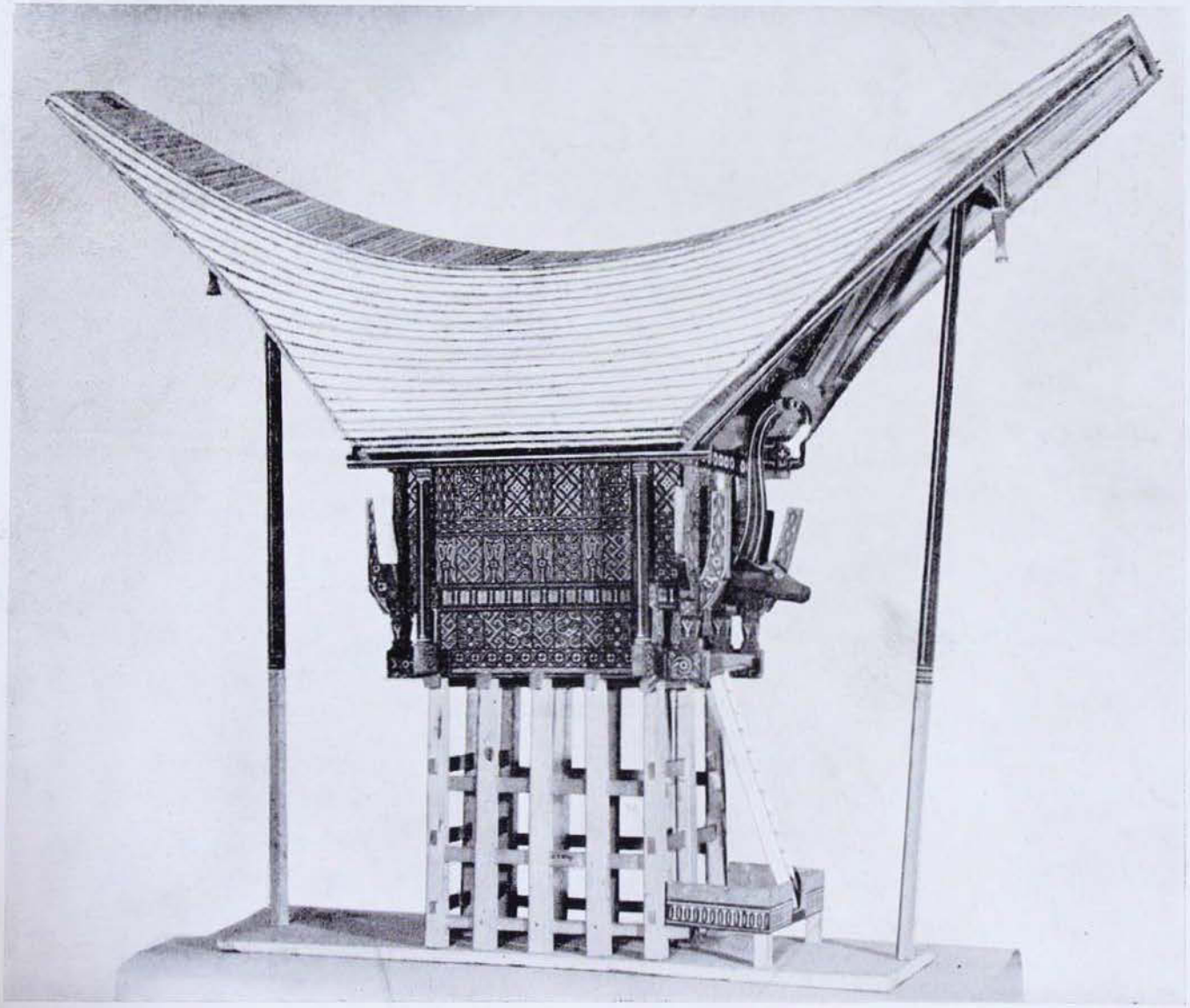
The AUSTRALIAN MUSEUM MAGAZINE

Vol. XI, No. 4 Price—TWO SHILLINGS



Toradja House, Southern Celebes.

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THE AUSTRALIAN MUSEUM

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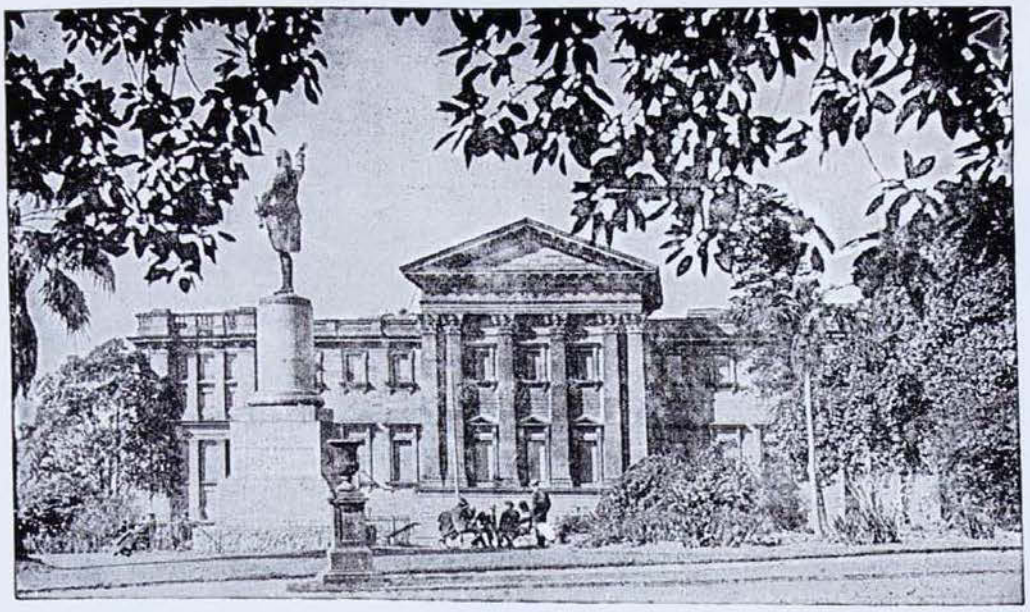
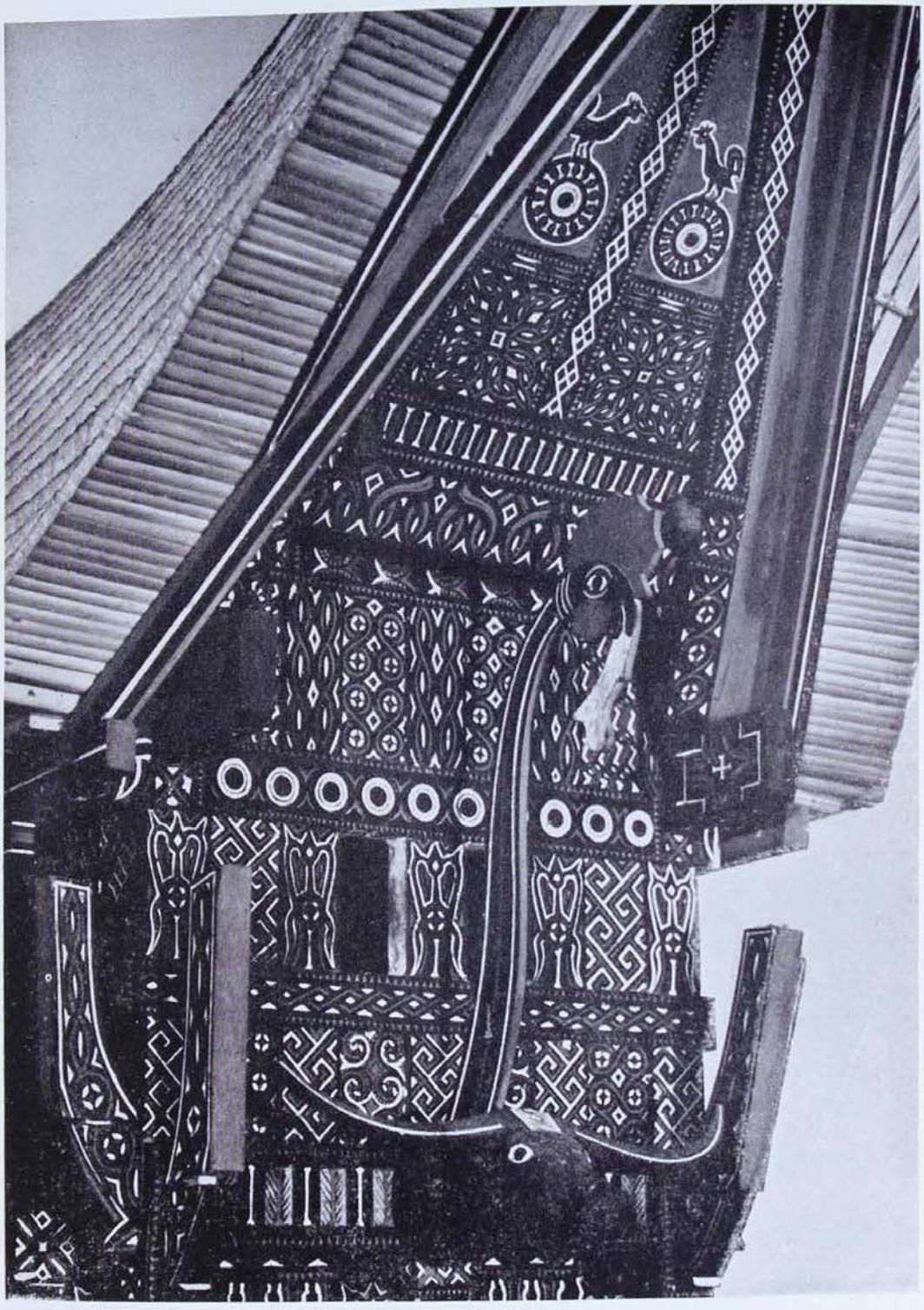


THE AUSTRALIAN MUSEUM MAGAZINE

(Photography, unless otherwise stated, is by Howard Hughes, A.R.P.S.)

● OUR FRONT COVER. A model of a Toradja House, Southern Celebes. This is a beautiful example of craftsmanship, and was presented to the Trustees of the Australian Museum by Commander T. F. E. Knox, R.A.N. (see page 105, and frontispiece).

VOLUME XI, NUMBER 4. DECEMBER 15, 1953.



The sides and ends of the Toradja house are decorated with intricate and attractively painted carving. Fighting cocks and water-buffaloes are featured in the motives.

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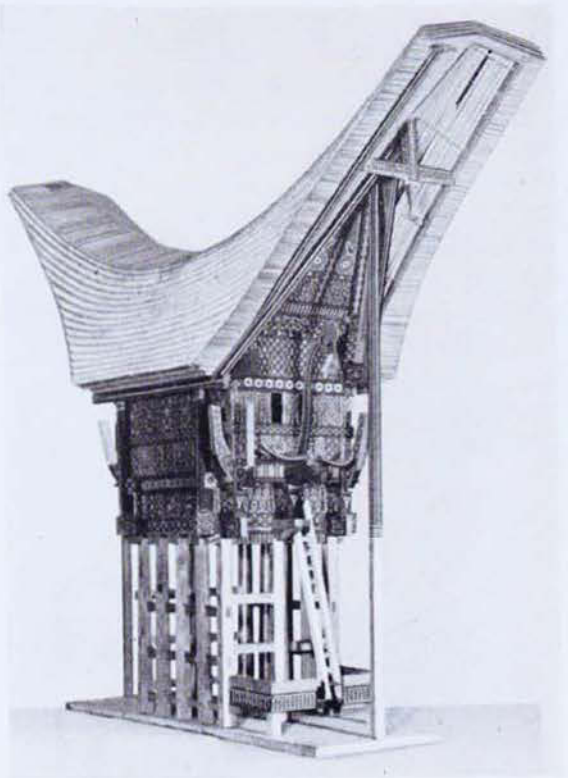
VOL. XI, No. 4. DEC. 15, 1953

A Toradja House

By F. D. McCARTHY.

THE Museum recently received by donation from Commander T. F. E. Knox, R.A.N, a fine model of a Toradja house illustrated in this issue. The Toradjas are a Mongoloid people who live on steep-sided ranges, up to 5,000 feet in altitude, in the interior of the Bone peninsula, southern Celebes. These ranges consist of innumerable razor-backed ridges covered with dense jungle, nurtured by tropical monsoonal rains during the wet season from November to May, and it rains frequently also in the dry season. The villages are built on the ridges because in the old days concealment and difficulty of access afforded some protection against merciless head-hunters who hung their hideous but prized trophies along the walls inside the houses. The latter accommodate an extended family which consists of several generations of men with their wives and families. Bamboo, wooden and pottery vessels and spoons are used for domestic utensils, and baskets of various kinds are also made. The beautifully proportioned houses, whose in-curved roofs are symbolical of the head and horns of the water-buffalo, are an excellent example of the high standard of native architecture in Indonesian houses.



The Toradja house is built on a high frame as a protection against enemies. The pigs and fowls find the space underneath a useful refuge from heat and rain.

The Toradja cultivate rice and other crops in the valleys, employing the water-buffalo to pull the plough and the harrow. The whole family devotes its time to this staple crop when necessary, but both the men and the women have other tasks to carry out. The men are skilled hunters who use the blow-pipe and poisoned dart, spear and kris, their principal game being the dwarf buffalo indigenous to the island. Trained dogs follow the tracks and scent of the game to which they lead the hunters for the kill. Steel is used on the heads of weapons and forms the blade of the plough. The women weave on their looms cloths for sarongs and blankets.

The wooden bowls and spoons, the bamboo lime-boxes, and other objects are attractively decorated by the men, as are the ends and sides of the elegantly shaped houses. The surfaces of these objects are intricately carved in low relief in all-over patterns incorporating crosses, stars, greek-fret, spirals, chain and many other designs which are also embodied in the cloths. The designs in the woodwork are painted red, white and black, thus producing vivid and striking decorative effects. Representations of the water-buffalo and fighting-cock are also featured on the houses.

The dead are usually placed in a hole in a cliff face, but a local sultan's body may be placed in a tomb which is really a small but by no means miniature replica of his dwelling-place.

New Shark Exhibits

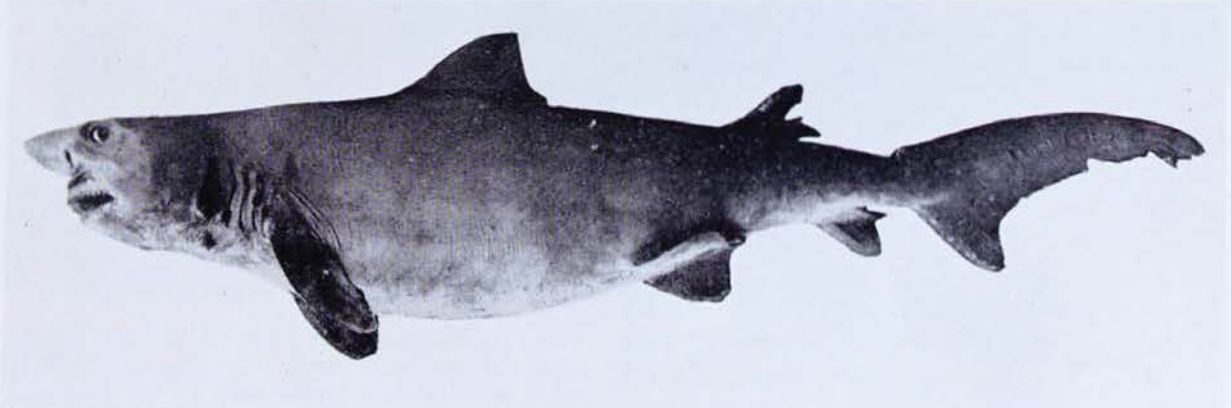
By G. P. WHITLEY.

