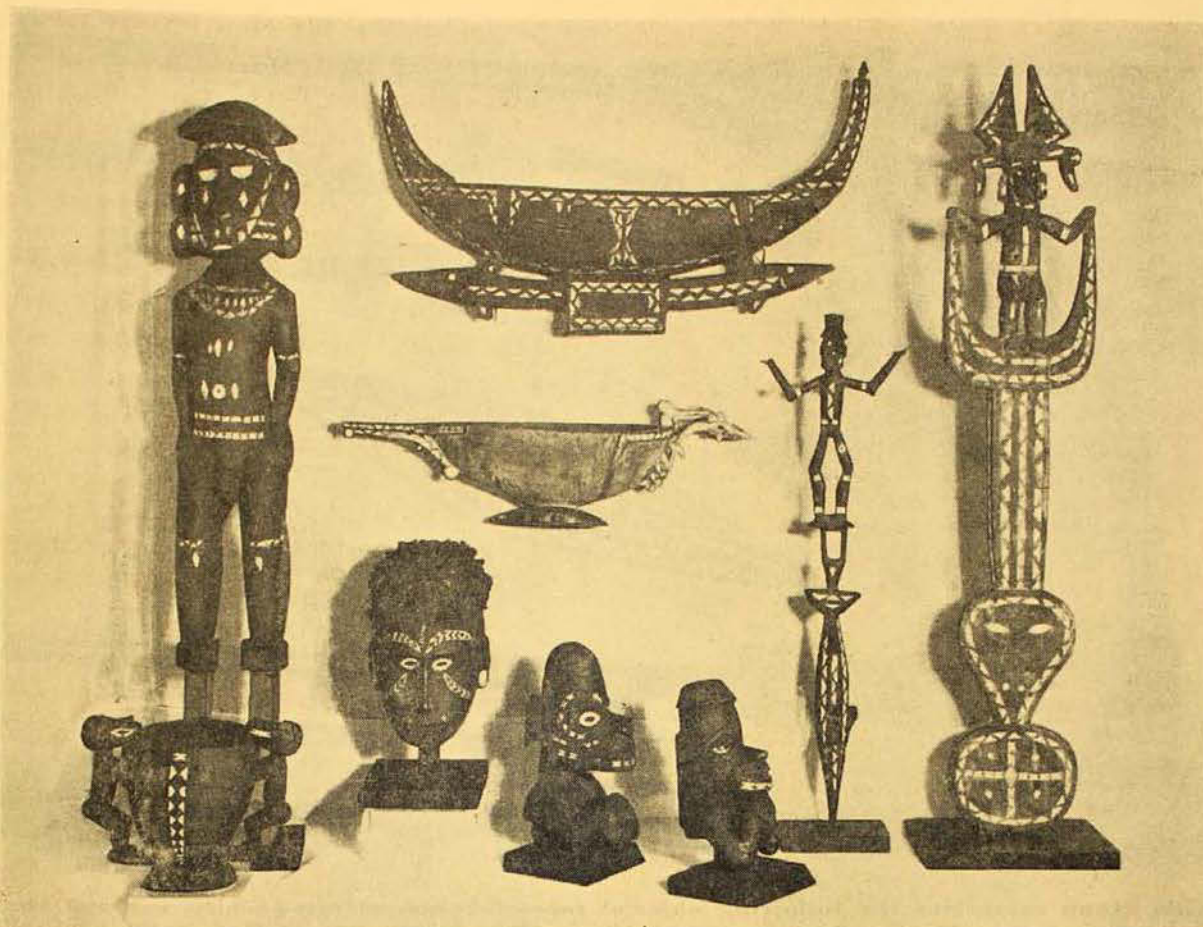
Herein lies one inspiration for the sculptures of animals. Secondly, the paramount importance of bonito-fishing has resulted in all of the associated fish and birds becoming sacred; thus the circling of the frigate-birds, sea eagles, and kittywakes is a warning of the approach of the schools of fish, and they become, together with the sharks and swordfish that feed upon the bonito, the hosts of the ghosts of successful fishermen and chiefs. With the aid of these ghosts, the people seek to control the movements of the fish. Faithful and life-like sculptures of the hosts are made, some large enough to form coffins of the dead men. We have two composite specimens from San Cristoval. One, three feet long, is a man standing on the tail of a fish which is joined to a disc, and there is a bird's head on each side of his head. The other, two feet long, is a delicate carving of a man in dancing posture, with arms upheld, linked to the tail of a dolphin, a mammal greatly feared

and never killed. There are also in our collections several figures of bonito, from one to three feet long, from Uji and San Cristoval.

The figures of other fish upon which social value is placed express the aesthetic talents of Solomon Island craftsmen. The most notable of these is the flying-fish, a wary shy creature caught with a V-shaped toggle at the end of a line attached to weighted wooden floats set in regular series. Their tops are carved, and the highly conventionalized birds and fish on some of them form a striking contrast to the life-like carvings of the animals associated with the bonito cult. In the collection are figures of barracouta and lampreys up to three feet long. Features of the body, such as the fins of fish and the wings of birds, are denoted by lines of inlay.

HUMAN FIGURES.

Two well proportioned male figures from Uji in the collection are three feet



On the left is a human figure, and on the right two others combined with fish. In the middle are two food bowls. Below, from left to right, are a food bowl, a human head prepared as a warrior's trophy, and two canoe-prow deity heads.

high and inlaid on the face, body and limbs. The sculpturing is notable for the series of flat or slightly convex surfaces which meet in rounded ridges on both body and head. The forehead is flat, the nose is raised, while the eyes and mouth, which is at the end of the chin, are denoted by pieces of shell. The hands rest on the hips, and the legs are flexed forward. A similar art style is embodied in the heads of victims of head-hunting raids, which are kept in the men's clubhouse; the flesh is removed and replaced by clay and gum-cement, and the face is inlaid. Our three specimens are from Rubiana Lagoon.

Canoe guardian spirits are carved in a different style. The domed or conical head curves down to the face which is projected outward to an extraordinary degree, like that of a dog. In the majority the chin rests upon the two hands clasped together, but one has the latter an inch

below the chin. The nose is prominent, the large mouth has flat lips, and the chin is rounded. They are from three to eight inches high, and are from Rubiana Lagoon.

A small bowl ten inches wide, from San Cristoval, has on each side a human figure with the dog-like face and flexed legs, and their remarkably long arms reach round each side of the bowl to an inlaid band. On the human figures lines of shell are inset on forehead and cheeks, curve from one to the other, or form a line round the lower jaw. Ear pendants of ring-like form are shown.

One of the finest inlaid carvings represented in the collection is that of a crocodile holding a pig in its mouth, each carved in a perfectly realistic manner, but the size of the small pig is out of all proportion to that of his saurian killer.¹

¹It is regretted that photographs of this and other fine specimens are not available at present for illustration.

WEAPONS AND OTHER ARTICLES.

Curved clubs from San Cristoval and lozenge-shaped clubs from Malaita have inlaid blades, and these are in the form of a gracefully posed porpoise on a light dancing club. One shield bears a neat line pattern on its blackened surface, and another one has a human face embodied in its intricate design carried out in red, black and white. A large

series of metal axes obtained by the natives from traders are mounted on inlaid handles. The chief's batons have a small stone encased in plaited grass bound on one end, and their slender shafts are covered with parallel rows of pearl shell sections. The combs are decorated with triangular and bird-shaped sections of shell, and form attractive head ornaments for dusky belles at festival time.

The Hopping or Jerboa Marsupial-Mice

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

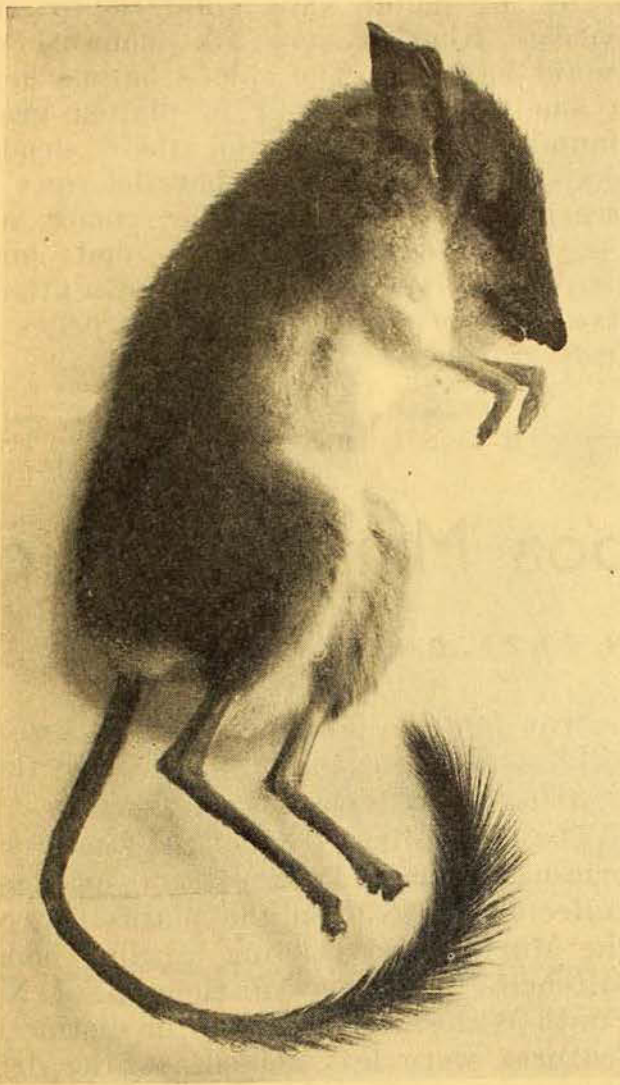
A FEATURE of the publicity concerning the capture of a jerboa-marsupial in the Nyngan district, central New South Wales, has been the general lack of knowledge regarding the habits and relationships of the smaller pouched animals. The recent "discovery" was persistently called "*the jumping mouse*", although there are numbers of hopping-mice and marsupials with which it might be confused. There was also a general tendency to classify small mammals by their hopping abilities, regardless of their ground- or tree-haunting habits.

Actually, furred animals in many parts of the world have independently evolved the hopping action which has moulded an outward similarity of form, such as in the jerboa rats of Africa and Asia, the kangaroo rats of North America, and the Australian hopping-mice of the genus *Notomys*. As everyone knows, however, the hopping adaptation attained its greatest variety within the single marsupial family of kangaroos, as explained elsewhere in this issue. The main interest of the jerboa-marsupial is not concerned with its relative rarity, but with the fact that it provides yet another extreme example of adaptation for hopping action in a distinct marsupial family (the *Dasyuridae*), which includes many

narrow-footed hopping species which differ mainly in lacking a brush on their relatively shorter tails.

