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The Koala—An article on its life history appears on page 396.

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THE AUSTRALIAN MUSEUM

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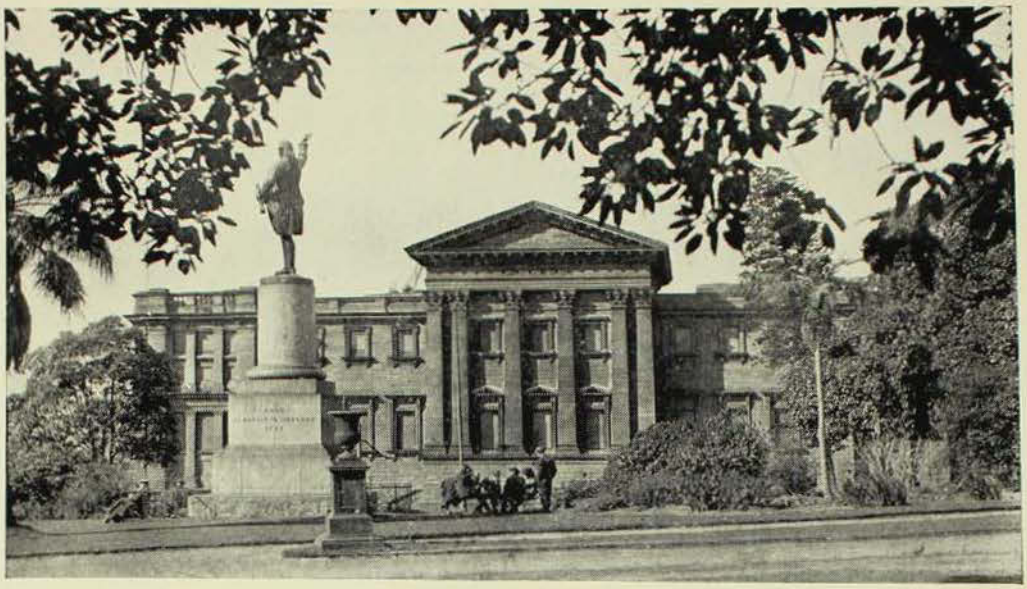

THE AUSTRALIAN MUSEUM MAGAZINE

OUR COVER PICTURE of a young adult koala shows all the reflective and appealing charm which has made a world-favourite of the solemn little marsupial of the gum-trees. Note the wide separation of the inner two fingers which function as a pair of strongly-clawed thumbs to compensate for loss of the prehensile tail during an earth-bound period of existence.

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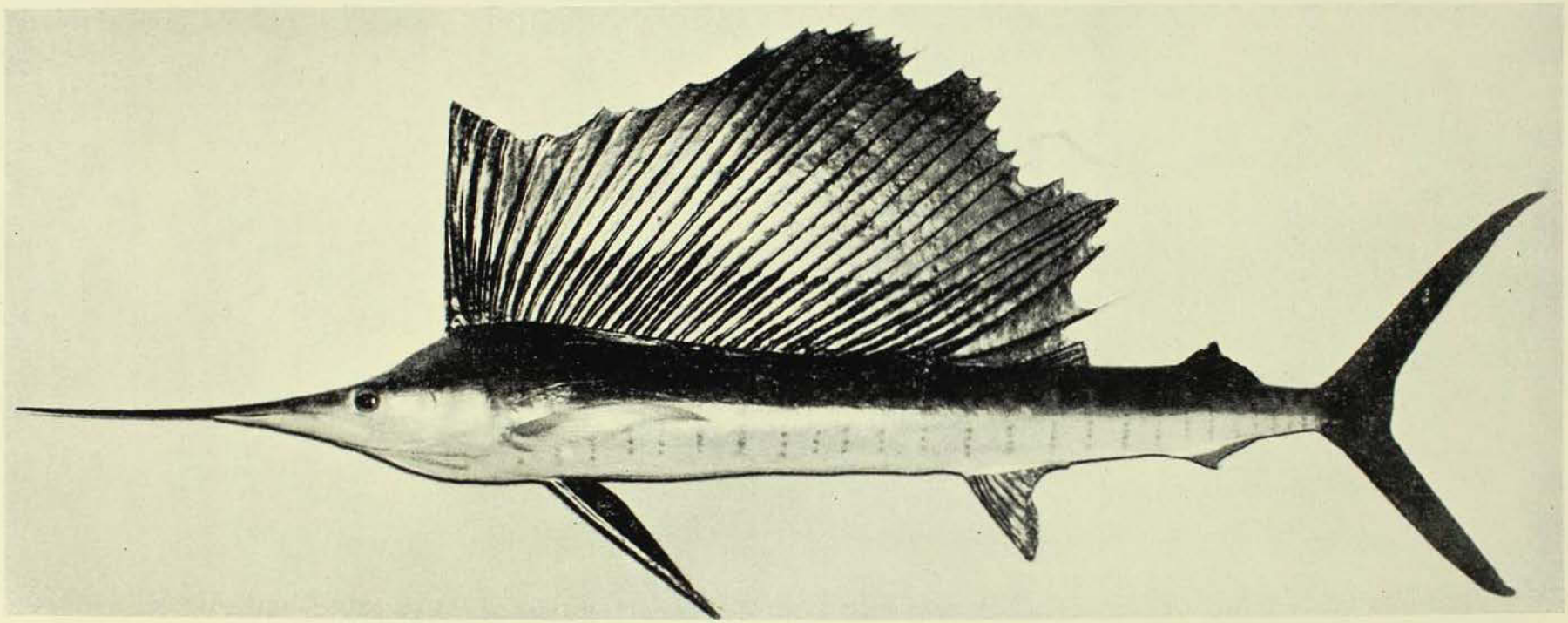