A STRIKING exhibit of two very different types of sharks has just been added to the fish gallery. In shape and size, in teeth and tails these two are strongly contrasted. The larger is a Thresher Shark, $12\frac{3}{4}$ feet in length, with a tail more than $6\frac{1}{2}$ feet long. The other, known as Herbst's Shark, $5\frac{1}{2}$ feet in total length, though dwarfed by its great companion, is no less interesting, being a rare deep-sea shark, whereas the Thresher is a mid-water inhabitant, often rising to the surface.

The tremendous tail of the Thresher Shark (*Alopias vulpinus*) is used like a flail to frighten fish into a compact mass or to stun individual prey. From early times, it has been believed to attack whales, so that in *Newes from the Bermudas*, 1609, it was related:

"The Threasher keepeth above him and with a mighty great thing like unto a flaile, hee so bangeth the whale, that hee will roar as though it thundered."

However, the stomachs of threshers have never been found to contain whalemeat,

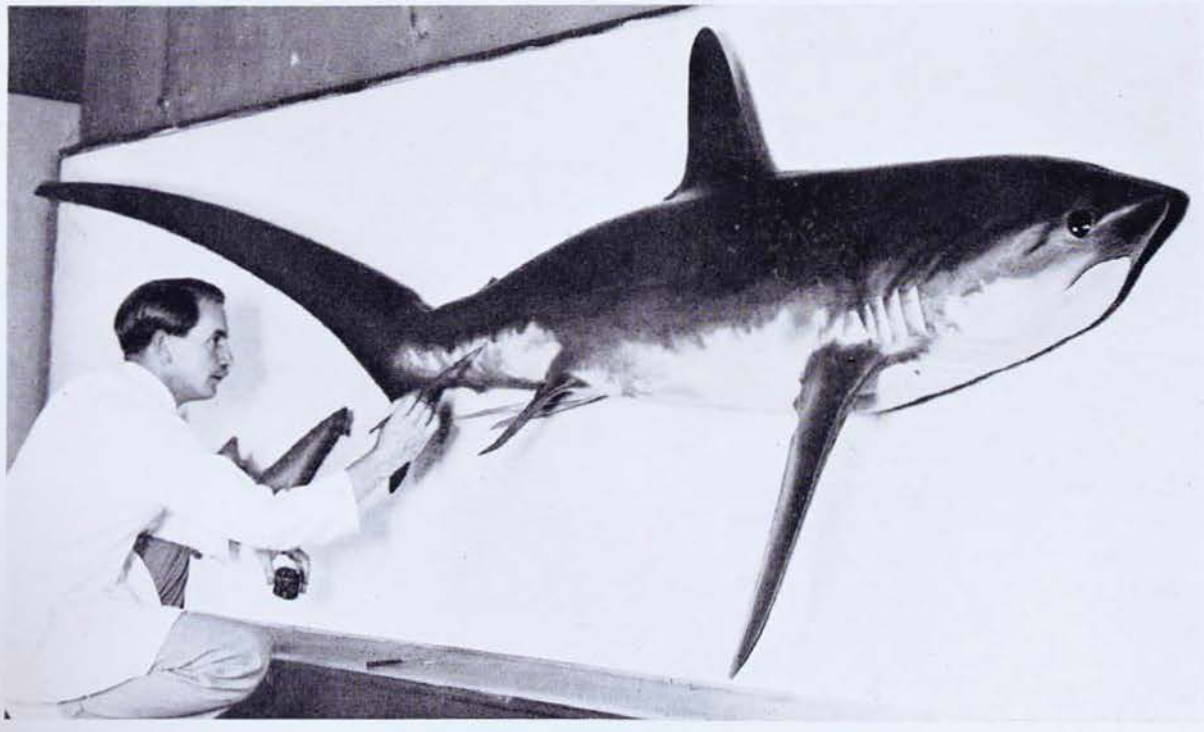


Herbst's shark from deep water, southern New South Wales.

only small fish and squid, so that the legend of the threshers attacking whales may have been due to observations of killer whales or the antics of courting humpbacks. Threshers sometimes leap well out of water and are sought as game fish, the record, taken by line in New Zealand in 1937, weighing 922 lb., but the species probably exceeds 20 feet in length and 1,000 lb. in weight. Our example, which was killed off Bondi, New South Wales, by Mr. Maxwell Lawson, who presented it, is a fine male of 285 lb. In other countries, threshers have been found to be viviparous, females having two to four embryos, about four feet in length.

Mr. W. A. Herbst presented the other shark, a new species which was named *Odontaspis herbsti* after him.[1] In 1947, Mr. Herbst had secured from the trawler aboard which he worked the jaws of a shark from southern New South Wales which was quite strange to me. I eagerly awaited a complete specimen and this was forthcoming in May, 1948, when Mr. Herbst arrived in a taxi with the fine male shark now exhibited. A cynic observed that sharks do not usually ride in the back of a taxi, an unworthy reflection on taxi-drivers! Herbst's Shark was seen to be a heavily built, rather ugly and savage customer, "with a paunch like a cow's belly", and superficially like a Grey Nurse (*Carcharias*). However, I soon noticed it had smaller pectoral fins and quite different dentition from the Grey Nurse, for whereas each main tooth of the latter has one little spine or "cusp" on each side, Herbst's Shark had two, and there were other differences as well. Comparing the jaws with others in the collection and descriptions in literature, I found that Herbst's Shark was indeed "old in the tooth" for its dentition agreed better with that of the fierce European *O. ferox* and its fossil ancestors from the English Eocene, known from remains more than fifty millions of years old, and yet very similar to the teeth of this "living fossil" trawled in 75 fathoms off Gabo Island, southern New South Wales.

[1] Whitley, Records of The Australian Museum xxii, 1950, p. 234, plate xvii, fig. 1 and text-fig. 1, q.v. for detailed description.



Museum artist John Beeman puts the finishing touches to the new exhibit of a Thresher Shark.

Aboriginal Rock-Paintings of the South Coast

By WILLIAM H. KINSELA.*

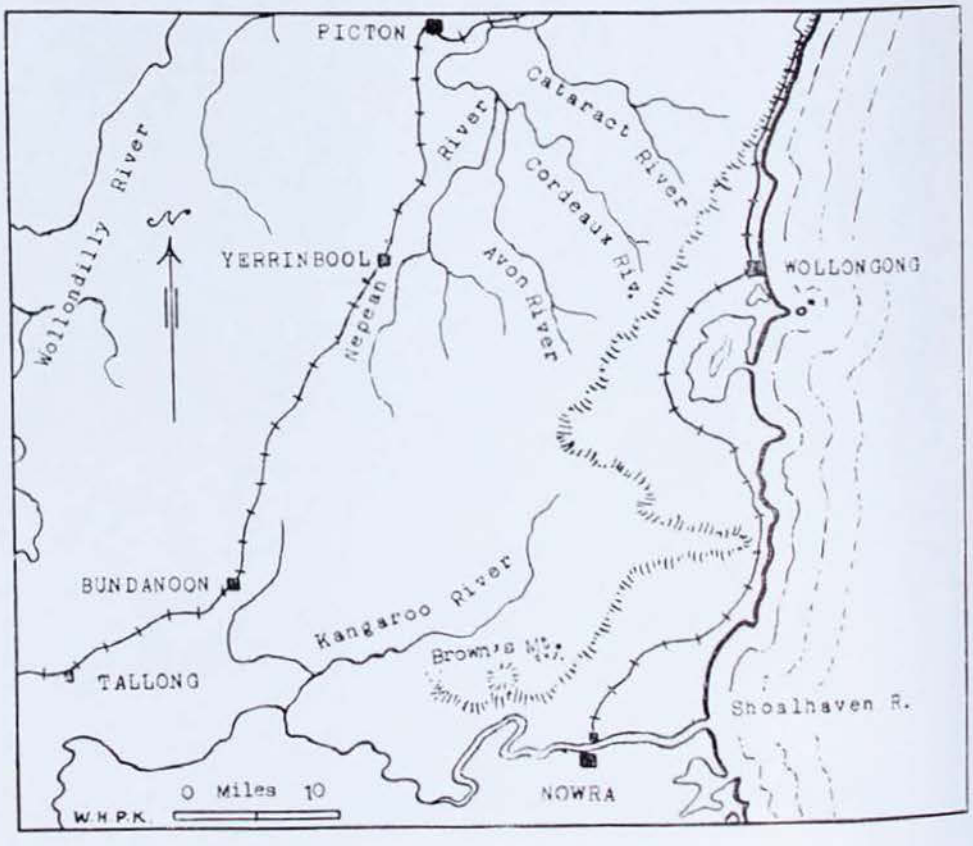
THE archaeological map of the Illawarra coast and adjacent ranges, like that of many other sections of New South Wales, bears numerous blank spaces. In some respects, a huge expanse of this area had been singularly lacking in material evidence of aboriginal occupation.

Now, however, we are in a position to show that this was more apparent than real.

The ensuing account of what has been brought to the notice of science in only the past four years underlines the importance of the evidence that does exist there, yet which had been hidden for so long. Moreover, this should help to emphasize the need for a continuing search and recording in the field along systematic lines. It was in work of this nature that the author had been associated, as a member, with the Anthropological Society of New South Wales. For some twenty-odd years, he had concentrated on the areas immediately south of Sydney and extending throughout the Illawarra coast and tablelands.

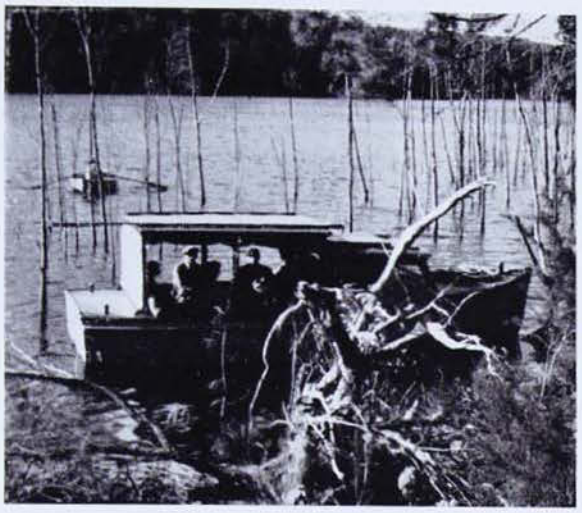
But, before proceeding into details of the most recent investigations, let us briefly examine the background to the subject.

While the numerous kitchen-middens of the Illawarra seaboard are well known, and have received close attention, other aboriginal relics of a prominent type, such as rock-art, appeared to be in a minority compared, say, with those of districts nearer Sydney and elsewhere. Of course, one expected little or no rock-art to be found on the coastal plain proper because of its geological limitations. But, the elevated hinterland—the ranges and plateaux—does have the structural characters that, elsewhere, support rock-paintings and rock-



Sketch map of part of the South Coast and tablelands, showing the Cataract-Cordeaux - Avon - Nepean area. Place names marked are referred to in the article.

*Photographs and drawings by the author.



Having crossed eight miles of Avon Dam, the launch lands our party at the site of the first rock-paintings inspected.

carvings. Here, over some hundreds of square miles, are typical gully and ridge formations of the Hawkesbury Sandstone —with numerous cliffs, rock-shelters and rock-pavements.

The particular area to which I refer is shown on the accompanying sketch map, bounded along the east by the scarp of the Illawarra Range, on the north by an approximate east-west line through Helensburgh, on the west by the main southern railway line, and extending south as far as the Shoalhaven River. In this sector I further concentrate attention on the watersheds of the Upper Nepean River, with its headwater tributaries the Cataract, Cordeaux and Avon Rivers.

Very much of this Upper Nepean country bears the familiar imprint of the Hawkesbury sculpturing. Then, as we proceed southward, geological changes deprive an expansive area of the surface of suitable sites for either aboriginal paintings or carvings—until we again meet with Hawkesbury Sandstone features repeated around the valley of the Kangaroo River.

Up till recent years, the only aboriginal relics recorded from within this whole elevated zone seemed to be occasional ground-edge axes and other stone implements, together with odd sites of axe-sharpening grooves. However, along the perimeter of the zone, more substantial evidence of native occupation had been known for generations. To the north, there are rock-paintings around Waterfall-Helensburgh, and others north-westward along the Wollondilly River. Due west, a limited number of rock-art sites exist near Yerrinbool and Bundanoon,[1] while relics in the Tallong[2] district, in the south-west, include a notable gallery of painted figures and ceremonies. Eastward from here, further paintings and stone-arrangements are recorded near Nowra[3].

Now let us move inwards from the perimeter.

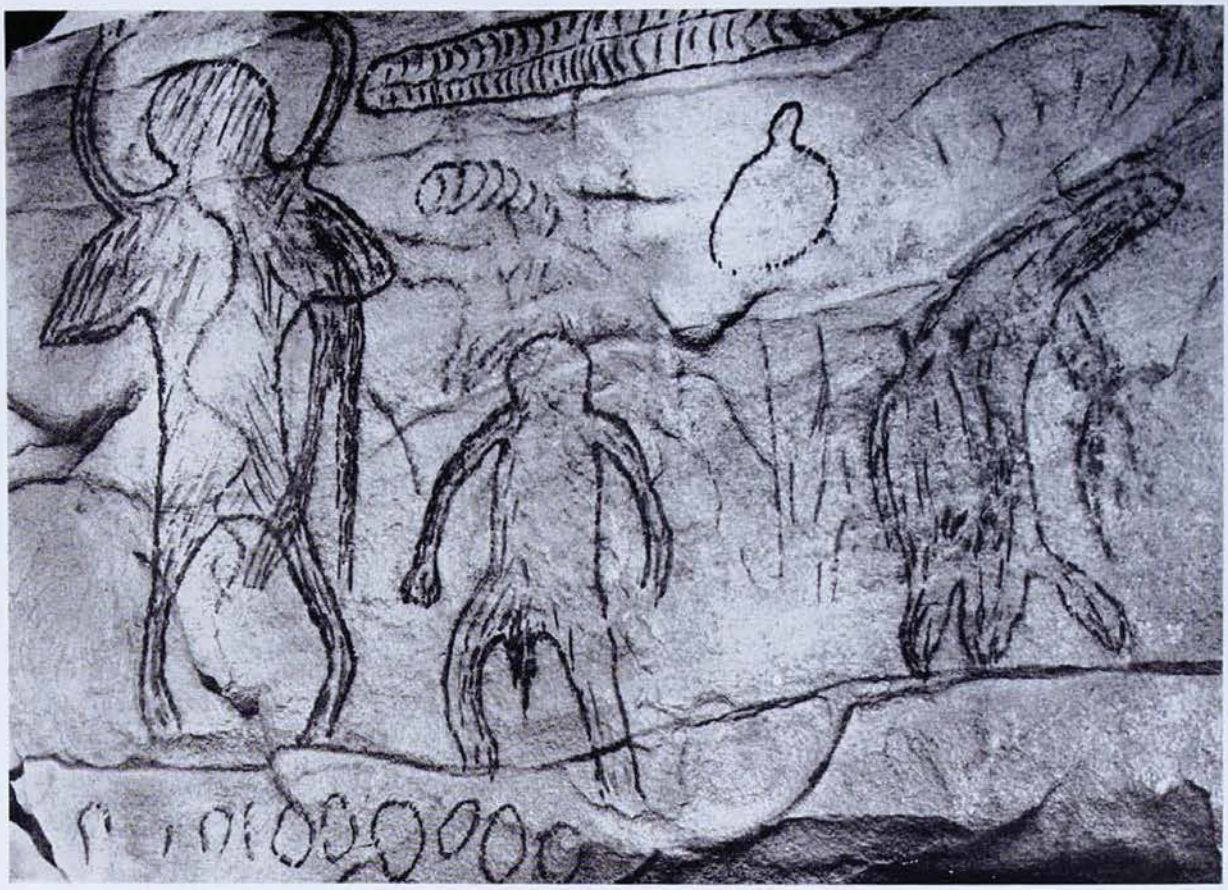
In 1905, a contemporary newspaper reported the existence of "a sandstone patch on Brown's Mt., near Cambewarra, where fish, birds and wallabies may be traced". No other clue was offered as to the site or nature of the figures. One imagines that they may have been rock-carvings.