The jerboa-like genus of the family was originally made known from specimens collected in 1836 on the plains between the Murray and Darling by Sir Thomas Mitchell, first Surveyor-General of New South Wales. Apparently, the distinctive features were less evident in the dried skins as no description appeared until 1856, when Gould named the species *laniger* in his *Mammals of Australia* in reference to the somewhat "woolly" nature of the long fur. The species was based on one of the Mitchell specimens presented to the British Museum. The next record was provided in 1865 when Gerard Krefft, a former Curator of the Museum, wrote of a pair obtained by the natives of Gol Gol Creek, on the Lower Murray.

The female, which had a well-defined pouch with young attached to seven of the ten teats, was fond of meat and promptly attacked some terrified mice placed in her box. Blacks of the Lower Murray failed to capture others for a good reward, saying that the species was strictly nocturnal and therefore rarely seen. Their name "Kultarr" was also used for the climbing Brush-tailed Phascogale, of the same family, which



Hopping or Jerboa Marsupial-Mouse (*Antechinomys laniger*), recently caught in a log near Girilambone, New South Wales. The strong tail-brush distinguishes it from other narrow-footed hopping mice of the same marsupial family. The tapered snout, with eight tiny incisors above, immediately distinguishes it from the non-marsupial or true hopping-mice, which have brushy tails but blunt snouts with paired rodent incisors.

possibly explains Gould's error in depicting the terrestrial jerboa-marsupial on the branch of a tree.

The larger species, *Antechinomys spenceri*, described in 1906 from British Museum specimens, was named in honour of Sir Baldwin Spencer, leader of the Horn Expedition which obtained them at Charlotte Waters, and from Missionary Plains, further north in the central region. In *Across Australia* Spencer tells of sitting quietly out on the stony plain near Charlotte Waters one bright moon-

light night and watching one of the quaint creatures leaping about. Evidently curious, it occasionally ceased hopping and eyed the intruders, tip-toeing on absurdly stilt-like legs, with the body almost erect, and the tail arched upwards so that it was not actually touching the ground. In comparison with size, the space covered when hopping was remarkable, and its movements were so rapid as to be followed with difficulty; perching erect on a stone, it would then leap away "in a flash" for at least six feet.

It is difficult to realize the actual advantage of the extreme hopping adaptation in small marsupials which could run for cover as readily as the numerous native mice of the central region. Evidently, the chief advantage is that tiny mammals are not so easily pounced on by their larger fellows or birds of prey when moving erratically in leaps and bounds, which are so helpful in securing their own swift-moving insect food.

An exaggerated idea of the rarity of *laniger* has arisen from a misconstruction of my statement that it had not been recorded from *the original locality* for about seventy years. It is notable that Gould's description referred to lack of habit notes because of its mainly nocturnal activities, and rarity of observation has been confused with the idea of extinction. Two of Mitchell's original specimens are in the Museum, and others were received some fifty years ago from Condobolin and Nyngan. The specimen recently taken by Miss Margaret Mankin from a hollow log at Welbury, near Girilambone, is therefore of special interest as confirming survival of the species in the central region of the State. More recently, a credible report of personal observation of the jerboa-marsupial in the Mudgee district has been supplied by Mr. William Plows, and a young specimen from the Byrock district was received from Taronga Park Zoo, where it was taken by a Service man returning from leave, who preferred to remain anonymous.

Collecting and Preserving Insects and their Allies

By A. MUSGRAVE

(Continued from last issue.)

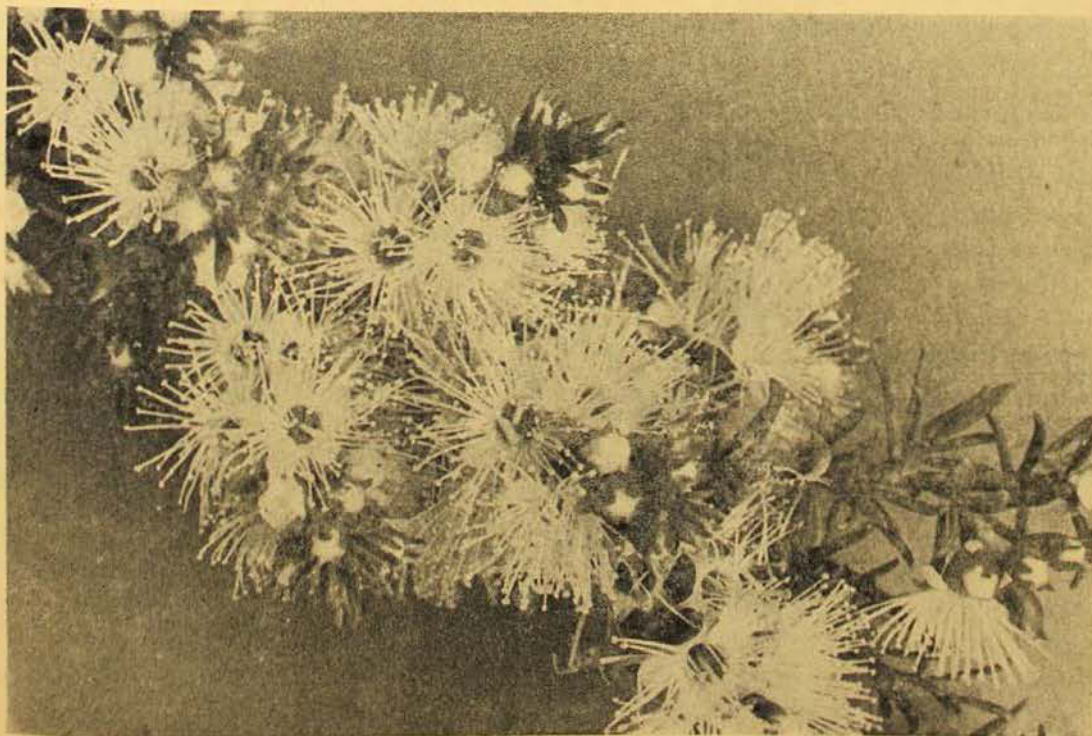
PRESERVING AND SETTING.

Appliances.—Pins, Kirby, Beard & Co. (entomological), No. 3, 19 or 20. Setting boards, various widths. Tracing paper or "Cellophane" and "Lillikin" pins. Cotton on pins, or bristles set in a pinned piece of cork. Setting forceps. Cabinet or case for setting boards. Bristles or dried grass stems (for dragon-flies). White Bristol-board. "Seccotine." Poly-porous pith. Store boxes, 17" × 12", 14" × 10", or entomological cabinets. Flaked naphthaline, crushed moth balls or paradichlorbenzene. Jar with damp sand for relaxing.

Pinning.—On removing the dead insects from the killing bottle or from the tins or boxes in which they have been temporarily housed, we next proceed to pin, mount or set the specimens. If the insects have hardened, they will need to be relaxed (see below).

Pinning calls for care, since a certain technique is involved and many insects are extremely delicate. *Entomological pins* should be used, and these are of two styles, British (Kirby, Beard & Co.) and Continental, these last-named being longer and more slender than the British pin and possessing a rounder head. Kirby, Beard Nos. 1, 2, 3, 4, 5 white (silvered) or black (japanned) are used for large to medium insects, while Nos. 19 and 20 are employed for small insects. The pins are numbered according to length and thickness. No. 3 is the Museum standard pin, but this is too small for some very large insects, being only 33 mm. in length.

Insects are not all pinned the same way; moths, butterflies, flies, wasps and many others are pinned through the thorax, plant bugs are pinned through the scutellum, and beetles through the upper part of the right wing-cover



The Tick Bush, *Kunzea ambigua*, grows to a height of about seven feet. The narrow leaves are in clusters. It flowers in the Sydney district during late spring and insects attracted by the strong odour of honey come to visit it.

Photo.—
A. Musgrave.



The Tea Tree, *Leptospermum flavescens*, may reach a height of six feet. Its creamy-white flowers are a feature of the Sydney bush during November. It occurs also in Queensland and Victoria.

Photo.—A. Musgrave.

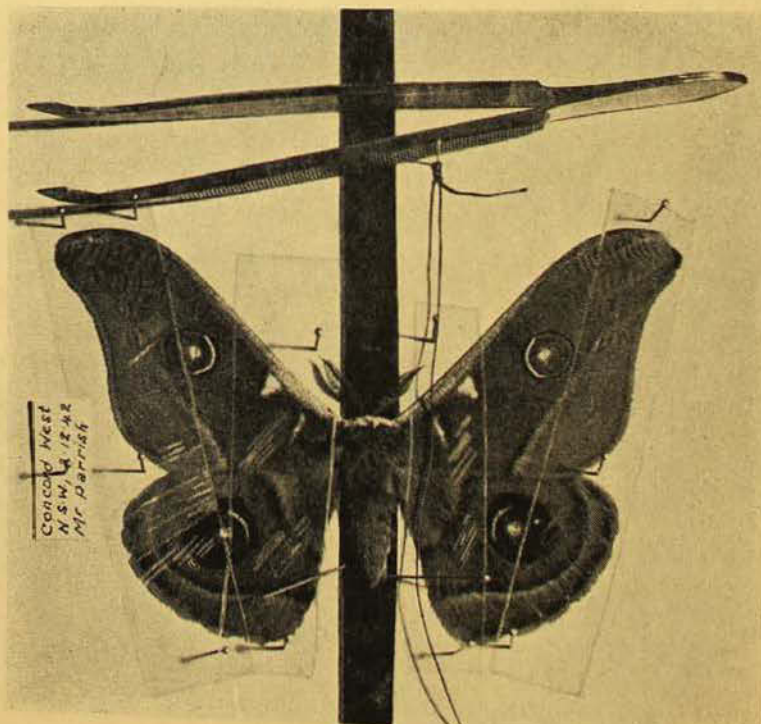
(elytron). It is advisable to keep the specimens at about the same height on the pins—that is, about a quarter of an inch from the head of the pin.