• A new exhibit in the Australian Museum: The cast of a 45 lb. Sailfish, 7 ft. 11 in. long, from Escape Reef, eighty miles north of Cairns, Queensland. The Sailfish was taken by Mr. Peter Goadby and presented to the Museum by the Moreton Bay Game Fish Club.

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VOL. XI, NO. 12. DECEMBER 15, 1955.

Sailfish Ahoy!

By GILBERT P. WHITLEY

THE giants of the fish world are the swordfishes and marlins, yet amongst them we find a lighter, more graceful type, the beautiful Sailfish, easily recognized by its extensive front dorsal fin, much higher and longer than the stumpy dorsal lobes of its cousins. The Sailfish is the peacock of the tribe, its brilliant blue-grey colours and spotted fan-like fin being its glory, relegating to the background its bulkier relatives.

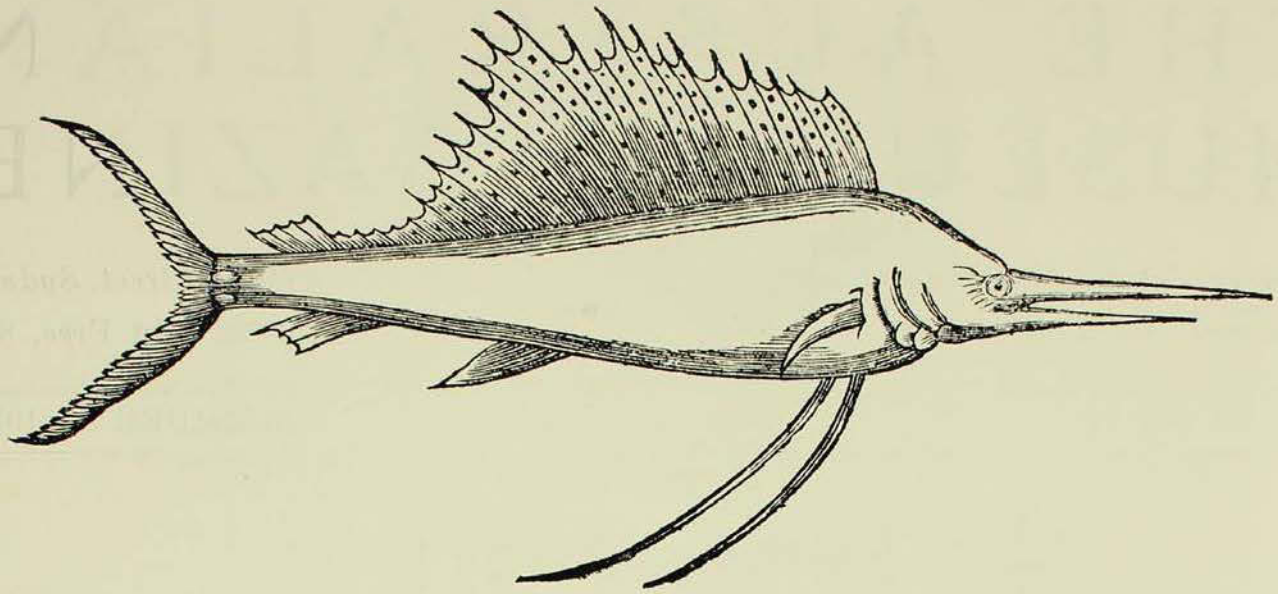
The function of the extensive dorsal fin has not been satisfactorily explained and many conflicting stories of its use are related by anglers or published in literature. Louis Renard, in 1754, stated that sailfishes sometimes swim at the water-surface, when the very high fin can be seen from more than a league, but that when they hoist it thus, it is a sign of storm. Sir Stamford Raffles wrote from Singapore in 1822:

> The only amusing discovery we have recently made is that of a sailing-fish, called by the natives *Ikan layer*, of about ten or twelve feet long, which hoists a mainsail, and often sails in the manner of a native boat, and with considerable swiftness. I have sent a set of the sails home, as they are beautifully cut and form a model for a fast-sailing boat. When a school of these are under sail together they are frequently mistaken for a school of native boats.