It was not until 1946 that I had an opportunity to visit the peak of Brown's Mt. (which is not far to the north-west of Nowra), and make a wide search for the alleged figures. I spent a whole day in September on the summit of that conspicuous landmark, and although there was ample sandstone surface in several places, I found no trace of either carving or painting. I did, however, locate two sites of axe-sharpening grooves, more than a mile apart, on the summit itself (2,050 ft. above sea-level).

About twenty-five years ago, during a visit to Cataract Dam (in the north of the zone being dealt with), a resident Water Board employee told me, very vaguely, of "a lizard drawn in a cave, and other markings", somewhere out there in the distant hills. From then on, this vast "empty" strip of country continued to intrigue me. Surely, I thought, there must be many paintings and carvings, at least, out among those sandstone gullies and ridges.

But, twenty-five years were to pass before some concrete evidence suddenly came to light that put me "hot on the trail". In April, 1950, at the invitation of the Illawarra Naturalists' Society, I addressed

[1] Thorpe, W. W.—*Records of Australian Museum*, Vol. vii, 1909, p. 325.
[2] McCarthy, F. D.—*Mankind*, Vol. iii, 1943, p. 150.
[3] Towle, C. C.—*Victorian Naturalist*, Vol. lviii, 1942, p. 173.



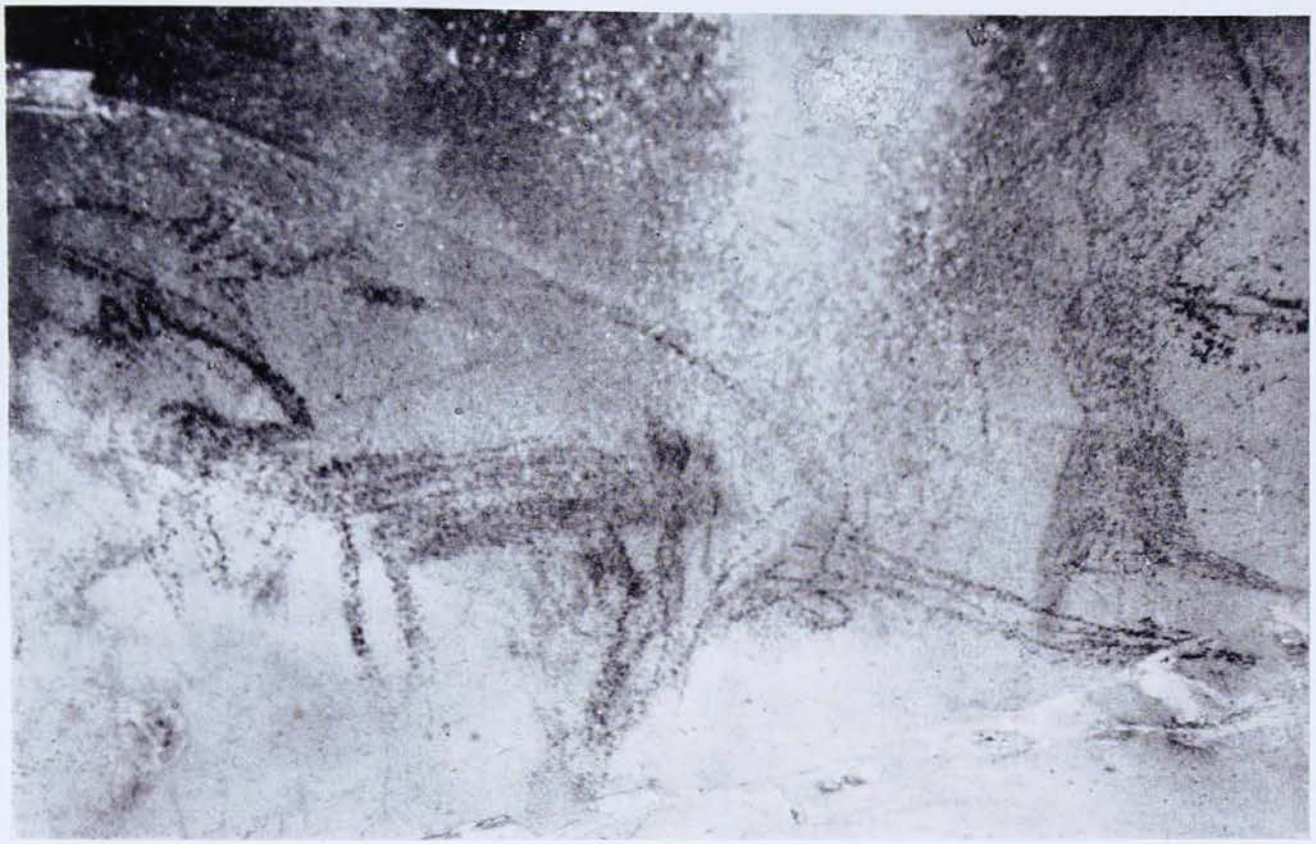
Paintings, carefully retouched on the print by the author, in the main gallery at Avon Dam.

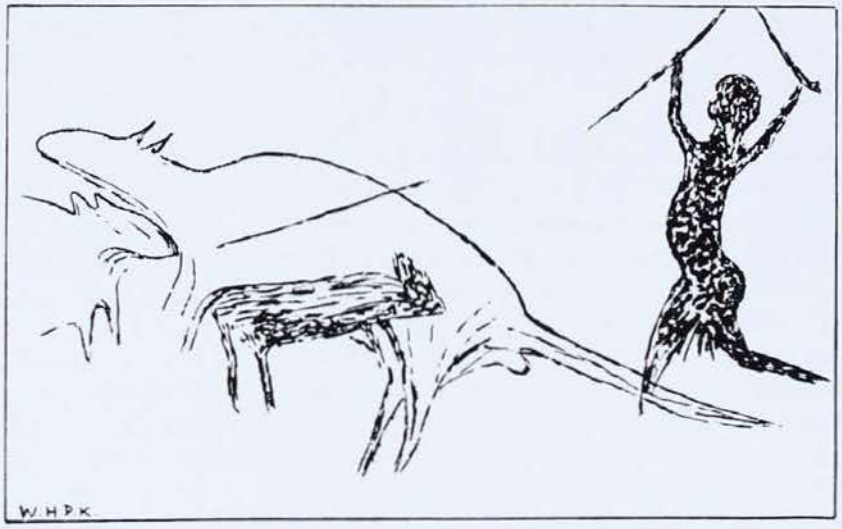
a gathering of outdoor enthusiasts at Wollongong on the subject of rock-paintings in general. There I met a youthful member, and ardent bushwalker, Mr. Royston O'Meley, of West Dapto. He it was who gave me my first precise clues to the existence of rock-art in the ranges behind the Illawarra scarp.

Mr. O'Meley had first visited the sites some eight months previously, after being told about them by an old resident of his district. On the strength of this, we lost little time in arranging a tour of investigation. Thus, in October, 1950, a party of us travelled by motor truck via Picton to the Avon Dam wall, which lies within the Upper Nepean headwaters, and is part of the metropolitan water-storage catchment. This visit was made possible by the ready co-operation of the Sydney Water Board, which kindly placed a launch at our disposal for the day. From the dam wall, Mr. Percy Carter, a resident officer at Avon, navigated us into the headwaters some eight miles to the south-east. This launch trip alone was a novelty, travelling as we did down the length of a sheet of water that looked as big as Sydney Harbour.

When the launch finally pulled into the bank at the upper end of the flooded Avon River valley, we were brought within easy access of a high sandstone cliff that sheltered two groups of rock-paintings. These sites were about a half-mile apart, along the same ridge.

The gallery contained many figures drawn in black, the dominant one being a woman with exaggerated breasts. Some others, including a wombat, were in red. Here, among the charcoal pictures, we saw our first example of a style that is rare in New South Wales. This is the realistic side-view of a human, in silhouette, with a genuine attempt to put natural shape into body and limbs. One such figure here seemed to represent a hunter with a shoulder burden that may have been a kangaroo or wallaby.





Above. — Another group at Avon Dam, with the remarkable side-view silhouette of a hunter spearing kangaroos. This is not retouched.

Right. — The author's scale drawing of the above group.

Somewhat curiously, the picture that appeared to be related to the foregoing was seen in the second gallery, where the main group was an animated kangaroo hunt. Here the hunter, in side-silhouette, was depicted in full-cry, with a spear poised in his right hand, and a spear-thrower in his left. The larger kangaroo had a spear in his side, while another smaller figure may represent the hunter's dog.

The only other evidence of occupation we found at both these sites was campfire charcoal on the floors, and scraps of flaked material.

Mr. O'Meley told me that there is a third gallery some distance back behind this same ridge.

This visit to Avon proved to be a spark that soon kindled into a flame of further and much wider investigations in the field.

Our party inspecting another gallery at the headwaters of Cordeaux Dam.

Two who became prominent in this work were Miss Jessie Giles, of the teaching staff of Wollongong High School, and Mr. Ellis McNamara, who is a member of the Royal Australasian Ornithologists' Union, and lives at Cordeaux. Both from information gleaned from old residents, and from their own explorations, they and Mr. O'Meley brought to light numerous sites of paintings scattered across these tablelands.

All this, of course, further inflated my own enthusiasm. So, in July the following year (1951), we organized another trip. This time we went on foot into the headwater area of the Cordeaux River, covering more than eight miles (by the map) across steep ridges and gullies. Here, Mr. McNamara led us to two sandstone galleries containing many human and animal figures. Colours used were red, black and white. One rock-shelter contained, among others, a representation of an emu and probably a shark. This latter is interesting because the site is more than nine miles due west (as the "crow flies") of the nearest ocean waters where a shark could be found.

A further point of interest at one site here were the remains, some short distance away, of what appeared to be an aboriginal stone-arrangement on the top of a ridge.

Since that day, the Wollongong enthusiasts have found at least two further sites of stone-arrangements westward of Cordeaux Dam. One such is described as a large circle, perhaps 15 yards in diameter, made up of stone heaps. This is mostly in good order.

In the meantime, their search for additional rock-paintings includes an elusive clue to the still hidden whereabouts of the rarest of all figures—a lyre-bird drawn on a cave wall. Outside of rock-paintings, the only known representation of a lyre-bird exists in the form of a rock-carving not far north of Sydney.

As a final commentary, I would add the following:—

The paintings throughout the whole of this "new" area of the South Coast tablelands are, in general, typical of the species, style and technique seen elsewhere in eastern New South Wales. One notices differences, however, though in quantity rather than quality. For instance, there is a marked absence of the mass-patterns of stencilled-hand paintings that are seen so frequently in Hawkesbury Sandstone areas north from the South Coast. Stencil-hands do occur among the southern galleries, but they seem to be subordinated, numerically, to other figures.

The majority of the paintings visited are fairly faint, and difficult to reproduce by photography. With the exception of one site, there was little or no evidence of vandalism. In the matter of conservation, it is fortunate that all of these relics occur within the water-storage catchments, which are out-of-bounds, nominally at least, to the general public.

Marine Stingers

By ELIZABETH C. POPE, M.Sc.

PUBLIC interest in the subject of marine stingers has been greatly stimulated since the bad outbreak of jellyfish stings in New South Wales in January, 1953. Although several articles on this subject have already appeared in past numbers of this journal*, so much additional information has recently come to hand that it is expedient to produce a further account of this matter for our readers in order to keep them up to date.

The animal causing the stingings referred to above was tracked down and proved to be the giant medusa, *Cyanea capillata*, and the story of this investigation has been told in the article "Sea Lice or Jellyfish?". During this visitation by *Cyanea* in New South Wales waters there was no fatal case, although hundreds of bathers and fishermen were stung and many had unpleasant experiences. On the whole, the general summing up was that the *Cyanea* stings were not so unpleasant and dangerous as those of the Bluebottle, *Physalia*. In view of the fact that there is an unidentified marine stinging medusa in Queensland waters, it is interesting to note that *Cyanea capillata* occurs quite plentifully in tropical waters too.

During this same period, a number of jellyfish stings were recorded in Queensland seas and here we meet with a very different story. In the last few years there have been at least half a dozen deaths due to jellyfish stings in the north—the latest one being on 4th May, 1953, near Townsville. In addition to these fatal cases there are a number of reports of stingings of a different type and these are described in letters and articles to the *Medical Journal of Australia* by Drs. H. Flecker and R. V. Southcott†.