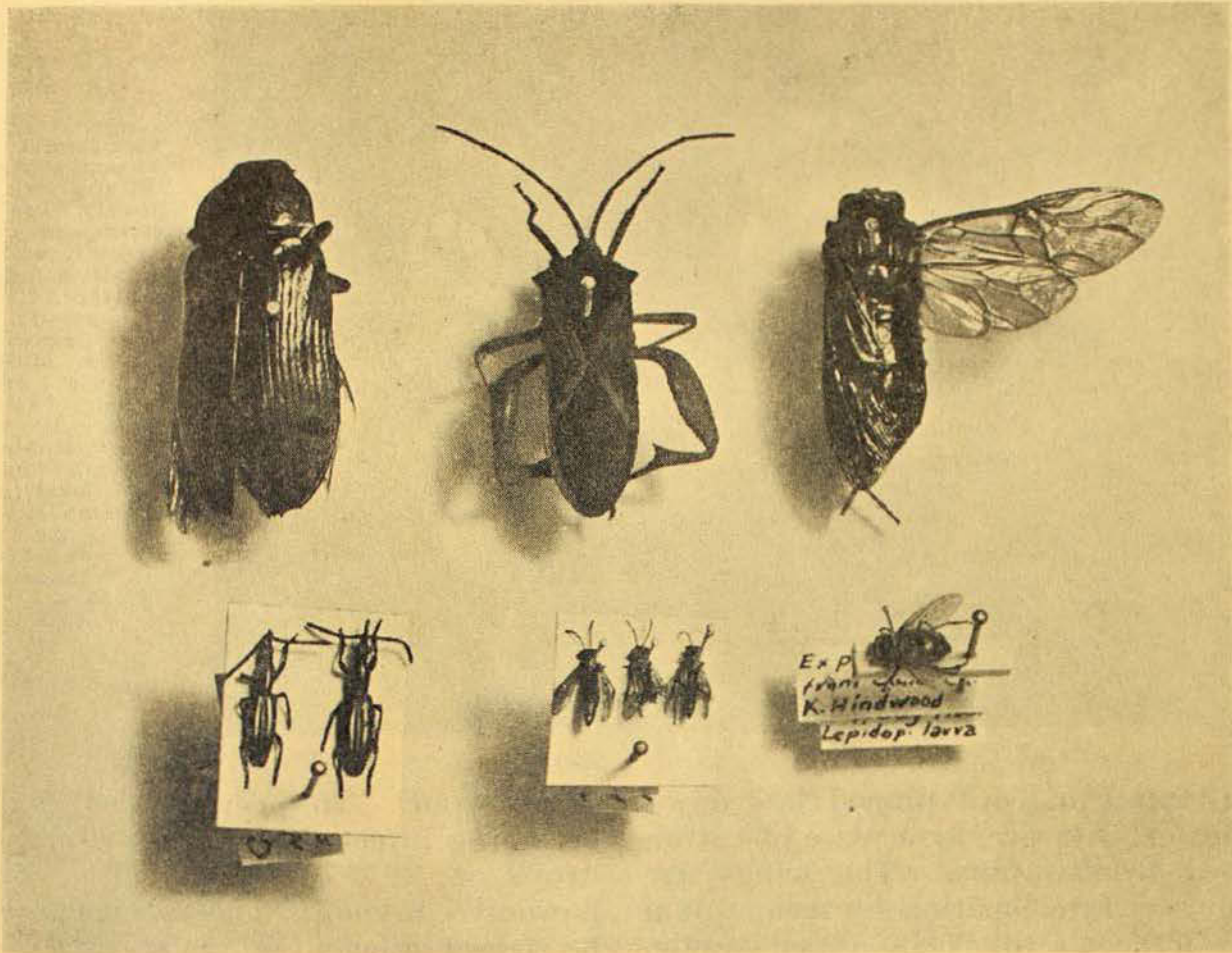
Carding Specimens.—Insects too small to be pinned directly into the store-box or cabinet are carded. Small bugs, beetles and other hard-bodied insects may be fastened on to a piece of card with "Seccotine" or similar adhesive with the legs arranged neatly so as to show the characters. Small flies and other delicate insects may be impaled on a No. 19 or 20 entomological pin and then pinned at one end of a piece of Bristol-board or a piece of polyporous pith. A No. 3 pin is inserted at the other end of the card or the pith and the specimen brought up to the required height.

Labelling.—A small label with the usual particulars, *viz.*, locality, elevation, date of capture and collector's name, as well as any other information of value, may be attached to the pin beneath the specimen. These labels may be written in india ink with a mapping pen or printed in a very small type, such as pearl or diamond.

Setting.—Winged insects, such as butterflies or moths, dragon-flies, ant-lions, mayflies, grasshoppers, and cicadas,

Emperor Gum Moth on setting board. Showing setting forceps; piece of cotton for holding setting down wings; strips of cellophane held in position by office pins; also label with particulars.





Methods of Pinning Insects.

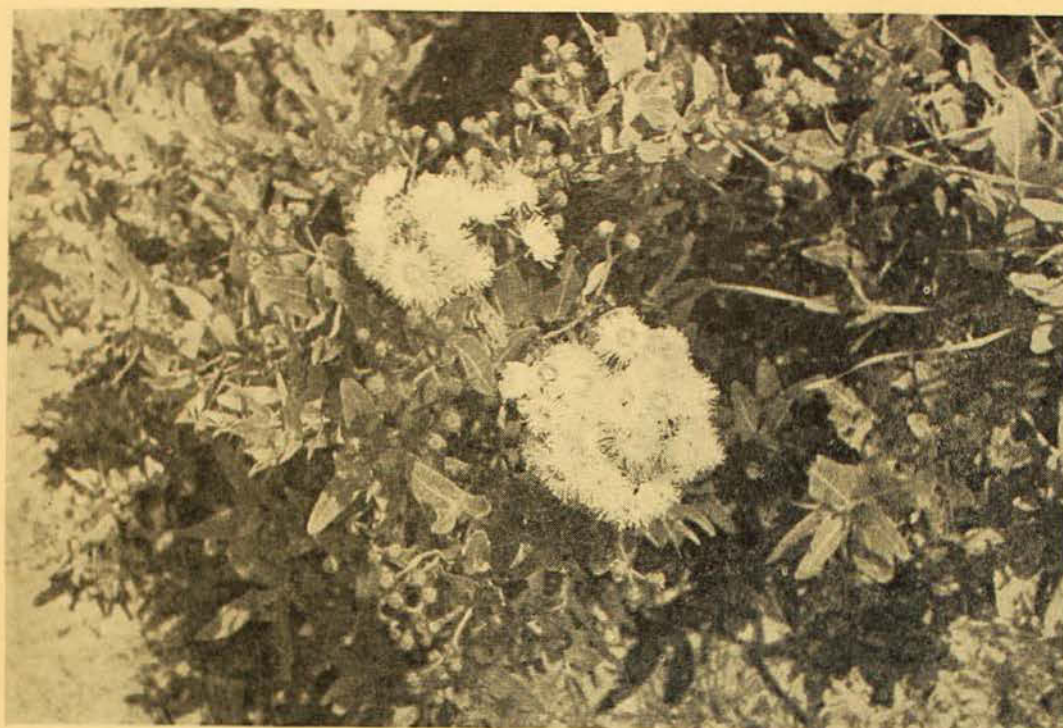
Top row (left to right): Beetle pinned through right wing cover; bug pinned through scutellum; sawfly wasp pinned through thorax.
 Bottom row (left to right): Carded beetles; small wasps pinned; fly pinned on polyporus pith and then mounted on larger pin.

are set on a setting-board with the wings spread out flat. Sometimes, in order to conserve space, only the wings on one side of the body are set. Setting-boards may be bought from a dealer, or they may be prepared by anyone with a little skill. Three sizes are in general use in this Museum, and the measurements are given below:

For large insects:	Length.	Breadth.	Height.
Base of setting-board (3-ply)	12"	6 $\frac{1}{4}$ "	$\frac{3}{16}$ "
Pieces (2) of pine or redwood	12"	2 $\frac{9}{16}$ "	$\frac{5}{8}$ "
For medium sized insects:			
Base of setting-board (3-ply)	12"	3 $\frac{3}{4}$ "	$\frac{3}{16}$ "
Pieces (2) of pine or redwood	12"	1 $\frac{3}{4}$ "	$\frac{11}{16}$ "
For small insects:			
Base of setting-board (3-ply)	12"	1 $\frac{1}{2}$ "	$\frac{3}{16}$ "
Pieces (2) of pine or redwood	12"	$\frac{9}{8}$ "	$\frac{5}{8}$ "

The two pieces of pine or redwood in each case are glued so that they parallel the outer sides of the 3-ply base. This leaves a groove between them in which a strip of cork or suberit (cork material) is fastened. Strips of the same material are then glued along the pine strips and a piece of white paper glued to the surface of the cork. The boards are then ready for setting.

In setting butterflies and other insects the setting forceps should be used to test the wings to see if they are sufficiently relaxed by gently opening them between the wings. The insect is pinned through the thorax and then placed in the groove of the setting-board. The forceps assist in bending the wings gently down until they rest flat on the corked surface. Here, if small, they are temporarily held in position by a bristle passed through



The Dwarf Apple, *Angophora cordifolia*, grows abundantly on the sandstone about Sydney and may attain a height of ten feet. Its opposite, sessile, leathery leaves, red flower buds and large creamy-white flowers make it readily recognizable. The flowers are at their best early in December, when they are visited by many kinds of insects.

Photo.—
A. Musgrave.

a small piece of cork pinned low down on a pin or, if larger, by a piece of cotton attached to two pins. The wings are then guided into position by means of a pin or a needle stuck in a pen-handle. The wings should be so arranged that the hind margin of the forewing is at right angles to the axis of the body; the hind-wing is then drawn forward until its anterior margin is covered by the hind margin of the forewing. The wings are covered and held in position by means of strips of "Cellophane" or tracing paper pinned close to the wings by means of short office pins ("Lillikin" pins). The abdomen is supported by means of pins crossed beneath it and the antennae are held in position by pins. To set a dragonfly, a bristle or a piece of fine dried grass stem should be cut to about the length of the body, the end sharpened and inserted just below the head and pushed through the abdominal segments almost to the end of the body. Insects are left on the boards for about two to three weeks. Labels with all particulars must be placed beside each specimen on the board.

Relaxing.—Dried insects such as those in butterfly envelopes may be *relaxed* by placing them in a tin or jar containing

damp sand. To prevent the specimens becoming infected with mould, add a few drops of 10% carbolic acid or a little powdered thymol. The specimens should be raised above the moist sand. They remain in the jar for 12 to 48 hours.

Mould.—This is an ever-present problem in tropical countries, and, even in southern Australia, care should be taken to see that the bodies of the insects are dry before packing, or that they are not stored in a damp place. Insects found to be affected may be painted with a mixture consisting of a pinch of thymol in benzene. Collectors in the tropics would be well advised to employ one of the following mixtures suggested by the British Museum authorities² for treating the inside of store-boxes:

Corbet and Pendlebury's mixture: The constituents, which are mixed as indicated, are powdered naphthaline (6 parts), chloroform (1 part), Beechwood creosote (1 part), petrol (4 parts). These should be mixed gradually as follows: 1½ parts of naphthaline to 1 part of chloroform, then add 1½ parts of naphthaline and 1 part of Beechwood creosote; stir well. Then add the remaining 3 parts of naphthaline and the petrol to increase the bulk. Stir the mixture thoroughly both before and while it is being used. As this mixture is of an inflammable nature due precautions must be

²J. Smart: Instructions for Collectors. No. 4A. Insects. Brit. Mus. (Nat. Hist.), p. 141, 1940.

observed, and it should be kept in an airtight bottle.

British Museum mixture: Flake naphthaline is added slowly to a quantity of chloroform till the latter is saturated. An equal bulk of creosote is then added and the mixture kept well stoppered. Both these mixtures are applied in the same way, and both dry up and leave a deposit of naphthaline and creosote in the box which prevents the development of moulds and the attacks of insect pests.