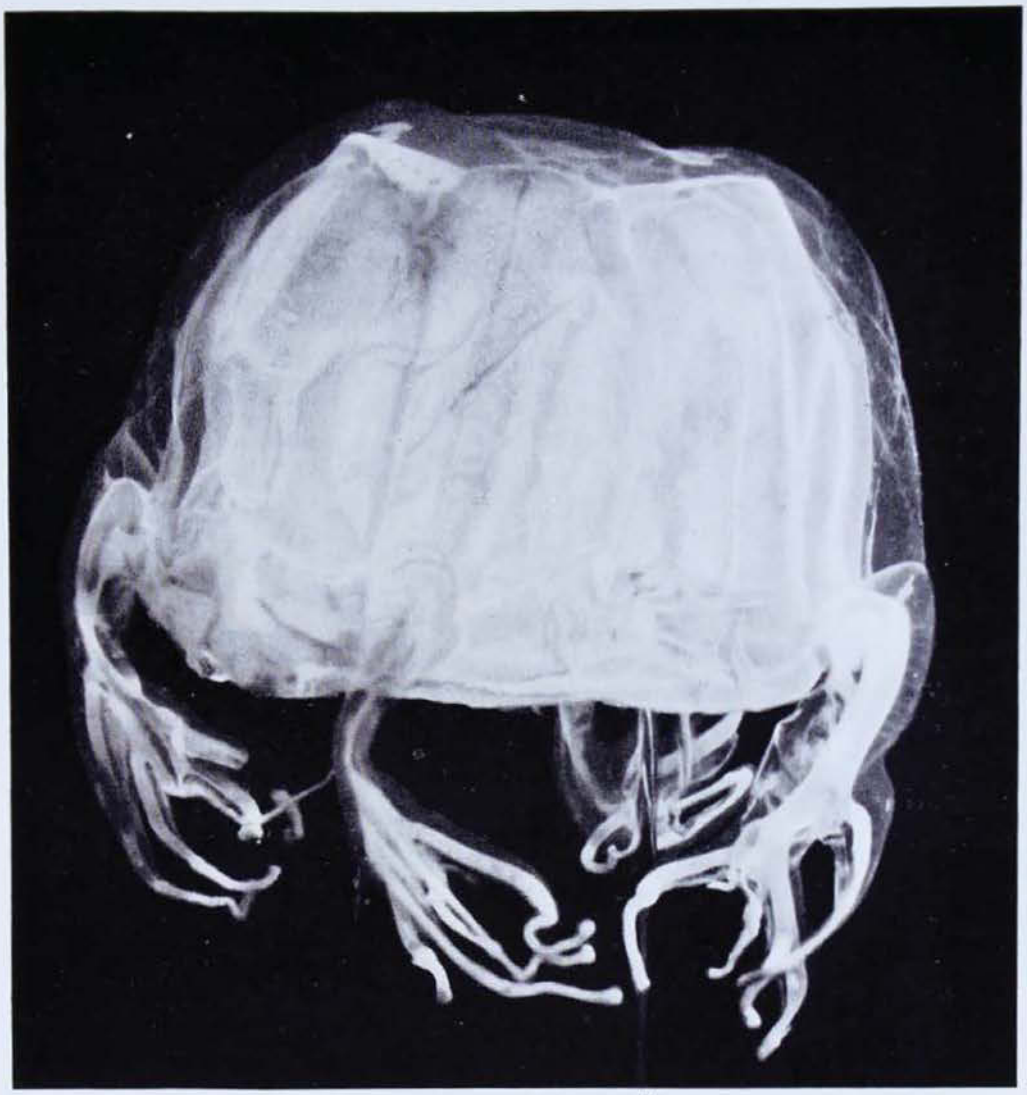
Not knowing the exact causal organism of the second kind of stings, Dr. Flecker calls them Irukandji stings, deriving this name from that of the aboriginal tribe inhabiting the area of the Queensland coast where the stings have been recorded (between the mouth of the Barron River and Brown Bay, near Cairns).

While it is now reasonably certain that the jellyfish causing the deaths of bathers has been tracked down and found to be a carybdeid medusa, *Chiropsalmus quadrigatus*, the cause of the other sort of sting, the less severe Irukandji type, still remains a mystery which Dr. Flecker and his helpers hope to solve in the near future.

The medusa *Chiropsalmus* was first suspected of being a killer in Australian seas in 1938 when the actual specimen that caused the death of a ten-year-old half-caste boy in Darwin baths was sent to the Australian Museum for identification. It was badly mutilated by its captors who wanted "to kill" it but, even in its cut-about state, it was clearly a cubomedusa or Sea Wasp. Although no definite identification was given at the time, a drawing was made of the reconstructed animal and was found to coincide in general with illustrations in Mayer's "Medusae of the World" of the genus *Chiropsalmus*, but, as no specific identification could be attempted then, this fact was not published. Since that time it has been established that both *Chiropsalmus quadrigatus* and *C. buitendijki* frequent northern Australian seas and, in February of 1952, Dr. Southcott published a rough sketch in the *Medical*

*Refer to: "Some Sea Animals That Sting and Bite", AUSTRALIAN MUSEUM MAGAZINE, IX, 5; "A Deadly Poisonous Jellyfish", AUSTRALIAN MUSEUM MAGAZINE, VIII, 4; "Sea Lice or Jellyfish?", AUSTRALAN MUSEUM MAGAZINE, XI, 1.

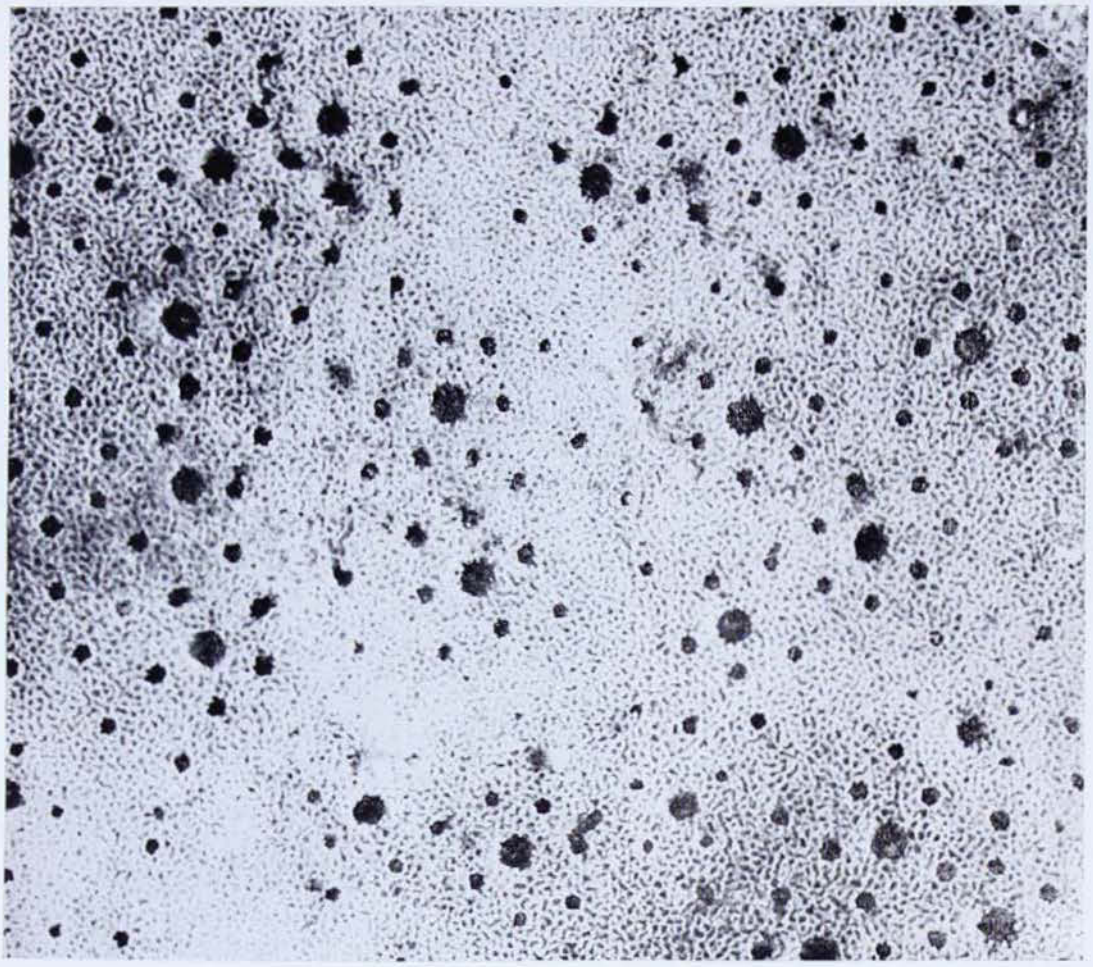
†Refer to a letter in the correspondence section of *Medical Journal of Australia*, (1952) Feb. 23rd, and "Irukandji Stings to North Queensland Bathers . . . etc.", *Medical Journal of Australia*, (1952) July 19th.



Chiropsalmus medusa taken off Palm Beach, near Cairns in Queensland, in January, 1953, by Dr. Flecker. One species, *C. quadrigatus* is suspected of causing deaths to bathers.

Journal of Australia of a medusa captured off a Queensland beach, north of Cairns, where stings were occurring. He tested its stinging powers by applying it to the arm of an experimental subject (presumably himself) and reported only local wealing without any drastic general effects on the victim's health. It is unfortunate that his account does not state whether the above test was carried out in the sea or not, for to the zoologist the test in air would not be a true one of the medusa's stinging powers. Since water is an essential requirement for the proper working of the stinging cells or nematocysts, the jellyfish-out-of-water would presumably not be able to perform normally at all. In addition to this doubt as to whether Dr. Southcott's test really showed up the stinging abilities of *Chiropsalmus* there is another factor that has to be taken into account. The reactions of different people to jellyfish stings are very variable and his test subject may have been one of the lucky people who are not much affected by such poisons. It would be interesting to clear this doubt up.

In 1951 Dr. Flecker sent from Queensland the first intact specimen of *Chiropsalmus* which we believe to be a juvenile of the species *quadrigatus*. This specimen is seen in the accompanying illustration but allowance must be made for the fact that, when photographed, it was in the preserved state and the tentacles were, therefore, highly contracted till they appeared like five small fingers projecting from the spatula-like pedalia. In life they would be very much extended and so fine



The surface of "Stinging Coral" — *Millepora* — showing the characteristic pore pattern through which project the sting - bearing fleshy parts.

as to be almost invisible. In fact, it is often easiest to detect the presence of medusae in shallow waters over clear sand by observing their shadows on the bottom, rather than by trying to observe the clear watery-looking tissues of their bodies. This is one of the reasons why they escape detection, even after the searches made where fatalities occur.

In view of the fact that circumstantial evidence points to several species of *Chiropsalmus* as being the causes of deaths in Queensland bathers, the following remarks from Dr. Libbie Hyman's great textbook, "The Invertebrates" become specially interesting:—

"In *Chiropsalmus* there springs from each bell corner a large thick pedalium that branches into a number of smaller pedalia with tentacles. This genus is one of the most dangerous Coelenterates and is greatly feared by Philippine and Japanese natives, who terms it 'Fire Medusa'."

Before leaving the subject of fatal stings on the Queensland coast, it is interesting to read the evidence of the 11-year-old son of the victim of the tragedy that occurred last May, near Townsville. The boy stated that the tide was receding and the water at most 4 feet deep as he and his father waded out with a box to reset their fish-trap. They were about 10 yards out from the shore in water that was knee-deep. They took a rest and were about to lift the box up again and proceed when his father stooped down, placing his hands between his legs. As he stood up the boy noticed thick cobweb-like looking stings on his father's arms and legs. His father went pale immediately and said, "Get out of the water quick, Ken". The boy climbed upon the top of the trap and so got out of the water. His father staggered ashore and said, "I've copped the lot". He died within a matter of from three to four minutes.

The son was accustomed to go fishing with his father and had some knowledge of marine animals. He was thus able to give the coroner a description of the crea-

ture which stung his parent. He stated that he saw "A jelly like a bell, with tentacles about 18 inches long hanging down and coming from where his father had been". It swam slowly, looked glassy brown in the water due to the colour of the sand which made it appear darker. When the medusa had passed by he jumped off the box and waded ashore without being stung. The jellyfish is thus clearly implicated in this case and the description fits a regular type of scyphozoan medusa (including a carybdeid like *Chiropsalmus*) and certainly is not a siphonophore type (like *Physalia*) since the boy described the bell-shaped body and made no reference to any float structure above the water. The colour is also wrong for the Bluebottle, *Physalia*. It is to be hoped that after direct evidence of this nature the local newspapers in Queensland will cease to blame the Portuguese Man-o'-war (another popular name for *Physalia*) for the tragedies which happen from time to time in those waters.

All the worst and fatal stingings from medusae, reported so far from Queensland, seem to occur seasonally—chiefly during the months December and January and for a week or so during February. Whether this is to be correlated with the fact that this is a holiday period when, presumably, more people go swimming and so expose themselves to stings or whether it is to be connected with the fact that the jellyfish toxins are more virulent at certain times than at others, is not yet known. Much investigation is needed on this subject before any answer can be given to such questions.

In addition to the medusae there are at least three more stinging organisms found in tropical Australian waters and all belong to the class Hydrozoa of the Coelenterates—a group which differs to a marked extent from the Scyphomedusae to which the Sea Wasps and other jelly blubbers belong. However, the stinging mechanisms in both groups work similarly and it is only in the virulence or otherwise of the toxins that the groups show differences.

The first of these animals is called locally "Stinging Coral" but it is a millepore coral and not a true reef-building type. Its white limy skeleton is constructed on a totally different plan from that of the madrepores and the accompanying photograph, which is a close-up, shows the characteristic pattern of pores on the surface by which a millepore may be recognized. Characteristically there is one larger pore, surrounded by five or six smaller ones and through these project the soft tissues of the body which carry the stinging nematocysts. The sting received, if one brushes against a *Millepora* colony, can be very powerful and cause an uncomfortable burning sensation. One professional zoologist, who has experienced a wide variety of coelenterate stings, rates *Millepora* sting as worse than *Cyanea* or Bluebottle stings for discomfort. The stinging qualities of *Millepora* have long been known to scientists and Saville-Kent fea-

Stinging "Seaweed" which is really a hydroid animal called *Algacophenia cupressina*.

tured this species in several illustrations in his beautiful work on the Great Barrier Reef.

Two further hydrozoan animals with nasty stings are *Aglaophenia cupressina* and *Lytocarpus philippinus*. As the illustrations show, their appearance is plant-like and they belong to the animal group called Zoophytes—a word whose literal translation means plant-animal. In fact at Heron Island, on the Barrier Reef, the people call *Aglaophenia* the "stinging seaweed". Its colour is the particular brown associated with seaweeds so that it is no wonder that it has been given this popular name. *Lytocarpus* on the other hand is generally more feathery in appearance and not so like a brown alga as to be mistaken for one. It grows attached to wharf piles and rocks, below the low-water mark of spring tides, and has been taken in Moreton Bay as well as at more northerly points along the coast. Both these animals inflict burning stings when they are touched or brushed against, about equal in severity to the sting of a nettle. The stinging mechanism works in the same way as that of the bluebottle or *Cyanea* medusa, the only difference being that in the two hydroid zoophytes the toxin they inject is less drastic in its effect on humans though it is an effective paralysing agent for the small creatures which form their normal prey.

Stinging hydroid zoophyte, *Lytocarpus philippinus* which "burns" like a nettle when touched. It grows just below low-water mark.

While this new array of stingers might seem a very formidable one, it is quite possible, by exercising a little care and using common sense while swimming or fossicking along tropical shores, to avoid being stung or injured. It would be very unlikely that the ordinary tourist or fisherman in Queensland would encounter more than one or two of the milder stingers described in this article and their effects soon wear off, so there is no cause to worry.

Bali: Emerald Gem of the Indies, I

By FREDERICK D. McCARTHY.

BALI is a magnet to the tourist, and forms the crowning glory of a tour of enthralling beauty and absorbing interest for the traveller in the Indonesian archipelago. Bali is a small island, only 2,243 square miles in extent, and forms part of a volcanic chain which links the archipelago with Asia. A high mountain range, along which majestic volcanoes rear their sacred peaks, extends from west to east across the island.

The rich volcanic land, scarred with deep ravines, slopes away to the coast in the north and south where it forms fields of incredible fertility. In these two areas the greater part of the population of one and a half million live in a throbbing density of five hundred to the square mile. In the west is Djembrana, the mythical home of the Balinese, a high arid plateau which has but little running water, and whose virgin forests are still the home of the tiger, wild pig and deer. There remains Tafelhoek or Table-corner, in the south-west, a limestone mass with sheer cliffs rising hundreds of feet from the sea. Upon it is the temple of Ulawatu, dedicated to Dewa Daya, goddess of the waters.

The famous naturalist, Wallace, discovered in 1879 that in this transitional Indonesian region the Asiatic fauna and flora extends as far south as Bali, while the earlier and more primitive Australian forms begin to appear in Lombok; thus Wallace's Line runs between the two islands which are separated by a very deep strait.

The two most famous volcanoes on the island are Gunung Agung of 10,300 feet and Gunung Batur of 5,632 feet. As their island forms the whole world in Balinese conception, so G. Agung forms its navel. It is the sacred peak of Bali where Siva lives, and is associated with the highest religious conceptions. The main tourist road, from Buleleng to Den Pasar, runs along the rim of the old crater, which is a mile across. The mountain top is usually enshrouded in mist, but I crossed it on a clear day, and saw the serene and peaceful Lake Batur in the crater, lapping the base of the new peak down the sides of which lava slowly oozes its way. An eruption in 1917 caused the loss of 1,372 lives, thousands of homes, and numerous temples in the great village on the lake shore, but the survivors, encouraged by the arrest of the lava at the doors of their great temple, returned, and were wiped out in 1926. G. Batur has erupted frequently in recent decades.

In the dry season from May to October the south-east trade wind cools the island, but from November to April the north-west

Balinese women with babies. The mothers are wearing Batik and calico skirts.

Photographs by the author.

monsoon ushers in a period of flooding rains, swelling the streams into swift and destructive torrents which carry away irrigation works, bridges, trees, gardens, pigs and people into the deep ravines. In this humid, hot-house atmosphere, the dripping forests are enmeshed with creepers, the trees are covered in orchids, and there are gorgeous butterflies everywhere.

The landscape of Bali is a palette of all shades of green from that of the dark gloomy forest to the delicate pastels of the young rice. The rice *sawahs* cover the hills and valleys, and rise high up the mountain sides in gracefully curved terraces. Coconut palms, banana, papaw, breadfruit and mango trees surround the villages, and

Canoes on Den Pasar beach. In the background a grove of coconut palms fringes the shore on which some Balinese are fishing in the shallow water.

plantain trees, areca and lontar palms line the roads. The large forest trees tower over both houses and temples, and the enormous banyan, a gift of the Hindu culture, contributes its welcome shade. The scenery of Bali is thus a composite of lush green foliage and gold, ripe rice, with a honey-brown people living in perfect harmony with their environment; ever present is the background of rice terraces and volcanoes, and the sweet scent of frangipani.

HISTORY.

The history of Bali is interesting but tragic. It was discovered by the Portuguese in the 16th century. In 1597 the Dutchman, Cornelius van Houtmann, used it as an emergency port, and his report caused the ruler of Holland to send an emissary with gifts for the "Konig van Bali", who was so pleased that he offered one of his island belles as a return gift. In 1855 the Dutch occupation was begun by officials who went to Buleleng, and from that date until 1908 they rigorously suppressed the internecine strife, piracy on the coasts, the sacrifice of widows on the pyre, and other harmful enterprises and customs. The Dutch East India Company caused much trouble on the island in its attempts to gain concessions until it was disbanded by the Government of Holland in 1798.

In 1908 only the principalities of Badung, Pemetjutan, and Klungkung remained uncontrolled and their conquest is a stirring epic of faith. When the Dutch soldiers approached the palace of the Radja of Badung at Den Pasar, he decided to die honourably, and assembled his family and retainers for the *puputan*; they all assumed their finest clothes and wore their most exquisite jewels and ornaments. They carried the traditional weapons, the kris and lance, which were imbued with the supernatural powers of the gods and were to be pitted against the guns of the Europeans. The assembly, worked into a frenzy marched forward to death. They attacked the Dutch to no avail, and so turned their weapons upon themselves. Soon all that remained of the gorgeously attired band of aristocrats was a blood-smeared heap of bodies! *Puputan* was carried out also by the Radjas

of Pemetjutan and Klungkung. No members of the group survived, those who missed the rite were either killed or committed suicide. The participants entered Indraloka, or Heaven, to their everlasting glory.

THE BALINESE.

Many people ask the question, whence came the Balinese? Anthropological research has revealed that they are a slender, light-skinned Indonesian stock in which there is present an earlier, dark-skinned, heavy-jawed Australoid-Melanesoid element. Into their Utopia, from the 1st century, A.D., came the Chinese traders to rise to predominance during the 12th century. Bali was under Javanese influence from the 10th century, revolt as the natives would against it. During the 14th and 15th centuries the great Hindu kingdom of Modjapait rose to supremacy in southern Java and Bali, but its power was broken in the 15th century by the Mohammedan penetration of Java. This resulted in the migration of some ten thousand of the Hindu intellectuals and their followers to Bali, and they settled in the Klungkung area. To this mass infusion is due the great expansion of Balinese culture, especially of the arts which were highly developed in the Hindu-Javanese empire. Hinduism, however, has not completely saturated Bali; it is predominant on the northern and southern slopes, but in the mountains of the interior the Indonesian Balinese, known as the Bali Aga, carry on their older culture with its animistic religion.

The Bali Aga lived in isolated and independent communities, differing almost as much among themselves as they do from the Hindu-Balinese. Their mode of life is comparatively simple, particularly the dances and music; the temples are often mere heaps of stones, although in the highlands are ancient stone statues, pyramids, and other monuments which have yet to be investigated by the archaeologist. Tenganan, in south Bali, is a Bali Aga village which has extensive and fertile lands, is rich and self-contained, and its long-haired rulers regard themselves as the superiors of the Hindu-Balinese nobility. Tenganan is famous for its magnificent woven ceremonial scarfs, which take five years to make, and only the faulty and poorer examples are sold to outsiders. The everyday life of the people is inseparably bound up with the practice of religious rites and the arts and crafts of the country.

Actually, the natives themselves form one of the main charms of Bali. They are of medium height, have small bodies, slender arms and legs, delicate hands and feet, and sensitive expressive faces. Their bodily development is perfectly proportioned. Their skin is light brown in colour unless it is sunburnt from work in the gardens. They are easy-going, courteous, witty and gay. Laughter is a frequent emotional outlet and their happiness is contagious. Their philosophy of life is ruled by an appreciation of beauty and dignity. The *sudra* caste, which comprises 93 per cent of the people, regard such professions as indigo-dyers, pottery-, palm-sugar-, and *arak*-makers as inferior, because the Balinese regard beauty and purity as the highest emotional and intellectual attainments. The most dignified bull-team, rather than the fastest, is awarded first place in the ploughing contests; the tender souls of the children would be destroyed if they were beaten.

Courting and marriage have some unusual features. Virginity is not regarded seriously among the *sudras*, and clandestine love-affairs are frequent. Love-magic is resorted to should a girl not reciprocate advances. A young couple who decide to get married have a honeymoon before the ceremony and if both are satisfied the bridegroom pays his future parents-in-law several hundred guilders for his spouse. The bride contributes a costly trousseau. She must be a good worker and, above all, must produce sons, otherwise she is doomed to a horrible future in the afterworld. The women of the nobility live a secluded and closely guarded life.

The Balinese previously wore woven sarongs or Javanese batiks, but nowadays they wear cheap imported copies. In the old days only prostitutes covered their breasts, but the staring eyes of the tourist and the camera have caused most of the

Carved pillars flank the entrance to and stand at the corners of the village enclosure.

women along the roads to wear light blouses. A scarf is neatly wrapped round the head and a large sun-hat is worn in the *sawahs*. The elders are inveterate chewers of *siri*, a quid made of areca nut, pepper leaves, and lime, which causes a great flow of red saliva; this is spat out, and, after a little group has moved on, one would think a murder had been committed.

VILLAGES.

The Balinese live in compounds, surrounded by high white-washed walls, in which one or more related families have their mud-houses thatched with rice-straw. A number of these family groups constitute a village, and this has certain interesting features in its layout. It has a sacred central square, at the junction of the north-south and east-west roads, orientated to the peak of G. Agung. Adjacent to the square is the village temple (*pura desa*), the prince's palace (*puri*) with a high gate and carved walls, the *bale* terrace where the people assemble for feasts and ceremonies, the tower for the alarm bell, the *wantilan* in which the cock-fights are held, and the market (*pasar*). A sacred banyan tree (*waringin*) grows in the square, its mass of aerial roots cut off just above a man's height, but which, when unchecked, reach the ground and form a Walt Disney underworld of fantastic shapes. Beneath the Banyan village theatricals and dances take place. Also adjacent to the village, in a cool shady spot among bamboos, is the public baths in a nearby stream. The Balinese bathe twice a day, as often

The markets are crowded and animated centres of economic activity, where the steaming tropical atmosphere reeks with the pungent flavours of durian and tropical fruits, fish, and other foods.

Travellers between villages and markets patronize the many wayside stalls along the roads and tracks. Here a girl is selling bananas, sugarcane, and other fruits.

as not in a roadside ditch or under a spurting shower from a rice terrace, but they observe strict modesty between the sexes in public. Finally, the cemetery, with its bamboo altars and temple of the dead, stands on the outskirts.

In the village one sees the natives going about their daily tasks. They have extraordinary pigs whose bodies sag so much that their bellies almost drag on the ground. Fighting cocks in their domed baskets are lined up along the roadway, upon which fowls scratch a living, and are constant victims of the motor cars. The ducks are trained to follow a boy or an old man and to stay near a white flag on a stick. Naked children are everywhere, especially round the water-buffaloes which wander about at will. Curs of all descriptions, mangy and half-starved, nose in and out and make the night hideous with their yelping. The cattle are fine deer-like creatures with long neck and slender legs.

The commercial centres form ugly blots round the capitals of the Regencies, where the Radjas live. They consist of rows of dingy and untidy stores, run by Chinese and their numerous offspring, by black-bearded Arabs, velvet-capped Javanese and Eurasians. Chinese hotels, garages, and curio stalls make up the balance, together with the large native market. About these townships the local natives are mostly unkempt and deeply sun-tanned, and belie the glamorous beauties of cruise literature and advertisements. The real Balinese and his culture are to be found only in the villages, especially those furthest away from the tourist roads. Soccer football is played by the town natives.

The village land really belongs to the gods and is only worked by the people. Each family has its plot for which it pays taxes to the rulers, aristocrats of divine origin who are the representatives on earth of the gods. The people respect the nobility, but they control despotism and unjust interference with boycott and passive resistance.

The village organisation is essentially co-operative. The men form village societies, which uphold the traditional institutions and laws and control the village activities. They pass judgment upon criminals,

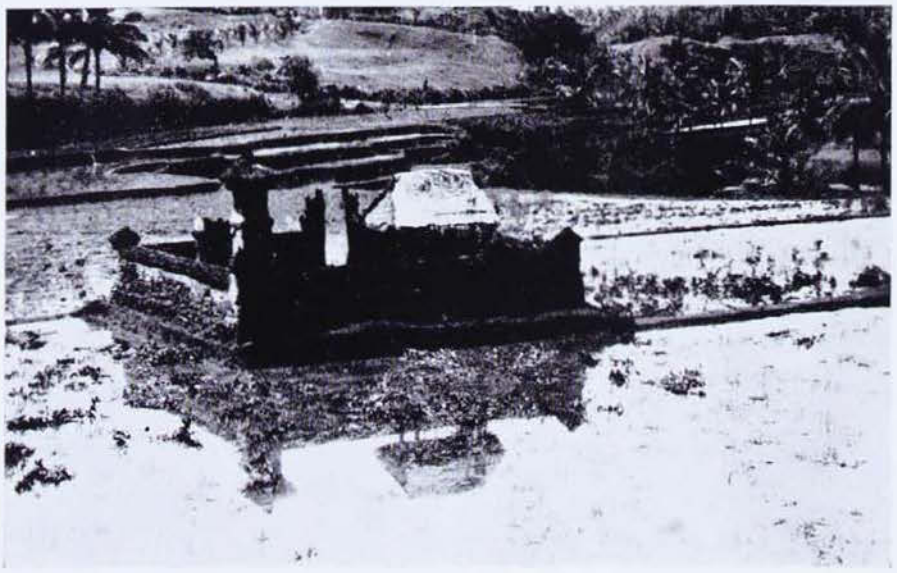
The harvest is gathered by the village community against a background of cloud-covered volcanoes.

always trying to adjust the matter between the contending parties, otherwise they are brought before a high tribunal of Brahmanic priests. Moral sanctions are the most potent deterrents in the maintenance of the law. The most severe punishment is expulsion from the village, because no other village will admit the wrongdoer, and the criminal becomes an exiled parasite. Caste distinctions are rigidly enforced, and dominate the social life and behaviour of the people.

RICE CULTIVATION.

Although the sweet potato, bananas, coconuts, tobacco and many other crops are cultivated, rice forms the principal food of the Balinese, and they grow the finest rice in Malaya. Its cultivation is an elaborate cult associated with Dewi Sri, goddess of agriculture, fertility and success. The art of growing rice was introduced by Indra, ruler of the heavens, who was forced to impart his secrets by Wisnu, ruler of the underworld.

Before planting, a priest visits a source of holy water and when he returns it is believed that the deity of the source visits the village. Rites are carried out at the temple to retain the goodwill of this deity, and the holy water is sprinkled over the *sawahs*. The rice seed is carefully selected, magico-religious ceremonies are performed at planting and harvesting, and the success of the crop assured by efficient cultivation and irrigation. The mother seed is planted in a nursery, and at the end of two months nine plants are set out in a sacred pattern. The rice reaches maturity in from five to six months, and two crops are grown each year. Mice and rice-birds are troublesome thieves of the ripening heads, and to frighten them away a device is employed which consists of an intricate



Offerings for a bountiful crop of rice are made in small temples erected in the rice *sawahs*.

The well-grown rice is of fine quality. A water distribution channel runs between these two *sawahs*.

network of strings hung with leaves and operated by a boy or an old man from a watch-tower. Scarecrows and the beating of drums and sticks are also used.

The men of the community co-operate in the planting and cultivation of rice, and women and children assist in the harvesting. The stalks are cut one by one, made up into sheaves to be stored in the granary, and the surplus is sold or bartered. A rice-mother is made out of stalks, dressed and decorated, and placed in the granary also, where it is left for the rats to eat because human beings cannot partake of these heads.

As a rule, breakfast is not eaten and a snack is taken to the fields. The family assembles for the noonday and evening meals, and the women eat after the men. The tattoo of the rice pounders is to be heard in the late afternoon in every village. The rice is boiled and is flavoured heavily with chili, pepper and other spices. It is eaten with vegetables and sweet potato. Chicken, duck and pork are commonly eaten, and beef on rare occasions. The few fishing villages sell their catch in the markets, and their most valuable haul is turtle which is eaten only at feasts. Some insects figure on the menu. The wide range of fruit in this paradise includes the banana, papaw, mangosteen, coconut, pineapple, mango, orange, melon, peanut, breadfruit, jackfruit, rambutan, and durian. At feasts a great variety of dishes is cooked, and the roasting of the sucking pig is a fine art.

Generally speaking, the men do their fair share of the work, although it is done when it suits them. As is usual in primitive society, the men do the harrowing, ploughing, and heavy work, look after the cattle, and are the wood and stone workers. The arts of painting and writing, music and drama, metal work and other skilled crafts, are the exclusive privilege of the men. The old men are the intellectuals, a cultured elite busy with teaching the arts and arranging their village business. The women do all the housework, weaving, and marketing, and their principal emotional outlet is dancing. In the lower coolie class, who possess no lands, the women do roadwork, bricklaying, and other strenuous labour because their menfolk do not like such work! A sharp distinction between the sexes is that the men always carry loads on their shoulders, and the women carry on their heads. To this training from childhood the women owe their upright graceful carriage, perfect poise, and good health, and their appearance is preserved into old age. A curious anomaly is that the women control the family purse, which is just as well because the men are inveterate gamblers on the cricket- and cock-fights.