Greasy Specimens.—Many large-bodied moths are prone to become discoloured with *grease* which corrodes the pins and stains the paper in the cabinets. These insects, as soon as they are killed, should be treated by opening up the abdomen and removing the body contents. Powdered magnesia is then placed inside the body; later this is removed and replaced with enough cotton wool to fill the cavity in a normal manner. The insect can then be set. Greasy specimens may be dipped in petrol and then covered with powdered magnesia which, when dry, may be blown off.

Insect Pests.—Museum beetles (*Anthrenus*) and book-lice (*Psocidae*) are the major pests in collections in colder climates, while in the tropics the tiny red Singapore Ant (*Monomorium*) is a serious problem. Powdered naphthaline or moth balls act as a deterrent, but paradichlorobenzene, though not so long-lasting, is more effective. Any pests found in the collection may be destroyed by means of bisulphide of carbon (highly inflammable) or carbon tetrachloride.

PRESERVING SOFT-BODIED SPECIMENS.

Such soft-bodied insects as termites, book-lice, bird and animal lice, fleas, bat-parasites, and silverfish are usually killed and preserved direct in 75% alcohol or methylated spirit. The larval or caterpillar stages of moths and butterflies, the grubs of beetles, the larvae of wasps and flies may also be killed in the same preservative unless it is proposed to try and bring them to maturity. The structure of the majority of insects is hard (chitinized) and this makes preservation a comparatively simple process.

Centipedes, millipedes, scorpions, spiders, ticks and mites, which occur in similar places to insects, may also be preserved in 75% alcohol or methylated

spirit. These animals are more or less soft-bodied and their characters are lost when allowed to dry. O. Lundblad, an authority on *water mites*, recommends the following formula for preserving these small animals: glycerine 5 vols., water 4 vols., glacial acetic acid 1-½ vol.

All bottles or tubes containing spirit material should be labelled, the information being written in pencil on cartridge paper and placed in the bottle with the specimens. If the specimen is a parasite (tick or mite), the name of the *host* should appear on the label. Sometimes it may be desirable to collect the host for purposes of identification, in which case a *register number* may be attached to the host and the same number noted on the spirit label with the parasite; the particulars are then written up in the *field register* (which may be an exercise book reserved for the purpose).

Packing Specimens.—Material to be sent to a museum should be carefully packed. Pinned specimens in store-boxes should be cross-pinned to prevent heavier insects from breaking loose and causing damage. Boxes containing *pinned or unset specimens* should be packed with at least an inch of packing inside a wooden box or cardboard carton. Packing may consist of crumpled paper, wood wool or wadding. *Material in spirit tubes* may be packed all around with cotton wool or crumpled paper placed inside a box and then packed into another box as in the manner of insects. Some collectors prefer to remove the corks and plug the tubes with wads of cotton wool soaked in alcohol and place the tubes in large screw-topped jars. Cotton wool is put inside the jars to prevent the tubes moving and then the jars are placed with packing in stout wooden boxes and the lids screwed down.

If the specimens are destined for the Australian Museum, they should be labelled: "Natural History Specimens Only. Fragile", and addressed to "The Director, Australian Museum, College Street, Sydney". Small packages should have the address and stamps on an attached luggage tag to prevent damage to the package from the post office cancellation stamp.

Lobster or Crayfish?

By ELIZABETH C. POPE, M.Sc.

A FREQUENTLY recurring query at the Museum is "What is the difference between a lobster and a crayfish?" Widespread confusion seems to exist over the name of our local table delicacy, for on menus it is called a lobster, while in the Commonwealth Year Book and other official publications the name used is "Spiny Lobster (Crayfish)". As a result some people refer to the product of the local fisheries as lobsters, while others call them marine crayfish, and a haunting doubt remains as to which is the correct title. Are two types of edible, lobster-like crustaceans caught, or is there only one to which two names have been applied?

The names lobster and crayfish are not, however, synonymous, and we shall see that there are important differences. As in many similar tangles over the application of popular names to local animals, we have to turn to the Old World to find out what the original lobsters and crayfish were like. We find that the confusion has arisen because the local animal was first given the name "lobster" probably just because it was edible and came out of the sea and the name seemed suitable; in reality the local form should have been related to the marine crawfish of the Old World. The wrong name lingers and the newer, correct one has not as yet come into wide use. The correct name



The Southern Marine Crayfish (*Jasus lalandii*), the most abundant of its family. The front pair of limbs carry no nippers.

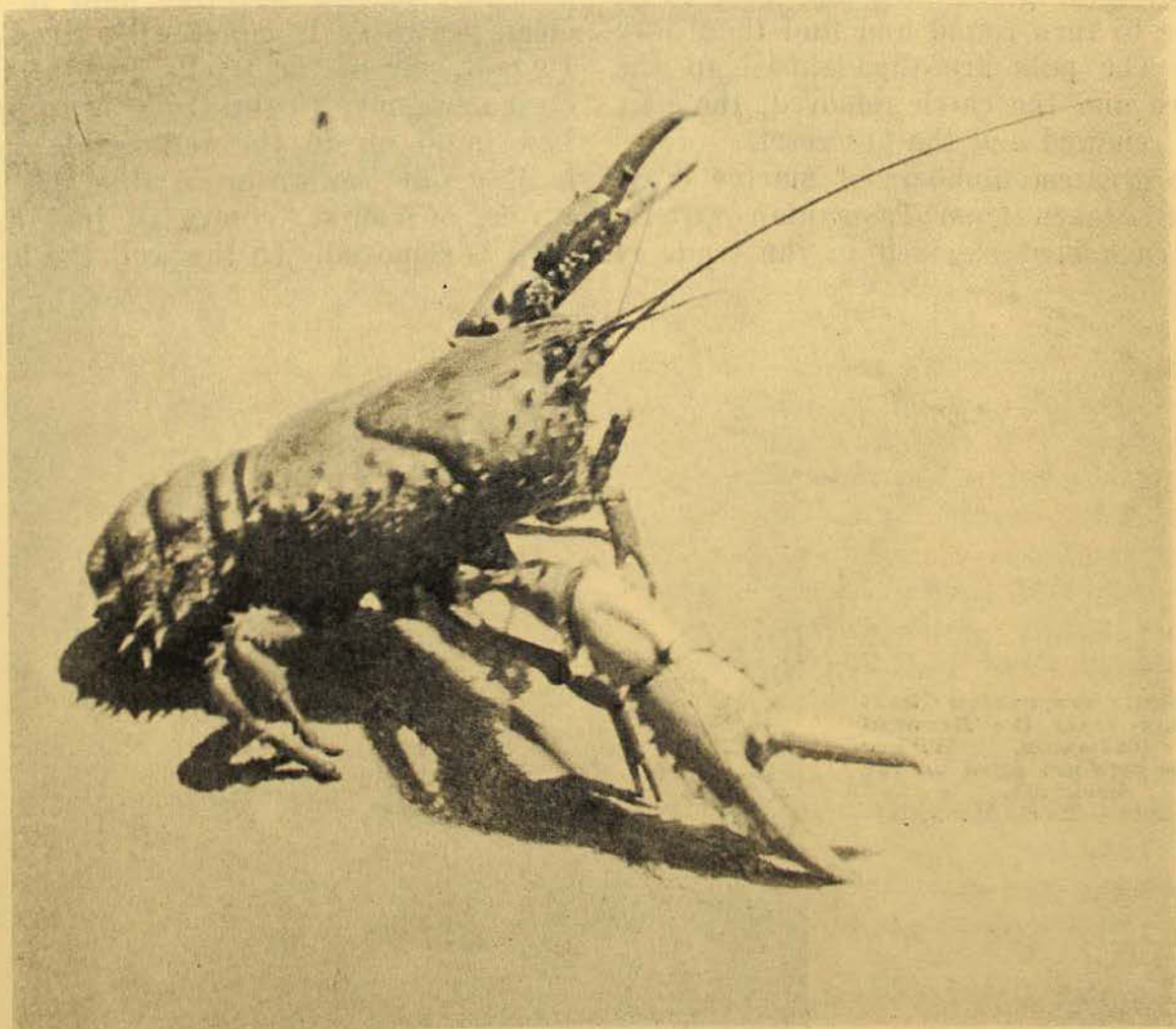
will, in time, oust the older one, but at present both are current.

In England the common, large, edible crustacean of the lobster type is the Sea Lobster (*Homarus gammarus*). Its front pair of walking legs are modified and greatly enlarged, each carrying a relatively huge pincer. In addition to the Sea Lobster, a large marine crayfish (*Panulirus vulgaris*) is also taken in European waters. This crayfish is the familiar "langouste" of the French coasts. It inhabits as well the shores of the Mediterranean Sea and the coast of Britain and Ireland. This marine crayfish lacks the large nipper-limb and its front pair of walking legs have nothing remarkable about them, being similar in structure to the succeeding ones. The characteristic which distinguishes the lobster would appear, therefore, to be the possession of the pair of giant nipper-limbs.

An examination of our local table delicacy reveals that the two front legs are of the ordinary walking type, and there is no semblance of a pincer-limb. It should thus definitely be grouped with the crayfish type of the Old World. In fact, the English marine crayfish and the Australian Marine Crayfish belong to the same family group.

The Sea Lobsters of Britain and also those of America find their closest relatives in the Australian fauna in the freshwater crayfish or yabbie, which also has enlarged nipper-limbs in place of the first pair of walking legs. A still closer relationship exists between the British and American sea lobsters and the freshwater crayfish of those countries. It is as if one of their freshwater-living forms had changed over and become a denizen of the marine world.

In the southern hemisphere there are no true marine lobsters; their place is



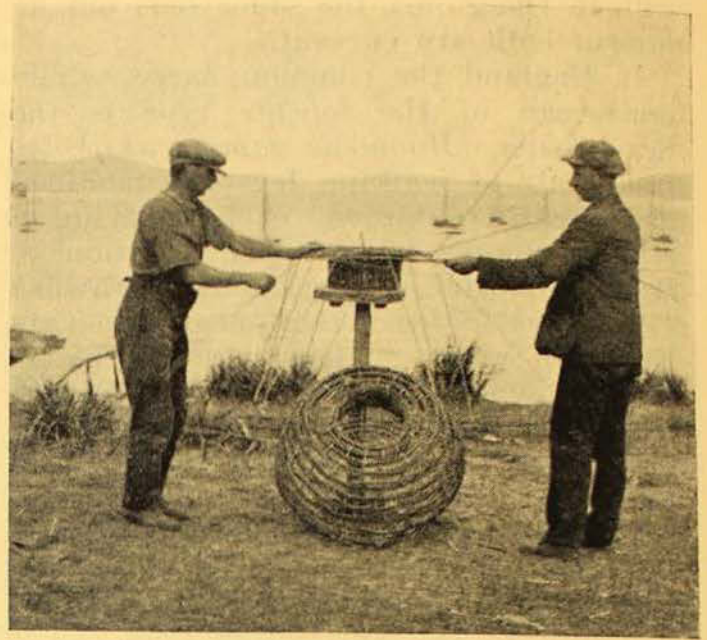
The Freshwater Crayfish or Yabbie (*Euastacus serratus*) carries prominent pincers on its first walking legs comparable to those of the Sea Lobster of Europe.