MARKETS.

Laughing women in a hubbub of conversation, amid heaps of brightly coloured

Water-buffaloes pull the harrow through a *sawah* in preparation for the planting of a new crop of rice.

fruits, vegetables and cloths, and the mixed scents of coconut oil, flowers and spices, at times overwhelmed by the strong smell of the durian and dried fish—such is a Balinese market. It is a never-to-be-forgotten riot of tropical colour animated by gracefully moving women who buy and sell their goods and exchange the local gossip. The big market is held every third day of the religious calendar, and from dawn it gradually rises to a crescendo of activity in midday and subsides in the late afternoon. Offerings are made to the market deity. The currency used is the familiar Chinese "cash" which is called *kepeng*; these are strung in *satak* of 200 coins. Since villages are close to one another, the natives can attend a market each day, so that the roads and tracks are lined with laden women going to and fro, and with occasional men carrying pigs. The main source of income lies in the products of their crafts and in the sale of cattle and pigs, large numbers of which are exported to Java each year.

Burial.

The cremation of the dead is one of the most exciting events in the life of the Balinese. The great expense entailed has compelled villages to co-operate in multiple disposals of corpses. An elaborate tower (*wada*) is made, which has only one roof for the *sudra* caste, and from three upwards for the nobility and priests. The corpse is placed in a *wada*, which is carried to the burning place (*sema*) by a struggling, tugging mass of men, where the deity of fire, Agni, is honoured by the assemblage walking round it three times. The bodies are then placed in special coffins (*patulangans*) made of bamboo covered with velvet, and differentiated according to caste. The *patulangan* for the Brahmins is in the form of a white bull, that for the Satrias a golden lion, for the Wesias a black bull, and for the Sudras a green fish. After the offerings and consecrations are completed, the *wada* and *patulangan* are burnt. Next day, the ashes and bones are again blessed, and their double purification is completed by throwing them into a river or into the sea. During the rites the *gamelan* music is played.

The Balinese are thus revealed as a happy and busy people with a definite set of values and a well-organized social and economic life. They have an intense desire to work their own plot of land and to obtain by rites and ceremonies the bounty of their numerous gods; further, their emotional life is given full scope in their highly developed arts and crafts, which will be described in the next issue.

The Mysterious Hairtail

By G. P. WHITLEY.

THE curious annual appearance of those strange-looking fishes, the hairtails, is a source of wonder to fishermen of the Hawkesbury River and Broken Bay in New South Wales. The legend arose that these visitors appear each year about Anzac Day (April 25), stay a few weeks, and vanish—no one knows where. It has also been assumed that they are caught nowhere but in the Hawkesbury's reaches, particularly Jerusalem Bay and nearby creeks, so fishermen are often surprised to learn that there are hairtails in other countries and, indeed, in other States of Australia, though the species are different. Let us review the known natural history of our hairtail and we shall see that the legends, attractive as they may be as modern folklore, are not in complete agreement with the facts. So little is known about these fishes that this article is written in the hope that fresh data will be forthcoming.

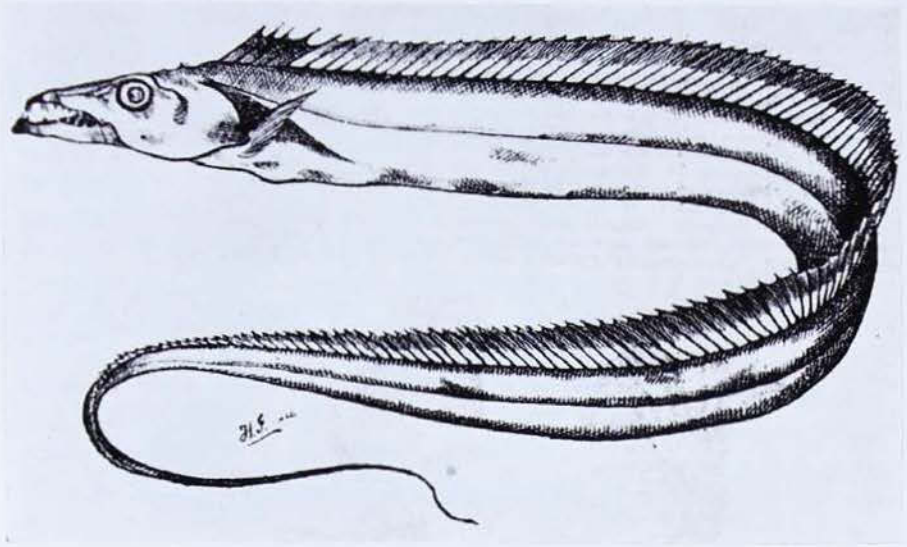
The hairtail of New South Wales (*Trichiurus coxii*) is a long, thin and compressed, very silvery fish, tapering to a finely pointed tail; the head is like that of a barracouta (the two are related) and the mouth has long sharp fangs.[1] These teeth and the pointed tail distinguish the hairtail from the Frostfish (which has a small forked tail) and the Ribbon Fish (which has no teeth or very small ones), with which the hairtail is sometimes confused by fishermen. The Whiptail, which invades Tasmanian waters, is an entirely different fish with large rough scales and should not be called a hairtail: the latter has no scales. A large eel, the Pike Eel, is sometimes caught in hairtail country, but the accompanying figures show the structural differences.

[1] Similar fangs are found not only in the related barracouta, but in the unrelated sea pike (*Sphyraena*), lancet fish (*Alepisaurus*) and the emaciated-looking *Anotopterus*, a striking example of evolutionary convergence in different predaceous fishes.

A haunt of the Hairtail: Cowan Creek, Hawkesbury River, New South Wales, a deep sandstone valley flooded by the sea.

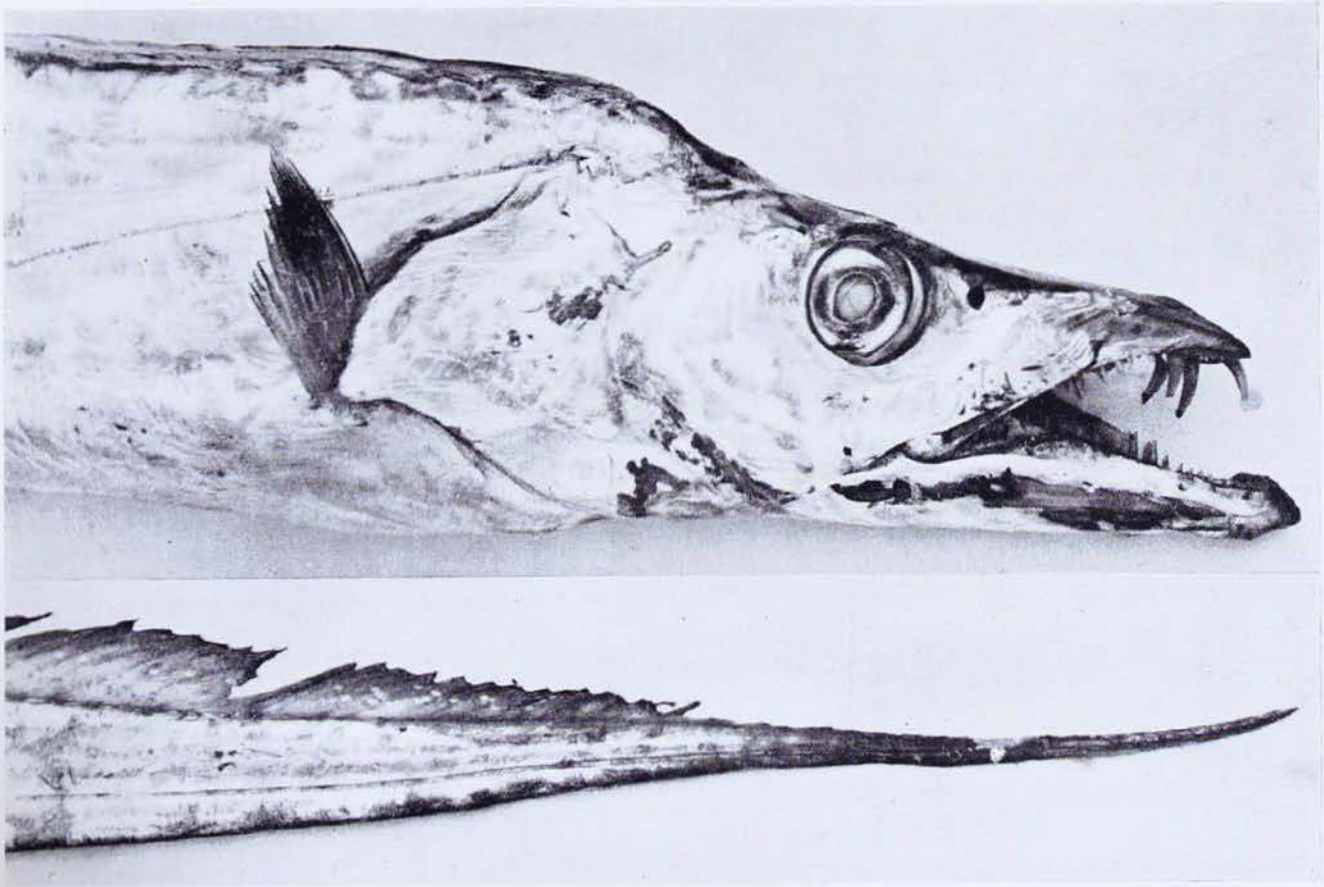
Photo.—(The late) Harold B. Rabone.

The earliest mention of our New South Wales species was a brief undated record from "Port Jackson and Newcastle" in Sir William Macleay's Descriptive Catalogue of Australian Fishes, 1880. However, in July, 1887, hairtail entered Broken Bay and a three-footer was named *coxii* in the *Australian Town and Country Journal* for October 15, 1887; this, the type of the species, is still in the Australian Museum. On March 12, 1888, hairtail again invaded Broken Bay and four were purchased for the Museum at one shilling each! We still have them. Then, for many years, I have

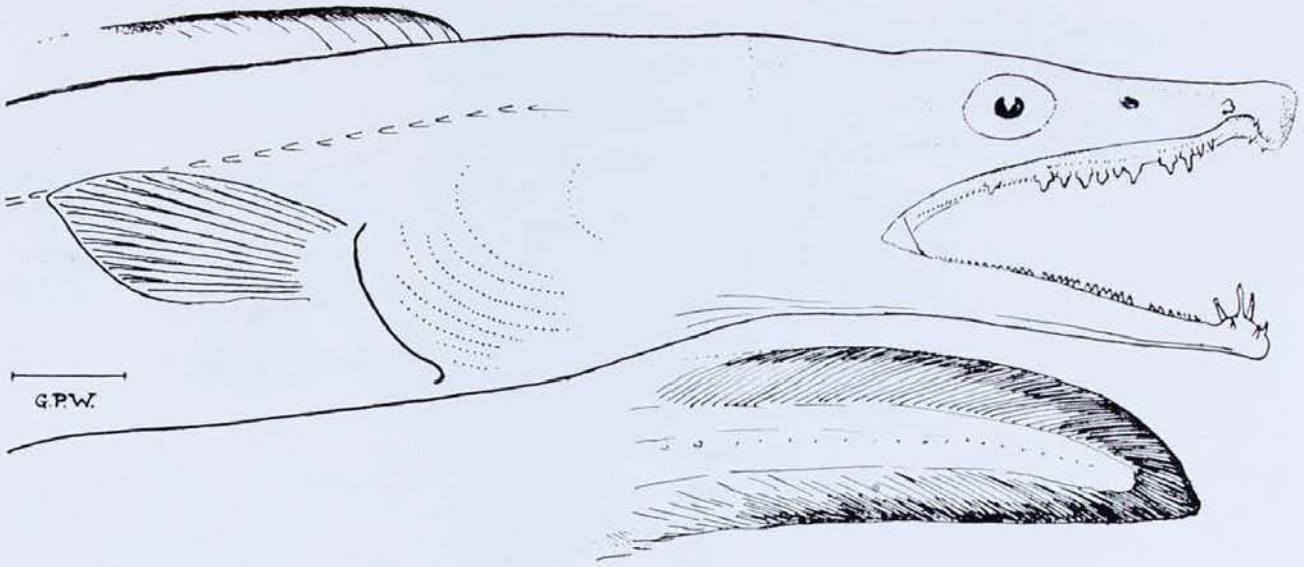


The original Australian Hairtail, *Trichiurus coxii*, from Broken Bay, New South Wales. From "Town and Country Journal", Sydney, 15 October, 1887.

Courtesy of the Mitchell Library, Sydney.



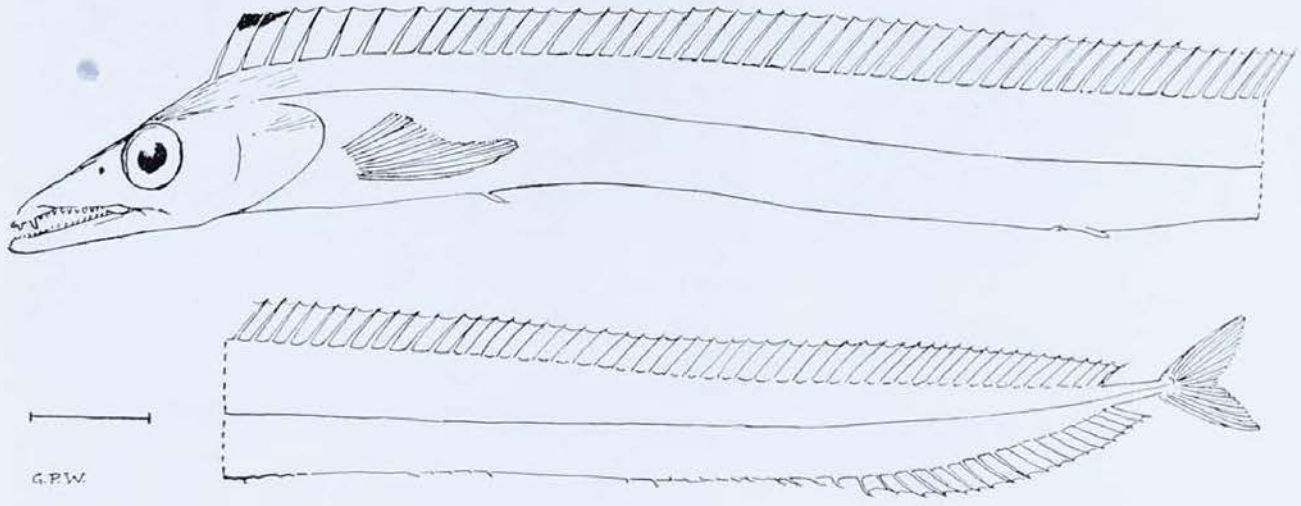
Head and tail of a Coogee Hairtail showing the characteristic barbed fangs in the mouth and the thin tapering tail.



Head and tail of the Pike Eel, *Muroenesox arabicus*, sometimes caught with Hairtail in New South Wales. The end of the snout, teeth, gill-openings, and the fins surrounding the end of the tail of this eel are quite different from those of the Hairtail.

G. P. Whitley, *del.*

no records, though Ogilby in 1913 remarked that the hairtail was "most erratic in its appearances". On February 4, 1913, they entered Newcastle harbour, and on June 27, 1917, the Sydney fish shops were displaying many others for sale. I have no data for the 1920s except that hairtail were in Jerusalem Bay June 26 to July 14, 1926, and Mr. D. G. Stead remarked that they work seaward when heavy rain is falling. Hawkesbury residents stated that in the late 1920s and early 1930s hairtail arrived about July, and in 1932 they were of the opinion that the vanguard of these fishes appeared annually about Anzac Day, followed by the majority in May, and stay there about three weeks before disappearing. However, in 1933, hairtail failed to appear at all in the Hawkesbury, but on May 17 to 20, 1934, they were back again at Cowan. On April 15, 1935, we received a specimen from the Shoalhaven River, near Nowra, a long extension south of the fish's range. In



A Frostfish, *Lepidopus lex*, trawled from 200 fathoms off Genoa Peak, Victoria, showing the forked tail fin. The fish joins at the dotted line; the small line (lower left) represents one inch to scale.

G. P. Whitley, *del.*

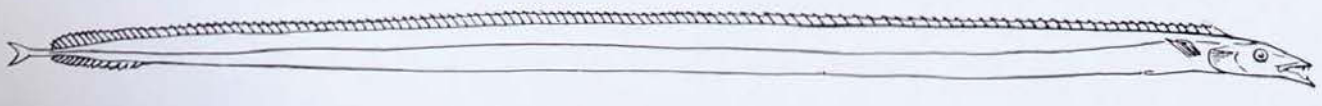
1937, hairtail had returned to Jerusalem Bay on May 6, but then came the locust years of war and I have no further data except Cowan, June, 1943. Surprisingly though, a 300-lb. catch of hairtail was made off Bunbury, Western Australia, on December 1, 1947. In recent years, the Hawkesbury invasions have not only resumed their regularity[2], but the fish have overstayed their usual few weeks by a couple of months, until now there are schools of them all the year round. Here then is an interesting example of a species spreading over time and area under our eyes and future records should be kept. The fish must come from the Tasman Sea, perhaps from the north or north-east, since the genus is a tropical and temperate one, or they may retire to deep water off our coastline in 40 fathoms or so, where they could have evaded capture by the trawlers. Their eggs and young and migrations have yet to be discerned.

The hairtail grows to about 7½ feet long and perhaps 8½ lb. weight, but the usual run is between 3 and 5 feet, going about 1 lb. to the foot. It is delicious to eat and is caught by handlining (with wire trace and a curtain ring or loop for the finger when hauling in) with fish bait and no sinker, the schools usually being in mid-water over deep spots in inlets. It is said to take the bait lightly at first, between the teeth, and later swallows it and can then be hauled in; moonlight nights are considered best for fishing. Adult fish were reported from the Hawkesbury in June, 1951, males being bigger than the females, which had ripe roes. Various fishes and crustacea form the food of the hairtail.

Trichiurus haumela, a related tropical species, extends into Queensland. "When resting," writes George Coates, "this fish has a peculiar habit of doing so in a head up, vertical position. It is sometimes found in small shoals and at first glance, a resting shoal appears as a number of black spots in the water. If the water is at all dirty, these resting fish are very hard to see. They are splendid leapers and often leap when pursuing prey." Another species (*Lepturacanthus savala*), with an enlarged front anal spine, occurs in Queensland, the Northern Territory, and Western Australia. The anal spine is thought to be venomous and a defence against attacks by squids. All the foregoing fishes have whiplike tails.

Australia also has three cold-water frostfishes, with small forked tail-fins. One is the same as the famous New Zealand *Lepidopus lex*, the depth of whose body is contained about sixteen times in its total length. The Anzac Frostfish, *Assurger anzac*, found on a Western Australian beach by a sentry during World War I, has a length twenty-eight times its depth, and it is about thirty-six in the Slender Frostfish, *Benthodesmus elongatus*, from Victoria and New Zealand.

[2] Hawkesbury (mostly Jerusalem Bay) arrivals: April 17, 1948; April to June and again on September 5, 1949; March 12 and June 27, 1950, in which year they were very abundant at Pittwater and, in October, at Cowan. Some visited the city of Sydney (Farm Cove) on March 29, 1951, appearing June and October, 1951, in the Hawkesbury, where in 1952 they arrived in July, becoming a pest, harrying commercial fishes, and remaining since. Recruits 2 to 2½ feet long joined them in late February, 1953; others came in March and left in April; more small ones came October 10. On May 26, 1953, a night of lightning, some were caught off Coogee (see photo). Others have been caught in Botany Bay.



A reconstruction of the Anzac Frostfish *Assurger anzac*, from Western Australia, a very rare fish also recorded from Japan and Korea.

G. P. Whitley, *del.*

The Kurrajong

Its History and Natural History, I

By A. MUSGRAVE.

THE Kurrajong district, lying some 45 miles north-west of Sydney, is perhaps best known to most people for its citrus orchards, the fine view from the Heights, as the location of the Police Boys' Club, and to geologists as the site of the Kurrajong fault. But in addition to these the district has much of interest to these the district offers a wide field for those who are interested in Australian history and natural history, and who are prepared to walk some distance or scramble off the beaten track.

The Kurrajong range forms part of the northern extension of the Blue Mountains and is bounded on the south-west by the Grose River, which junctions with the Nepean to form the Hawkesbury River just south of Richmond, while the northern boundary is the Colo River which flows into the Hawkesbury.

For many years the district has had a fascination for me, for as far back as 1905-1906 I spent six months there on a farm as a result of a doctor's suggestion. My school holidays often found me here, and after leaving school to join the staff of the Museum in 1910, my annual leave was sometimes spent there. It is natural, therefore, that I should take an interest in a district that has meant so much to my development. While I still have much to learn and even much to see of the district, perhaps I may be permitted to tell something of what I have gleaned of it down the years.

My associations with the Kurrajong I owe to my friends, the late Mr. and Mrs. James Stewart and their family, who, I feel, must have imparted to me some of their own deep regard for the district. To them and their friends my thanks are due.

Historical. The political history of the Kurrajong is almost as old as that of the State itself, for, only a little more than a year after the arrival of the First Fleet, exploring parties were investigating the country near Port Jackson and must have seen the steep wooded slopes of the Kurrajong Range.

In 1788 early names for the northern Blue Mountains were those of Governor Phillip's Carmarthen Hills; for the southern range, Lansdowne Hills; and, for a hill in between, Richmond Hill.

In June, 1789, Governor Phillip and his party discovered the Hawkesbury River (which he named after Lord Hawkesbury) and in July of the same year he explored the river and its tributaries, the Colo and Macdonald Rivers, and journeyed by boat up the Hawkesbury as far as its junction with the Grose River. He also visited Richmond Hill. This last-named spot would appear from its position on the old maps to be where "Belmont" on the Grosevold Road is now situated.

Captain Watkin Tench and a party, in June, 1789, had discovered the Nepean River, and later, in May, 1791, while accompanied by Lieut. Dawes, it was found that the Nepean and the Hawkesbury were one river, a question that had arisen in the Colony. On this last expedition Tench's part also included Sgt. Knight, of the Marines, and a private soldier. Mountainous country prevented their continuing further, and lack of provisions and a fear of a rise in the Hawkesbury forced them to retreat. They called this point, which had proved the turning point of the expedition, Knight Hill, later identified as Scott Trig. Station on Kurrajong Heights. Tench, writing in his *Journal*, says, "To the elevation which

bounded our research we gave the name of the Knight Hill, in honour of the trusty serjeant, who had been the faithful indefatigable companion of all our travels." From the Knight Hill Tench's party saw, in the distance, peaks which they named Saddle Hill and Round Hill. These peaks have since been identified as Mt. Tomah and Mt. Bell (Saddle Hill) and Mt. Hay (Round Hill) by Mr. J. F. Campbell, a surveyor.[1]

In 1793 Captain William Paterson explored the Grose River for 10 miles. He named the river after Major Francis Grose (Acting Governor) also of the New South Wales Corps, and a peak in the distance, Harrington's Peak, probably Mt. Hay. Sir Joseph Banks had been instrumental in the appointment of Paterson to the Corps, as he was a student of botany, and Sir Joseph Banks was ever ready to advance the study of this science. On his way up the Grose River Paterson's party found their way barred by cliffs and waterfalls.

Collins says in his account of this trip,[2] "Captain Paterson as a botanist was amply rewarded for his labour and disappointment by discovering several new plants. Of the soil in which they grew, however, he did not speak very favourably." Captain Paterson later became Lieut.-Governor of the Colony and played a part in the Governor Bligh debacle in 1809. He died on the way home to England. The Wild Iris, *Patersonia glabrata*, serves to remind us of this explorer-pioneer of the Kurrajong district, and the Paterson River near Newcastle was also named in his honour.

Ten years later, Robert Brown, the botanist, who has been described as "botanicorum facile princeps", and the artist, Ferdinand Bauer, visited the Grose River. Governor King, in a letter to Sir Joseph Banks dated 9th May, 1803, states, "Whilst the Investigator lay here, Flinders used much dispatch in refitting. His scientific gentlemen were busily employed in their several pursuits. Mr. Brown and Bauer, &c., visited the confluence of the Grose, Nepean and Hawkesbury, and were indefatigable."[3]

Later Robert Brown, in a letter to Sir Joseph Banks, dated 21 February, 1805, says, "since my last letter I have, as well as my strength would permit, examined the banks of the Rivers Grose and Hawkesbury, and added a few new species to my herbarium."[4] The art of Ferdinand Bauer, who accompanied Matthew Flinders and R. Brown on the *Investigator*, is, with that of his brother Francis, discussed in W. Blunt's *The Art of Botanical Illustration*,[5] and where both receive the highest praise.

One of the earliest explorers of the Kurrajong district was George Caley, a botanist sent out by Sir Joseph Banks to collect plants and seeds, but he was also a collector of other natural history specimens. In November, 1804, with a party of four of the strongest men in the colony he made his way over the Kurrajong range to Mt. Tomah, which he called Fern Tree Hill, ascended it and Mt. Bell (Saddle Hill) and discovered and named Mt. Banks (Mt. King George), on 14-15 November, 1804. He thought the mountains impassable, not realising that he was only about 8 miles from where he would have seen the Cox and Lett River country.

In September, 1823, Archibald Bell, Jr., son of Lieut. Archibald Bell, the founder of "Belmont", near North Richmond, made a successful crossing of the country from Belmont to Cox's River via Mt. Tomah. He had previously tried in August of the same year, but the rough going and the fact that no way could be found down Mt. Tomah forced his party to return. An account of the expedition appeared in *The Sydney Gazette*, Thursday, October 9, 1823;[6] the distance travelled was about 35-40 miles.

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[1] J. F. Campbell and G. A. Wood, "Explorations under Governor Phillip", *Royal Austr. Hist. Soc. Journ. and Proc.*, xli, 1926, p. 1 and p. 26.

[2] *An Account of the English Colony in New South Wales*, &c. (1804), pp. 225-227.

[3] *Hist.-Rec. N.S.W.*, v, King, p. 133 (1803-1805 (1897)).

[4] *Op. cit.*, p. 559.

[5] (The New Naturalist) 1950, Chapter 17.

[6] Vol. 21 (1038); 2.

Of the aborigines which formerly frequented the district, none exist. This picture is taken from an old French work, Peron's *Voyage de decouvertes aux Terres Australes.*

On October 6, 1823, Robert Hoddle, Assistant Surveyor to Surveyor-General Oxley, left Richmond to survey the line discovered by Bell. The thick brushwood on the slopes of the Kurrajong, we are told, retarded their progress. The task was completed by 11 November. In 1824 Hoddle also surveyed grants and roads about Richmond and Kurrajong. The line from Richmond to Cox's River was long known as "Bell's Line of Road' but, save for its easy grade as a stock route, it was never popular. After the railway was built over the Blue Mts. it was little used. It will be recalled that the *main* Western road was built by William Cox of Clarendon (whose son George was a brother-in-law to Archibald Bell, Jr.). The road was built in 1814 by thirty convicts guarded by eight soldiers. Within six months the road was completed, work having started at the Nepean cutting on 18 July, 1814, and was completed at Bathurst on 21 January, 1815.

But to return to the Kurrajong! In 1823 another famous botanist and explorer visited the district—Allan Cunningham. He has been termed the "Prince of Australian Explorers". On 26 November, 1823, he left Mr. Bell's farm, from near which a fine view was to be had, and which he called Bell's View, and visited the mountain known to the aborigines as "Tomah". Allan Cunningham was a collector for Sir Joseph Banks, and in 1837 he became Colonial Botanist and Superintendent of the Sydney Botanic Gardens. He resigned, however, the following year, but died in a cottage in the Botanic Gardens on 27 June, 1839. An obelisk is erected over his remains in the Gardens.

In 1823 no less than four parties were exploring the district west of Kurrajong: two by A. Bell, Jr., and those by Hoddle and Cunningham.

Aborigines. Of the natives who frequented the Kurrajong district when the first Europeans arrived we do not seem to know very much, except that the tribe here was the *Boo-roo-ber-on-gal.* According to Captain Watkin Tench they lived on birds and animals and were regarded as bad men and the enemies of the coastal natives,

who belonged to a different tribe.[7] They are said to have been great tree-climbers and hunters, while the women did the hunting for such fish as mullet (Hunter's *Port Jackson*). Miss Louisa Atkinson, writing of them in the *Sydney Mail*, September, 1863, remarks, "These unhappy races have become rather a tradition than a reality already in many districts. Soon will the tribes have passed away from the land. The Richmond tribe is reduced to one . . ." According to R. H. Mathews the *Dhar' rook* tribe occupied the region from the mouth of the Hawkesbury River to Mount Victoria.

Tench speaks well of the Australian aborigines who were able to assist them upon their arrival at Richmond Hill. These natives helped them cross the river and brought over their guns and knapsacks and, it is pointed out in Barton's *History of New South Wales*, p. 164, "that all who were qualified to form an opinion —especially Phillip, Hunter and Collins, as well as Tench—seemed to have formed an opinion of the natives they met with, and to have been animated by the kindliest feelings towards them, notwithstanding their occasional outbreaks of savagery."

Convicts. Reference to the convicts should not be omitted, for it was largely upon their labours that the work of the colony depended. The construction of the roads, building of bridges and public works were the results of their efforts and they continued to be hewers of wood and drawers of water until long after the arrival of the first free settlers. Between the years 1788-1841 some 83,290 convicts were sent to New South Wales alone, but, on the other hand, between 1861-1915 some 443,000 immigrants arrived in the State. On the voyage out many unfortunate convicts perished of "gaol fever" or epidemic typhus, a louse-borne disease, while the brutalizing effects of the "system" doubtless killed many more. At first Australia, or "Botany Bay" as it was better known, was intended to be nothing more than a dumping ground for the gaols of Britain. A certain number were doubtless "anti-social" in their ways, but there were many, including such poor illiterates as Margaret Catchpole, who lived for years in the Richmond district and who is buried in Richmond cemetery, who were sent out for what were little more than childish peccadillos. Many were political exiles from England, Scotland, and Ireland, and among these latter we note the name of the Rev. Henry Fulton, a preacher in the Richmond district, and whose name appears among the list of Rectors of St. Peter's, Richmond, for 1814-1825.