Photo.—Cpl. L. White.

taken by the various kinds of marine crayfish which support lucrative fisheries in South America, South Africa, Australia and New Zealand. In fact, the whole population (287 persons) of the island of Juan Fernandez, of Robinson Crusoe fame, depends almost wholly on the marine crayfish industry for its livelihood. Australia too is exceedingly fortunate, for it possesses good supplies of this much fancied seafood. As many as 13,000 dozen crayfish may pass through the fish markets in one year, and the income from the fishery is always round about the £23,000 mark in a normal year.

The method used here for capturing the "crays" is to set out wicker-work traps, "lobster pots", near rocky reefs which lie a short distance offshore. The baited wicker trap is lowered, sometimes to a depth of eighty fathoms or more, and a glass or cork buoy floats on the surface to mark the spot. Crayfish climb into the pot seeking the bait, but seem to be unable to turn round and find their way out. The pots are then raised to the surface and the catch removed, the bait being renewed and the pot reset.

The greatest numbers of marine crayfish are taken from Tasmanian waters. Here each boat engaged in the trade is



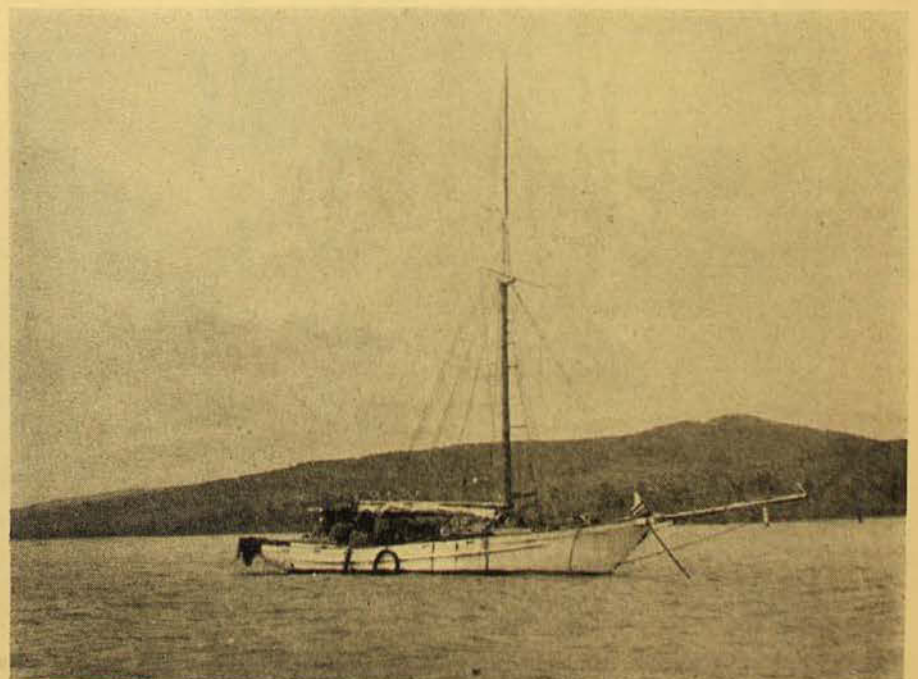
Construction of a crayfish pot. Material used is cane or the stems of other pliable coastal shrubs, reinforced with wire.

Photo.—T. C. Roughley.

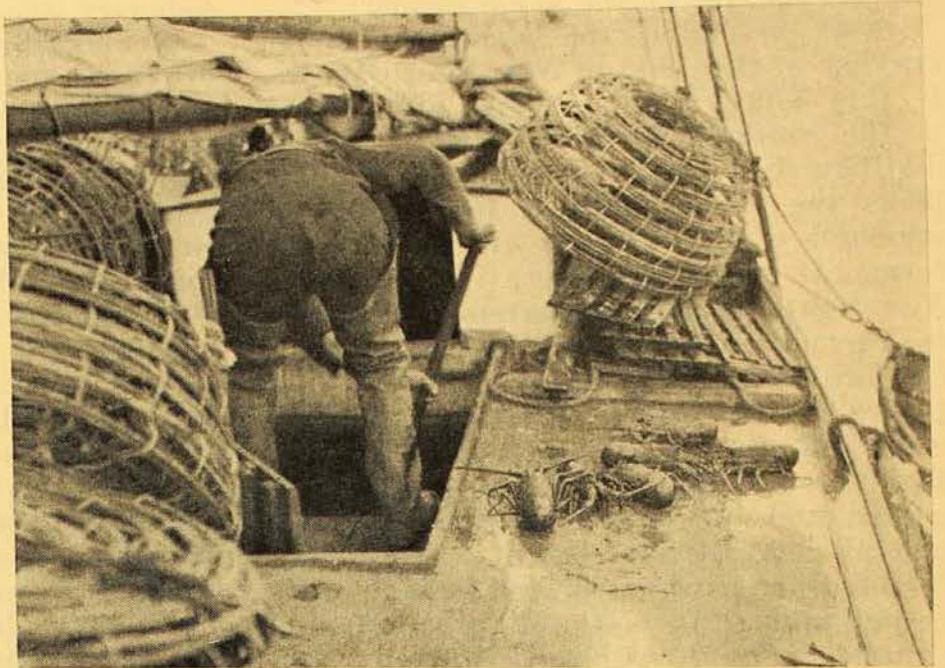
provided with a well-like hold in which clean seawater is constantly circulating. In fact, one of the tricks generally tried on a newcomer to the trade is to put the new hand on to the impossible task of bailing out the water in this well. The water, of course, comes in just as fast as it is removed. In the well the lobsters

A typical crayfishing boat operating from the Derwent River, Tasmania. Wicker crayfish pots are piled on the deck aft.

Photo.—T. C. Roughley.



Fishing out a few crayfish from the well-hold of the boat. Crayfish are easily damaged when dead and the keeping of them alive in the well guards against this.
Photo.—T. C. Roughley.



can remain alive till packing operations begin.

The southern marine crayfish, *Jasus lalandii*, is fished off Tasmania. The most abundant marine crayfish in the world, it is the one which mainly supports the great fisheries of the southern hemisphere. Only occasionally is *Jasus lalandii* taken along the New South Wales or Victorian coastlines, for it much prefers the colder, more southern waters of Tasmania. In 1909 an interesting attempt was made by the Commonwealth Director of Fisheries, H. C. Dannevig, to acclimatize this species to the warmer, northern waters of New South Wales. Sporadic specimens were, even then, taken occasionally in traps set off the coast as far north as the Sydney region, and Dannevig hoped to increase the supply by releasing thousands of young larval lobsters which would thus grow up accustomed to the local conditions and, in turn, would produce young. His experiment has failed, for although many of the transferred individuals have actually survived, the numbers of the species available off this part of the coast has not been significantly increased, and the predominant form in



In port, crayfish not immediately required for market are kept alive in partly submerged, wooden cages.
Photo.—T. C. Roughley.

local catches is still *Jasus verreauxi*, another species of the same genus.

Jasus verreauxi, the common marine crayfish of the coast of New South Wales, is very similar in size and appearance to the southern form *J. lalandii* and is distinguished from it by the fact that it lacks the raised pattern found on the segments of the tail-part of the southern form. It supports a lucrative fishery in New South Wales and extends its range to Tasmanian and New Zealand waters, but is not at all abundant in these two places. The principal fishing grounds occur off Broken Bay, Camden Haven, Broughton Island, Coff's Harbour, Woolgoolga and the mouths of the Hastings and Macleay Rivers.

One other marine crayfish is taken and is palatable. It is the Painted Marine Crayfish (*Panulirus ornatus*) from tropical seas, and is easily the most colourful of the Australian "crays". Its bizarre markings fit into the general colour-scheme adopted by the other denizens of coral reefs. Capture of the Painted Crayfish among the coral reefs is rather diffi-

cult and in consequence no regular fisheries are supported by it.

An exhibit featuring the Australian crayfish mentioned in this article and also some of the better-known crabs has recently been set out in the Museum galleries. This display features the three types of marine crayfish from our east coast. They have been most carefully coloured, making them appear as life-like as possible—a great help to naturalists wishing to distinguish the differences between the various local forms. Two kinds of yabbie or freshwater crayfish are also displayed: the giant, black Tasmanian Crayfish (*Astacopsis franklinii*) and the most typical yabbie from the mainland (*Euastacus serratus*). Both of these freshwater forms, as mentioned above, have large nipper-limbs like their distant relative, the English Sea Lobster. Comparison between the displayed specimens of our freshwater yabbie and the local marine crayfish will show clearly the essential difference between the Sea Lobster and Marine Crayfish of European seas.

Review

POISONOUS AND HARMFUL FISHES. By G. P. Whitley. (Commonwealth of Australia. Council for Scientific and Industrial Research, Bulletin No. 159, Melbourne, 1943.) 8vo, pp. 28, 16 figures, 3 coloured plates.

WITHIN the compass of this small publication there has been drawn together a fund of information upon noxious fishes. With the dispersal of many people around the Australian littoral, and the nearby islands, there has been created a genuine need for such a publication, compact and well illustrated, and the Division of Fisheries of the C.S.I.R. has recognized this, and met it. Mr. G. P. Whitley, whose name is well-known to the readers of this MAGAZINE, has presented the information in a manner both comprehensive and lucid.

Poisonous, venomous, and aggressive fishes are dealt with. In the first category fish poisonous as food fall. Here occur such well-known forms, among others, as the toados, porcupine fishes, trigger fishes, and members of the Red Bass group, the last-named bearing a

resemblance to the snapper and bream. Of eating the toado we learn that Captain James Cook suffered! Venomous fishes are not to be confused with poisonous fish; they comprise those fish that poison by means of spines, spikes, or biting, and include such fishes as stingrays, catfishes, stonefishes, and many others. Lastly, there are the predatory or aggressive fishes which attack, such as sharks, gropers, and so on.

Antidotes and methods of treatment are given. Finally there are hints for collectors. The author points out that "since some of the poisonous fishes are still known only from old descriptions, it would be helpful if specimens of any such species could be preserved and sent to a scientific institution for expert examination". In this we can but concur. Specimens should be sent either to the Division of Fisheries, Cronulla, New South Wales, or to any State museum. It is to be hoped that this request will meet with a well-merited response.

The Kangaroo Family

Rat Kangaroos, I

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

ALTHOUGH wallabies or small kangaroos were the first Australian marsupials described by early navigators, it is not yet generally realized that the kangaroo family contains about fifty species, ranging from relatively miniature "rat-kangaroos" to the great-grey and red "roos" of the coastal forests and inland plains. Indeed, ever since Captain Cook's party described a medium-sized wallaby which the Cooktown blacks called "kanguru" or "kangooroo",¹ there has been a tendency to restrict the popular name to the largest members of the family, arising partly from the mistaken idea that the Cooktown description referred to the great-grey kangaroo, observed later about Botany Bay by the "first fleeters".

This somewhat limited conception of the kangaroo family has led to the popular supposition that there are some special differences between wallabies and kangaroos. There are, however, no basic differences of anatomical structure between a wallaby, kangaroo, and

wallaroo in any way comparable with the differences between them and the sub-family of small rat-kangaroos. In spite of great disparity in size, all members of the kangaroo family are naturally linked by a common ancestry, from which was derived the greatly elongated feet, associated with the semi-erect posture and hopping habit.

The hopping action evidently originated with the efforts of the tiny ancestral marsupials to catch swift-moving insects, and to avoid the pouncing of birds and reptiles. The common ancestry of all kangaroos is further shown by their retention of the paired and stiletto-like lower incisors, associated with an original insect diet. With gradual adaptation for the bulkier herbivorous diet there came a gradual increase in size, and certain digestive and dental changes. The teeth of kangaroos and kindred wallabies are therefore of a more grass-eating type, with the incisors arranged for nipping herbage, followed by a space for manipulation by the tongue, while the molars are sharply-ridged grinders resembling those of sheep.

¹ Troughton: THE AUSTRALIAN MUSEUM MAGAZINE Vol. viii, No. 1, June-August, 1942, p. 17.

A rat-kangaroo gathering nesting material by means of its tail.
Photo.—Harry Burrell, O.B.E.



RAT-KANGAROOS.

The rat-kangaroos, however, retain evidences of the primitive insectivorous ancestry in their dentition, anatomy, and general appearance. The dentition differs in having the upper central pair of incisors much larger than the others, while the canine teeth are present, and the premolars are elongated to function as ridged "secators" for cutting tuberous roots. The molars decrease in size backwards, instead of increasing as in wallabies and kangaroos, and have rounded crowns for pulping fleshy roots and insects. Compared with wallabies, rat-kangaroos have somewhat shorter faces, more rounded ears, and relatively shorter and thicker tails, which may be used in a prehensile way for gathering nesting materials. The nails of the hands are relatively larger, those of the middle digits being decidedly larger than the others, for scratching out yam-like tubers, underground fungi, and insect larvae, in addition to certain grasses upon which they feed.

HABITS AND RANGE.

The habits of the various kinds of rat-kangaroos are much alike, but some lie-up during the day in grass nests in hollows under tussocks or shrubs, while others make warrens. The supple tail is used for carrying nesting material which is scratched on to the tail, which then loops the bundle firmly while the little kangaroo hops away to its building site. They trust to the security of the nest until the last moment before dashing away from under one's feet for the nearest hollow log or available cover. The usual sounds made resemble a nasal snorting or growling, and males may be so pugnacious in captivity that two should never be kept in a small enclosure, while young ones should be separated soon after leaving the pouch. As in all members of the kangaroo family, there are four teats, of which not more than two are functional.

In the past, rat-kangaroos inhabited most of the continent, excepting the tropical far north, as well as occurring

in Tasmania, where it is hoped that absence of foxes may ensure survival. Before the spread of foxes on the mainland, rat-kangaroos were so numerous that settlers often had to take measures for safeguarding their crops, but all species are now quite rare, and at least two have evidently become extinct. At night most species were quite fearless of man and would come about camps for scraps of food, so that in the early days many pioneers were cheered by their sprightly antics in the light of lonely camp fires.

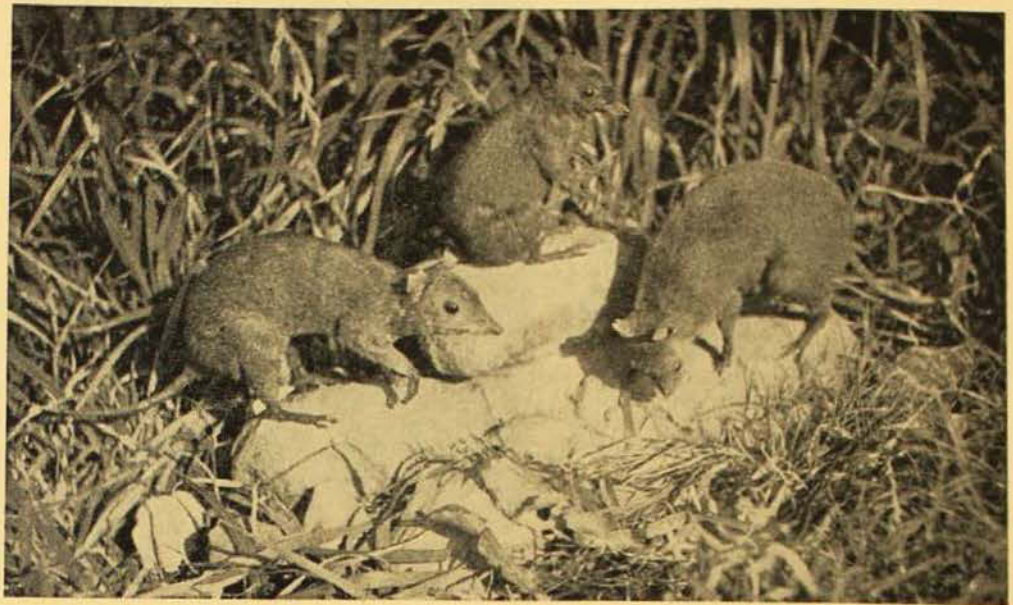
Unfortunately, the slow-breeding little kangaroos have suffered greatly from the competition of the prolific rabbit, which consumes food otherwise not denied them by man, and even more drastically from the spread of settlement and bush fires, so that the delightful little marsupials must inevitably become a thing of the past wherever the fox penetrates. Where possible, naturalists' societies in various States should immediately plan the transference of a few pairs of the individual species to island reserves, or mainland sanctuaries, where elimination of foxes may favour their survival.

THE MUSKY RAT-KANGAROO.

This quaint little kangaroo is the smallest and shyest as well as the most primitive living member of the family, so that the single species is placed in a genus (*Hypsiprymnodon*) and a sub-family all to itself. Indeed, so closely does the structure of the teeth, limbs, and tail resemble that of certain possums that the odd creature apparently links the two great groups of climbing and hopping marsupials. Some authorities have even contended that the Musky Rat-Kangaroo should occupy a distinct family intermediate between the possums and kangaroos.

The hind-foot is unique amongst kangaroos in having a well-developed great-toe which is movable and clawless as in the possum family, but is not opposable to the other digits as in the climbing marsupials. The tail also differs from that of all other kangaroos

Museum specimens of the primitive little Musky Rat-Kangaroo (*Hypsiprymnodon moschatus*) of the Atherton Tableland and coastal scrubs of the Cardwell district, north coastal Queensland. The relatively more equal proportions of the limbs, unique presence of the great toe, and the slender scaly tail, probably indicate primitive descent from the possum family. The specific name refers to the musky smell, also characteristic of semi-insectivorous possums.



in being almost entirely hairless and covered with skin-scales, as in the true American opossums, and as partly so in the cuscus and other members of our own possum family. Though such adaptive features may develop independently, without indicating a common ancestry, there seems no doubt that the primitive foot and tail of the Musky Rat-Kangaroo are indicative of the ancient origin of kangaroos from possum-like insectivorous ancestors.

The little "Musky" was first observed in 1874 by Dr. E. Pierson Ramsay, a past Curator of the Australian Museum, during a visit to northern Queensland. It inhabits the dense brushes fringing rivers in the Rockingham Bay area around Cardwell, and the lakes and streams of the Atherton Tableland. The specific name of *moschatus* was given it by Ramsay because of the musky scent emitted by both sexes, which are of a similar rich brown coloration. The general form is more slender and possum-like than in other rat-kangaroos, mainly due to the more equal length of the limbs. The head and body length averages 12 inches, and the tail about 6 inches. More than two are seldom together, unless with young, and they apparently breed during the rainy season from about February to May, as Ramsay

obtained one in March with two very small young in the pouch.

Although not rare in its dense rain-forest haunts, the shyness and rapid movements of the Musky make capture almost impossible, while it is difficult to provide a suitable bait, since its diet consists mainly of insects. Abroad mostly in daylight, its food is procured by turning over the scrub debris for insects, worms, and tuberous roots. It also eats the berries of a palm (*Ptychosperma*), which are held in the fore-paws after the manner of a possum while sitting up on its haunches. During my visit to the Atherton tableland, the elusive Musky was seen flitting through the bush, and one was disturbed scratching amongst leaf-mould for insects. However, no suitably intriguing bait was discovered to provide any additions to the specimens of 1874, and one may hope that the survival of the unique little kangaroo will be assured for all time in its jungle haunts.

LONG-NOSED RAT-KANGAROOS OR POTOROOS.

These were almost certainly derived through the primitive Musky Rat-Kangaroo, though all differ in lacking the possum-like first toe, and in having the tail completely haired instead of

Long-nosed Rat-Kangaroo or Eastern Potoroo (*Potorous tridactylus*) of the south-eastern mainland, and Tasmania. The three long-nosed species are distinguished by their relatively short hind-limbs in comparison with the more kangaroo-like limbs of the shorter-headed Bettongs. The popular and generic names are founded on "Potoroo" applied by the blacks about Port Jackson in 1790. Photo.—Harry Burrell, O.B.E.



scaly. The Latin name for the long-nosed genus (*Potorous*) is based on the aboriginal name "Poto Roo" quoted in Surgeon-General White's Journal of 1790 as being used by the blacks about Port Jackson. There are three species of Potoroos, clearly distinguished from the shorter-nosed Bettongs by having the hind-foot decidedly shorter than the head. A corresponding shortness of limb rather lessens the kangaroo appearance, and results in them using both fore- and hind-legs in a kind of gallop, instead of hopping.

Little is known of the habits save that low, damp localities are favoured, with dense herbage in which nests are built to lie in during daytime. Disturbed by a slight noise, they bolt with rabbit-like speed and seldom break cover, sheltering under a bush or amongst stones when hard pressed. Captives in the London Zoo were found to be inoffensive and more stupid than the aggressive little short-faced Bettongs. Although often standing on the hind-feet, they fed in a pig-like way, seldom using the hands to convey food to the mouth, and seemed very partial to boiled rice. They are equally active by day or night, and very quick in movements; they express disapproval with a faint hissing sound.

The larger or "common" Potoroo of south-eastern Australia and Tasmania, with a head body length of about 16

inches, and tail about 9 inches, was one of the earliest marsupials known to the settlers about Port Jackson. It was first described and illustrated in 1789 in *The Voyage of Governor Phillip to Botany Bay* as the "Kangaroo Rat" because of the kangaroo-like limbs and "the visage being strongly similar to that of a rat". It was said to inhabit "New Holland", and that two were now to be seen alive in London "at the curious exhibition of animals over Exeter Exchange".