Hawkesbury River Floods and Towns. Exploratory work and settlement went practically hand in hand along the banks of the Hawkesbury and Nepean Rivers. Pests, famines, and floods were the lot of the first settlers endeavouring to establish themselves in a semi-arid land. The floods in the Hawkesbury River valley caused much suffering in the past, as well as considerable damage, and records of the heights to which they rose, often more than 40 feet above summer level, are noted.[8]

The devastations caused by the Hawkesbury floods in the early days of the colony caused Governor Macquarie to take steps to have five towns laid out above the reach of the flood waters. The town of Richmond was one of these so laid out in 1809. In December, 1810, Governor Macquarie named the township on the Hawkesbury near Richmond Hill, Richmond, from its beautiful situation and as corresponding with that of its district. Windsor and three other Hawkesbury townships were likewise named in the same official decree: Pitt Town, Wilberforce, and Castlereagh.

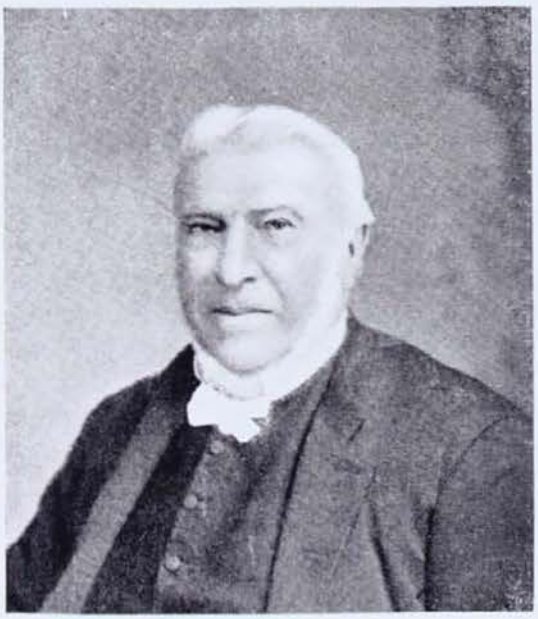
Origin of Kurrajong District. Just when the name "Kurrajong" came into being for this particular part of the Dividing Range, I have not been able to determine. An indirect reference is given

[7] Trench, *A Complete Account of the Settlement at Port Jackson*, pp. 115-116.

[8] Flood records have been given by Miss Lesley D. Hall (*Proc. Linn. Soc. N.S.W.*, 1927) and by Mr. P. W. Gledhill, The Hawkesbury River. Its Discovery. *J. Proc. R. Austr. Hist. Soc.*, xxvii (2) 1941, 127-152, illustr.

to it in an early French work by R. P. Lesson, *Voyage autour du Monde sur la corvette Coquille*, published in 1938. The *Coquille* was at Port Jackson in 1824 from 17 January to 20 March; he says, p. 233, "The new county of Northumberland placed to the north of the preceding, [County of Cumberland] comprises only the districts of Phillip, Meehan and of Kurryjunh, on the rivers of the Grose and Hawkesbury." This suggests that the name was in use before 1824. The Kurrajong district is really located in Co. Cook and not Northumberland.

In the *N.S.W. Calendar and General P.O. Directory*, 1834, pp. 103-104, we read under the heading of "Bell's Road through Kurrajong, from Richmond to Mount York", "The small grants commence. This country is called the Kurrajong: it is mostly brush land, and is entirely located, there are some hundreds of small grants, the population is numerous, and the cultivation extensive; there is no church or school yet established here, but on the right is a track leading to the village of Wilberforce, distant eight or ten miles, where there is a church, burial ground, &c."



The Rev. Dr. Wm. Woolls, a well-known botanist, who became Rural Dean at St. Peter's Church of England, Richmond, and who collected in the Kurrajong and neighbourhood.

Courtesy Royal Society of New South Wales.

Miss Louisa Atkinson (Mrs. James Snowden Clavert), a keen botanist, who lived at "Fernhurst", Kurrajong, and contributed fiction stories and articles on natural history to the Sydney Press.

Courtesy Royal Society of New South Wales.

The first settler in the Kurrajong appears to have been Joseph Douglass, on Wheeny Creek. His house is said to have had Kurrajong trees growing in front of it.

Kurrajong—Its Meaning. Apropos of the word "Kurrajong". This aboriginal name meant the fibrous bark of certain plants among which the Green Kurrajong, *Hibiscus heterophyllus*, B. Fl. i: 212, Malvaceae, is said to be probably the plant answering those requirements in the Kurrajong district. My colleague, Mr. F. D. McCarthy, has shown me that the name "curra-j'yong" was the name given to the fishing line in George's River and Sydney districts.

In 1860, George Bennett, writing in his "Gatherings of a Naturalist in Australasia", p. 363, says of the Currijong, *Hibiscus heterophyllus*, "From the bark, which is rough, greyish and soft, the aborigines procured the material for their fishing lines, nets, and various other purposes. The wood is soft and spongy and is used by the blacks for making canoes."

The Rev. W. Woolls, in his little book, *A Contribution to the Flora of Australia* (1867), writes, p. 179, "I find that the tree called 'Kurrajong' (*Sterculia diversifolia*) in the low country, is by no means common in that district, KURRAJONG, and that the trees whose bark is still used by the settlers for tying up things, are *Hibiscus heterophylla*, and *Sponia*, the former of which is by far the better of the two."

In a note in the *Australian Naturalist*, vol. ix (1935), the late W. W. Froggatt writes about the Kurrajongs. He points out that the shade trees called Kurrajongs are included in the genera *Sterculia* and *Brachychiton*. *Sterculia* (Latin, Sterculius, the God of manure) first named by Linnaeus after an Indian plant *S. foetida*, whose flowers have an objectionable smell. The Australian species of *Sterculia* are confined to Queensland and N.W. Australia. The seeds of this plant are smooth and shining.

The majority of our Australian Kurrajongs and Flame Trees are placed in the genus *Brachychiton* (so called in reference to the short bristles of the seeds: *brachys*, short, *chiton*, a coat of mail). The best-known representative of this genus is *B. populneus* R. Brown, which occurs commonly in the inland parts of the State and whose foliage is lopped to feed drought-stricken sheep.

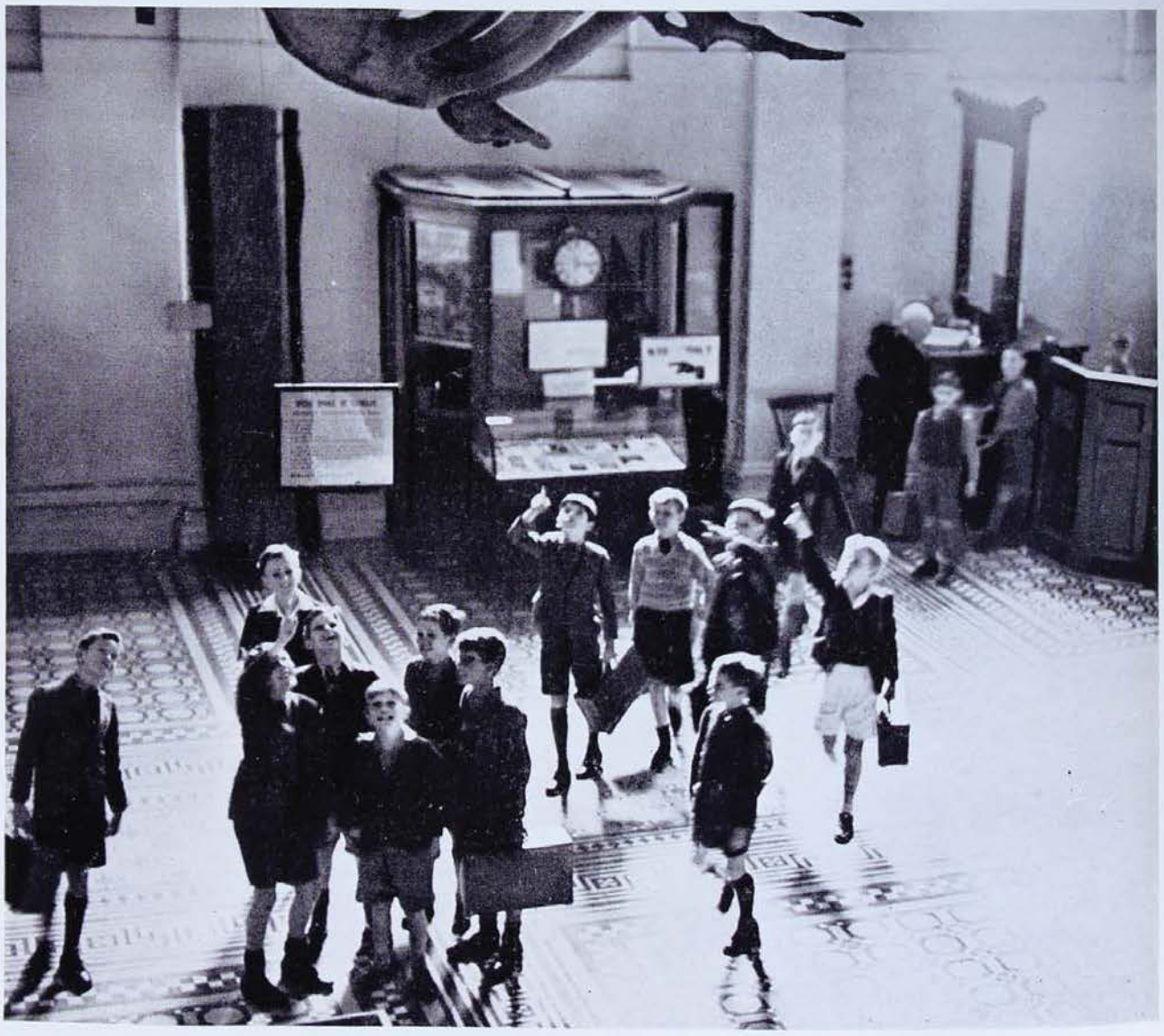
Films at the Museum

By PATRICIA M. McDONALD, B.Sc., Dip.Ed.

IN January of next year, the Australian Museum will once again be a goal for thousands of school children from all parts of the State; they are coming to see films shown during the last three weeks of their school holidays.

Over the past three years, the growth and popularity of these vacation screenings has increased enormously from very modest beginnings. Before that time, the Museum was making its facilities available to school teachers and children only during term time, but it was felt that something could be done for the children during their vacations. It was decided to hold free film programmes as the best method of encouraging children to use the Museum.

The first step was to find what films were available for screening. As our own library of films at the Museum is very small, the various film libraries in Sydney were



Children arriving at the Museum to see the films.

Examining the Limestone Cave Exhibit in the Museum before viewing a film on caves.

approached on the subject and they proved most helpful. When it was clear that their films were to be used for an educational purpose and not purely entertainment, they placed all their facilities at our disposal. Now came the task of choosing suitable films for the programmes. Films of an educational nature were required, but not films too advanced in their subject or too technical in their content, as these would not appeal to children. It was found that the number of films of this type was limited, but, despite these restrictions, a programme was satisfactorily arranged and the first screening held in September, 1950.

The manner of presentation of that first screening has supplied the pattern for every other screening that has followed. The first film of the session is introduced by the Education Officer and the film screened. After the film is over, the audience is invited to ask any questions about the topic of the film, these questions being answered by the Education Officer, then additional information may be given and the location of the subject in the galleries indicated. The next film is screened and the session continues in this fashion until the half-hour programme is complete. The questions the children ask are numerous and varied, but all show how keenly they have followed the film and how eager they are to learn more. Especially is this the case after a film on an Australian topic. The adults appreciate the film as much as the children; many have said how informative and helpful they have been.

Thus, as a direct result of these films, many more people are coming to the Museum. Visitors to the galleries on week-days in January, 1950, before the films started, numbered 23,813. In January, 1953, there were 35,302, an increase of nearly 50 per cent. Not only are there more visitors, but for the great majority their purpose in visiting is different. No longer is the Museum a place for a once-in-a-lifetime duty visit. The children particularly are beginning to look on the Museum as a place for gathering knowledge and useful information, rather than a somewhat fatiguing collection of mounted animals with unpronounceable names. With the knowledge gained from the films they

can now examine the exhibits, recognize familiar points and discover new ones. This awakening interest is helped immeasurably by the more modern arrangement of some of the galleries. Encouragement of an intelligent understanding and pleasurable interest in its exhibits is one of the prime functions of a museum and to this end the films are doing a great deal.

Although the films are screened especially for children, adults may also attend. So if you, the reader, would like to come to these free screenings held every school vacation, you will be very welcome. The programmes are advertised in the press and the *Education Gazette*, and over the air during the Children's Session. The programme for the coming school vacation in January, 1954, is shown below.

The following films will be screened at 2.30 p.m. in the Lecture Theatre of the Australian Museum, College Street, Sydney, during the last three weeks of the January school vacation. Total screening time is approximately 30 minutes.

MONDAY, 11TH JANUARY.

Swan Song. Courtesy of N.S.W. Film Council. (Scenes of the white swans in England.)

Point Pelee. Colour. Courtesy of the Canadian Government. (Canadian animals in a national park.)

TUESDAY, 12TH JANUARY.

The Rock Pool. (Common animals found in a pool by the seashore.)

Life in an Aquarium. (How to care for the animals and plants in aquaria.)

He Would A-Wooing Go. (The life story of a frog.)

Films by courtesy of N.S.W. Film Council.

WEDNESDAY, 13TH JANUARY.

Your Forest Heritage. Colour. Courtesy of Canadian Government. (Preservation of forest areas and the animals that live in them.)

THURSDAY, 14TH JANUARY and
FRIDAY, 15TH JANUARY.

Land of the Long Day. Colour. Courtesy of Canadian Government. (An outstanding film on the life of the Eskimos.)

MONDAY, 18TH JANUARY.

Free To Roam. (Scenes of many animals in a national park.)

Grouse of the Grasslands. Colour. (The life of these birds in their natural home.)

Films by courtesy of N.S.W. Film Council.

TUESDAY, 19TH JANUARY.

The Beaver. (The life of this American animal.)

Common Animals of the Wood. (North American otter, deer, elk, etc.)

Camouflage in Nature. (Shows how animals disguise themselves.)

Films by courtesy of N.S.W. Film Council.

WEDNESDAY, 20TH JANUARY.

Desert Glory. Colour. (Wild flowers of the Broken Hill area.)

Campfires. Colour (Scenes of Australian wild life.)

Bushfire Brigade. Colour. (The effects of bush fires and how to prevent them.)

Films by courtesy of N.S.W. Film Council.

THURSDAY, 21ST JANUARY and
FRIDAY, 22ND JANUARY.

Australia's Coral Wonderland. Colour. Courtesy of N.S.W. Film Council. (A newly released film on the Great Barrier Reef.)

MONDAY, 25TH JANUARY.

Four Seasons. Colour. Courtesy of Canadian Government. (Scenes of Canadian wild life through the year.)

TUESDAY, 26TH JANUARY.

Children of Switzerland. (Typical life in a Swiss village.)

Bali To-day. (Native life in Bali.)

South Pacific Island Children. Colour. Films by courtesy of N.S.W. Film Council.

WEDNESDAY, 27TH JANUARY.

The Adventures of Willie, the Skunk.

Rikki, the Baby Monkey. (Life of a monkey in the jungle.)

Baby Animals.

Films by courtesy of N.S.W. Film Council.

THURSDAY, 28TH JANUARY.

Primitive Peoples. Courtesy of N.S.W. Film Council. (Aborigines in Arnhem Land.)

FRIDAY, 29TH JANUARY.

Australia's Platypus.

Kangaroos.

Films by courtesy of Australian Instructional Films.