It was once common in the swampy coastal brushes of Victoria and South Australia, but depredations of foxes have rendered the old nature-book term of "Common" Rat-Kangaroo a mere mockery for all of its kind on the mainland. The species is fortunately represented by a distinct geographical race in Tasmania, where it is often called "Wallaby Rat", and is distinguished by the somewhat larger size, minor cranial features, and usually white-tipped tail. There seems no doubt that adequate protection, coupled with the absence of foxes in Tasmania, can alone save this fine species from the fate of extinction.

Of the two small species once inhabiting the extreme south-west of Western Australia, Gilbert's Rat-Kangaroo (*Potorous gilberti*) named in 1841 by Gould in honour of his diligent collector, was apparently a smaller form of the

eastern long-nosed Potoroo. The only habit notes were by Gilbert, who said it was called "Ngil-gyte" by the aborigines about King George's Sound, where, as a constant companion of the short-tailed wallaby, it was hunted by the blacks amongst dense thickets bordering swamps and streams. Possibly a general likeness to the wallaby led to the rat-kangaroo being overlooked, but a British Museum collector in 1904-7 only obtained old skulls from caves in the Busselton area, and concluded that the species was extinct.

The second western species, the Broad-faced Potoroo, is of special interest as being, with exception of the Musky Rat-Kangaroo, the smallest and most primitive of the kangaroo family; its cranial and dental features provide further evidence of ancient derivation from the

possum group of marsupials. It is at once distinguished from the other long-nosed species by the breadth and shortness of the facial region, giving the head a quaintly bluff appearance, like a young wombat. It also differed from the slender-nosed species in not having the naked muzzle extending back along the snout, suggestive of differences in feeding habits. The original specimen came from near Northam, and Gilbert also collected a specimen from the Albany district. Apart from the doubtful report of a specimen being sent to the London Zoo in 1908, it has not been reported since Gould's description of 1844, and there seems no doubt that settlement, with its wild cats and bush fires, must have settled the fate of this striking species even before the recent western advent of the fox.

(To be continued.)

Australian Insects. XIX.

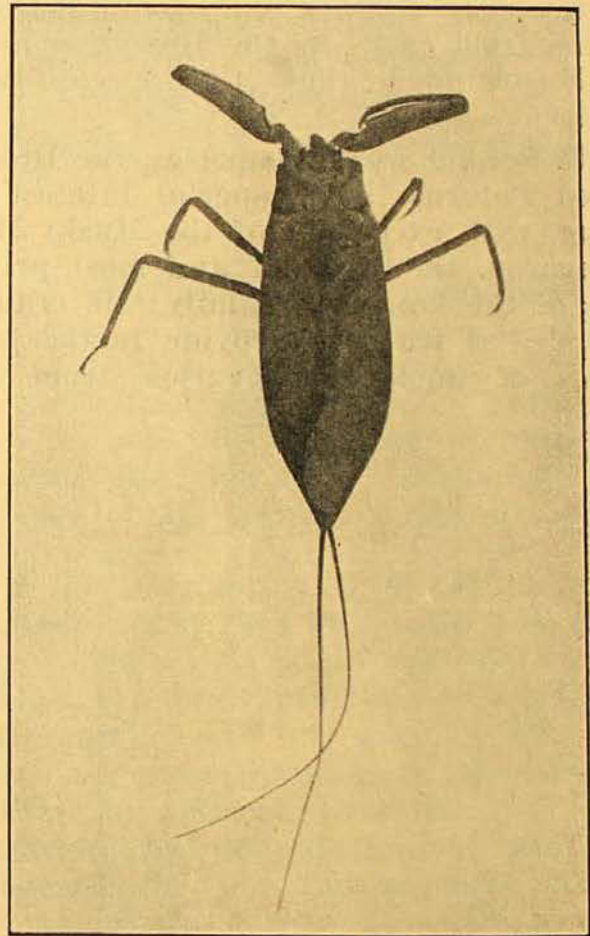
Hemiptera—4. The Bugs (Gelastocoridae-Corixidae)

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

THIS article completes the account of the true bugs belonging to the sub-order Hemiptera, and, with one exception, all the species to be passed in review are those aquatic forms popularly referred to as water-bugs, water-scorpions, water-boatmen, and back-swimmers, and most of them will be familiar to anyone who has kept aquaria. They are easily kept in confinement and provide fascinating subjects for study.

The exception to this gathering of water-dwellers is *Mononyx annulipes*, the commonest and most widely known of the nine species placed in the family Gelastocoridae, the Sand-bugs. These little bugs live on the margins of creeks and water-holes, and the muddy banks of excavated tanks, situations in which their dull yellow-brown colour blends closely with their surroundings. Here they search for small prey along the water's edge. As a rule the insects are rather sluggish, trusting in their camouflage to escape detection, but when disturbed they are capable of rapid movement, running over the sand or progressing by a series of short jumps. *M. annulipes* is a small, stout insect, with the head completely hidden when viewed from above, giving the little creature the appearance of having been decapitated.

The Water-scorpions (family Nepidae) are represented in Australia by five species. They fall into two forms, but in both the abdomen of the adult insect terminates in a pair of grooved appendages which fit neatly together to form a slender tube. This is not, as is so widely believed, a "sting", but a respiratory tube, enabling the submerged insect to retain contact with the air above the surface. The second and third pairs of



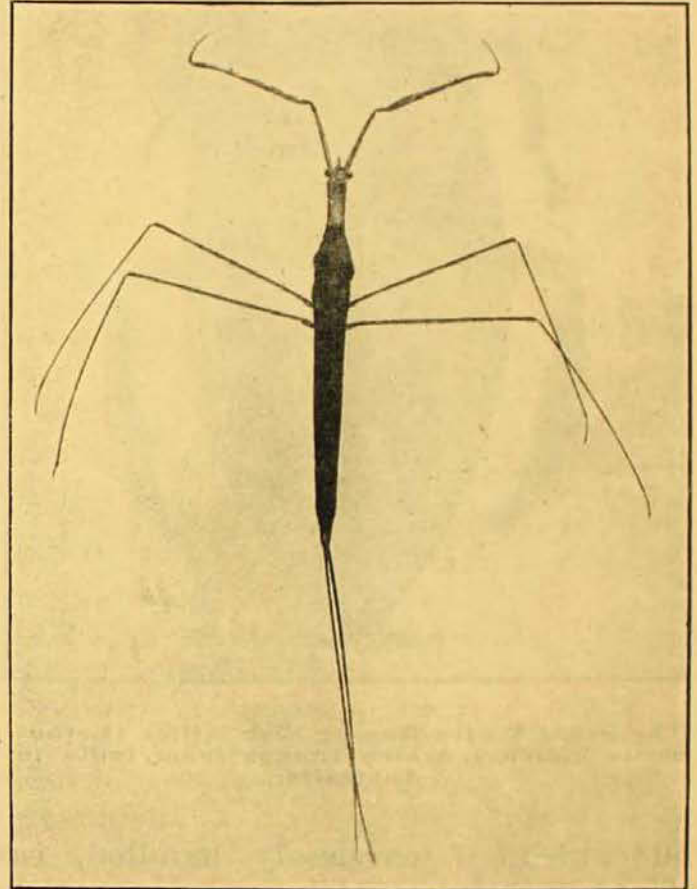
A "Water Scorpion" (*Laccotrephes tristis*).

legs are slender and show little evidence of adaptation for swimming, but the forelegs are formed for grasping prey, reminding one irresistibly of those of mantids. Both serve the same purpose, and form a striking example of parallel development in two widely separated orders of insects. The head is provided with a short, down-turned beak or rostrum for piercing the captured victim and sucking up its juices; such prey usually comprises dragon-fly nymphs, small tadpoles, and other aquatic life. The Water-scorpions are sometimes

known popularly as "Toe-biters", under the impression that they bite the feet of bathers, but I have never been able to ascertain whether this actually occurs. The adult insects carry the wings neatly folded down over the abdomen, so their presence is often unsuspected; they are, however, capable of flights of long duration. Two common species may be referred to here in some detail. *Laccotrephes tristis* is dull brown in colour with the upper surface of the abdomen, normally hidden by the wings, bright scarlet. In form it is broad and leaf-like—so leaf-like indeed that, when resting among fallen and decaying leaves at the bottom of a pool, it is extremely difficult to detect unless it moves. Mr. H. M. Hale, in a very complete account of the group published in the *Records of the South Australian Museum*, states that he has never taken this species in other than weedy situations. I have, however, frequently found it in numbers in excavated tanks, or "dams", quite destitute of vegetation, and consider it more an inhabitant of such situations than the slender *Ranatra australiensis*, which seems to prefer weeds, although the two species may be found in localities of both types. The insects seem to prefer to lie in wait for their prey to pass within reach of their raptorial forelegs rather than engage in active pursuit. In winter these insects hibernate at the bottom of the pool, and sometimes bury themselves in the mud, and so deep is their sleep that, when they reappear in spring, they are often adorned and impeded by growths of algae.

Ranatra australiensis is a slender, elongate, and somewhat stick-like insect bearing a considerable resemblance to the familiar "Praying Mantis". A favourite attitude of the slender Water-scorpion, while waiting for prey, is to hang head downwards, suspended from the surface film by the tip of the respiratory tube, with the body inclined at an angle of about forty-five degrees, a position which it can maintain for hours. When disturbed, the insect paddles somewhat awkwardly down to the bottom.

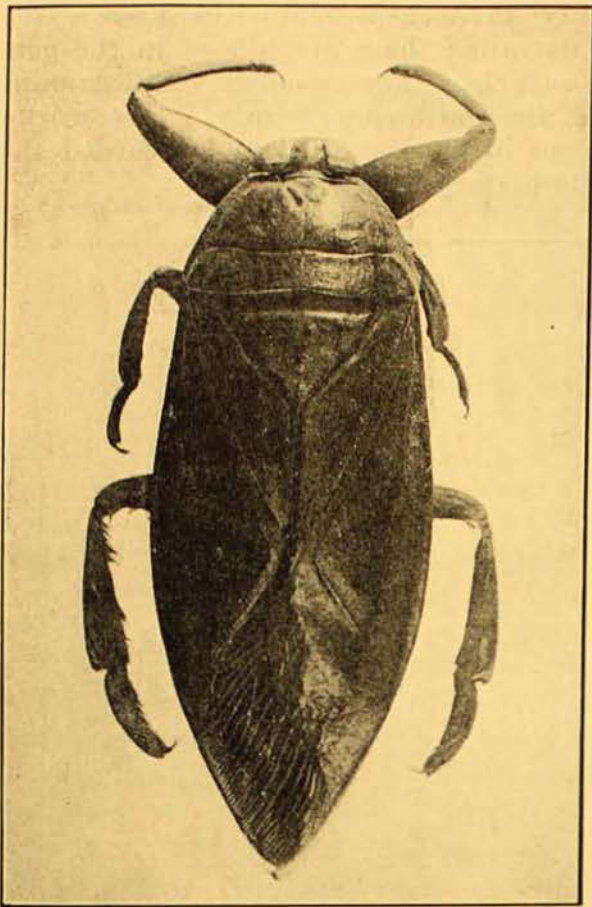
The Naucoridae is a small family with only three representatives known from Australia; these are placed in the genus *Naucoris*. They resemble small examples of the following family. No workers seem to have studied and recorded their life history and habits.



A typical "Toe-Biter" (*Ranatra australiensis*).

The family Belostomatidae, although poorly represented in Australia with only four species, is an interesting one since it includes the largest of the water-bugs, and also a species in which the female conscripts the male to act as "nursemaid" to her eggs. Both these species are not confined to Australia, but range as far afield as India.

The Giant Fish-Killer (*Lethocerus indicus*) is a huge brown insect, more than three inches in length. The hind legs are strongly "feathered" with hairs, enabling the insect to drive itself rapidly through the water by strokes of these oar-like limbs. Its head is armed with a stout beak, with which it impales its prey,



The great Water Bug or Fish Killer (*Lethocerus indicus*), which ranges from India to Australia.

and which, if carelessly handled, can inflict a painful wound on the incautious hand. Quite large aquatic insects fall victims to its prowess as a hunter, and it can with equal success deal with comparatively large fish and frogs. In attacking a frog the powerful legs grip the body of its captive, and the sharp rostrum is inserted in the fold of soft flesh at the junction of the hind limb with the body. Despite all its struggles, the unfortunate victim is powerless and soon succumbs, its end being probably hastened by the injection of a salivary fluid by the bug. These Giant Water-bugs, although spending the greater part of their life in the water, are powerful flyers, and when their watery home dries up, or by night, they take wing and cover considerable distances by air. It is on these flights that the insects are attracted to street lamps, flying around them in whirling

swarms. Many fall to the footpath and are trodden underfoot.

Sphaerodema rusticum, strangely enough, has received no popular name, despite the fact that such distinction would appear justified in view of its strange habits. The female *Sphaerodema* is a militant feminist—she has her own ideas on the position of the male in the home, and does not hesitate to put them into execution. When maternal ties appear imminent, she seizes upon her mate and, in spite of all his efforts to resist, glues her eggs upon his back, where he must carry them until they hatch—and longer, for it is not unusual to find the empty shells from which the young have emerged still adhering to him, possibly for weeks, after the important event has taken place. This burden renders the wings of the male useless, and seriously handicaps his activities, but the emancipated female goes on her way without a care or responsibility in the world!

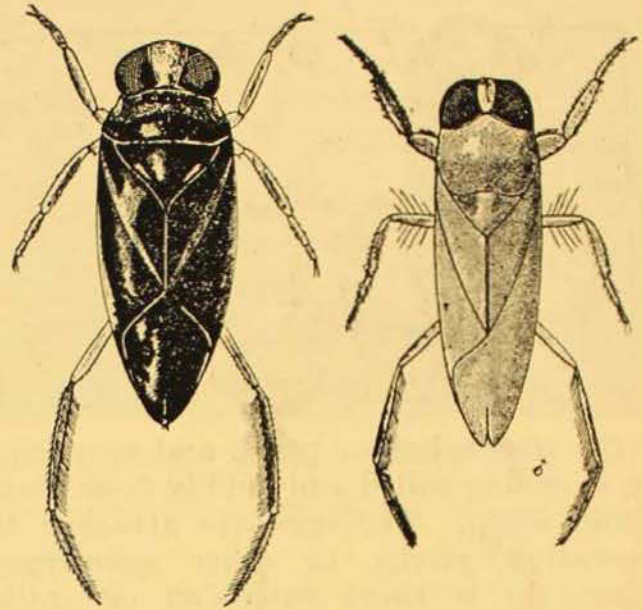
The Notonectidae, or Back-swimmers, are remarkable for their habit of swimming "upside-down", and this has given rise to their popular name. The insect poises itself in the water, resting, as it were, upon the long oar-like, hair-feathered hind legs, which usually point forward at an angle of about forty-five degrees to the body. The creature is



Sphaerodema rusticum, a bug widely distributed in eastern Australia. The illustration is of a male upon whose back the female has deposited a number of eggs. (Enlarged.)

distinctly buoyant, and, when motionless, tends to rise to the surface; the tip of the body breaks the surface film, and the air is received into a hair-covered groove along each side of the abdomen, which serves as a reservoir. A stroke of the hind legs drives it darting below the water again. The Back-swimmers are carnivorous, feeding upon mosquito larvae and other small water life. The eggs are deposited in the tissues of aquatic plants in small slits cut by the ovipositor of the female. Shortly after they are deposited, the red eyes of the forming larvae can be seen clearly through the egg-shell. There are two broods, at least, in the year, the insect becoming mature about two months after the egg is laid. The male is something of a musician, using his chirping "song" as a love serenade as he swims behind the lady of his choice. The sound is not a true song, but rather is it instrumental, being produced by rubbing comb-like organs situated on the tibiae of the forelegs against prongs on the rostrum when the forelimbs are folded. *Anisops hyperion* is a common and widely distributed Australian species, as is also *Enithares bergrothi*, a darker and broader insect. Mr. Hale records an instance where one of the latter inflicted a painful injury, resembling a bee sting, upon an unwary hand by the puncture of its beak.

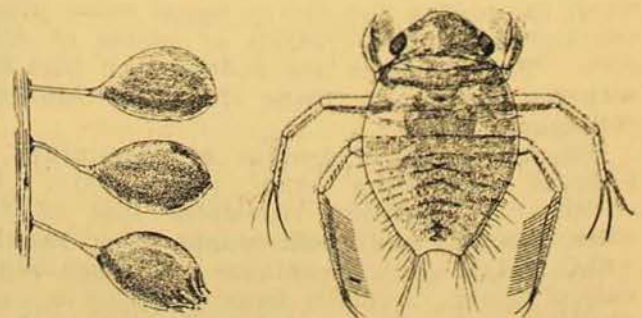
Members of the family Corixidae—the Water-boatmen — are proportionately shorter and broader than the Notonectidae. As with insects of that family, the Water-boatmen swim in a reversed position — back downwards — driving themselves rapidly through the water by powerful strokes of their long, oar-like hind legs. When at rest they cling to the submerged vegetation, the latter habit being in marked contrast to the Back-swimmers, which rarely avail themselves of such support, but seem rather to depend on their poise in the watery element. Their food appears to consist mainly of small water-dwelling creatures, mosquito wrigglers occupying an important place in their diet; but Professor H. D. Hungerford states that in America



Two Back-Swimmers (*Enithares bergrothi* and *Anisops hyperion*).
After Hale.

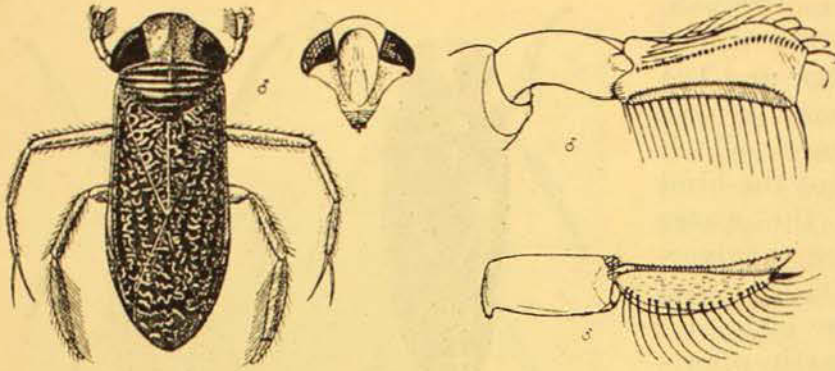
they are largely herbivorous, feeding on small algae, on which food he has successfully reared them. It would seem, therefore, that the Water-boatman is a believer in a balanced diet.

Like the Back-swimmers, the males of the Corixidae are instrumentalists, swimming leisurely behind their innamorata while strumming upon a "lute", "guitar", or what you will. The musical instrument is here again a tarsal comb, but it is rubbed against a toothed area upon the femora instead of prongs upon the rostrum, but the effect is much the same—a small whirring or chirping note which, though it may appear of but little consequence to the human ear, yet is appreciated by the female *Corixa*. Development seems to be slow, so there is possibly but one brood in the year, the adult insects overwintering in the mud



The eggs and larva of a Corixid—a Water-Boatman.

After Hale.



A common Water-Boatman (*Arctocoris truncatipala*); adult male; face, and the palae of male and female, that of the male showing the stridulating pegs.
After Hale.

of the stream-bed or pond, and reappearing in spring soiled and muddy from their winter sleep. The eggs are attached to vegetation, sticks, or other submerged objects by a short extension or stalk. The adult insects, like so many of the water-bugs, can fly strongly, and swarms of them in flight from drying ponds, and passing to other breeding places, have been recorded from inland areas. *Arctocoris truncatipala* is a common and

widely distributed species, to be met with in almost any body of fresh water. The smaller *Procorisa parvipunctata* has also a wide Australian distribution.

When rearing the water-bugs in aquaria it should be remembered that they are all highly carnivorous; not only will each species prey upon the others, but they will decimate any other small and helpless—and possibly cherished—forms of water-life.

A New Mineral Record

DIASPORE is not a very common mineral and, until recently, only four specimens, none of which came from Australia, were included in the Museum collection.

The search for minerals within the Commonwealth for wartime needs has been responsible for quite a few interesting discoveries. It has been known for a long time that an emery rock, yielding abrasive material of the highest quality, exists on the Richenda River, Kimberley Division, Western Australia. Some of this material was taken to Melbourne for experimental purposes and Mr. J. J. Johnston, when examining the emery found some pieces containing tabular crystals or plates of diasporite. The Trustees are indebted to him for securing some of these for the Museum collection.

Diasporite is an hydroxide of aluminium or hydrous aluminium oxide ($\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$). Its chemical composition resembles that of the more common, and much sought after, bauxite ($\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$) which contains one more molecule of water. Actually bauxite varies in composition and may contain a fair amount of colloidal aluminium hydroxide which has the same composition as diasporite.

What a difference this one molecule of water makes. Diasporite is as hard or even harder than quartz, while bauxite is almost as soft as clay. It is crystallized and will break with a perfectly smooth surface in one direction while bauxite is never crystallized and never breaks with a plane surface.

Diasporite is commonly associated with corundum or its impure variety emery, though it is sometimes found in deposits of bauxite. In southern Norway particularly it is found as a microscopic constituent of certain igneous rocks.

The famous French mineralogist, Professor R. J. Haüy, who first discovered the mineral named it from the Greek word meaning to scatter, in allusion to the violent way in which it breaks up on heating. It has a greyish white colour and does not possess the beauty of its near relatives, sapphire and ruby. Because of its rarity it does not have the commercial value of the more common bauxite from which the world's supply of aluminium is derived.

T. HODGE-SMITH.