In Indonesia, the Dutch *Siboga* Expedition observed, "With the help of this fin, the fish is in a state of sailing. That is certainly what the one we captured was doing. It was seen several times, in the course of the day, near the *Siboga*, erecting the high dorsal fin above the water".[1]

Captain F. E. Wells tells me he has seen a school of about five small sailfishes swimming just *below* the surface in the Northern Territory with their fins up. Normally the dorsal and anal fins of swordfishes are used as brakes or balancers; it seems odd if the very efficiently swimming sailfish has evolved a special sail (and a fragile one at that) merely to catch the aid of the wind. Off Florida, pelicans have been observed excitedly diving upon the sails of sailfishes which were rounding up "pilchards," so that the extended membranes were ripped leaving the spines of the dorsal fin standing. Apart from drifting invertebrates like the By-the-wind Sailor, *Velella*, very few animals seem to have developed sail-like structures and we know little or nothing of their use. The Lancet Fish, *Alepisaurus*, has a similar dorsal fin and general shape, but lives in deep water. May, then, the fan-like fin be a sort of signal-flag for species-recognition? Both sexes have it, so it is evidently not for nuptial display. An extinct reptile, *Dimetrodon*, had a high crest supported by the greatly lengthened neural spines of its

[1] Translated from M. Weber, *Siboga*-Expeditie i, 1902, p. 110 & fig.



The earliest picture of a Sailfish, the Guebucu discovered when the Dutch conquered Brazil in the seventeenth century. From the 1658 edition of Piso's *De Indiae utriusque re naturali et medica;* (copy, autographed by Piso, in the author's library).

After G. Piso.

backbone: it has been suggested that that "sail" might have acted as a kind of radiator to catch the sun's rays and raise the reptile's temperature, or it may have been a defence from attack by carnivores. A number of snouts and other remains of fossil relatives of modern swordfishes have been discovered in Eocene to Miocene deposits. Of these *Blochius* appears to have been the earliest (Cretaceous to Oligocene), but it does not help us to explain the function or development of the sail of modern sailfishes which comprise the genus *Istiophorus*.

Wood Jones[2] regarded the sailfish of the Cocos-Keeling Islands as dangerous to man, "for it dashes through the water with great speed, and on more than one occasion has made a sudden rush among a party of bathers. It is coloured a vivid purple when alive, and presents a very different appearance from the dried leathery specimens seen in museums . . . . but I have never heard of a case in which a man has been speared, although the narrow escapes have been many."

Wishing for something better than a "dried leathery specimen," the Australian Museum was grateful to receive from the Moreton Bay Game Fish Club recently a fine sailfish which one of its members, Mr. Peter Goadby, had caught near Escape Reef, eighty miles north of Cairns, Queensland, early in January, 1955. A cast has been made from this fish and is now on exhibition. The specimen was 7 feet 11 inches in total length, or 7 feet to fork of tail, and weighed 45 lb. A few dimensions and other particulars may be of interest: Length of sword 1 ft. 8.3 in.; eye-diameter 1.8 in.; length of head 2 ft. 4.5 in.; pectoral fin 11.5 in.; ventral fin 1 ft. 2.5 in.

Each ventral fin had a flat ray with a wide, furled bat's-wing-like membrane which, when moistened and spread out, had the shape shown on page 382 and as reproduced in the museum cast. In most published illustrations of sailfishes, this membrane has been overlooked and omitted. The dorsal fin had 44 spines in the sail and 7 rays in the soft fin; the anal had 13 and 6, the pectoral 2 plus 17 and the ventral fin one ray. There were about 168 elongated scales along the straight portion of the lateral line to just before the butt of the tail, where the scales sank below the skin. The tongue was rounded. The gills had been removed and

[2] Coral and Atolls, 1910, p. 322, pl. xx.

A Sailfish about 7 ft. 9 in. long, weight 65 lb., from off Seal Rocks, New South Wales (16th March, 1951) with a 20 inch sword and the sail 3 ft. long by 2½ ft. deep.

Photo.—Athel D'Ombrain.

the fish had been gutted but was about 8½ inches deep in the body. The sex and stomach-contents are unknown. When received in Sydney it was dark bluish-black along the back with the lower surfaces slate-grey with some pink and yellowish tinges. Series of broken bars of a greyish colour crossed the body; the fins were coloured similarly to adjacent parts of the body. The sail-like dorsal fin was slaty-blue with about eighty black spots on portions of the membranes. The pupil of the eye was blackish, the iris dull ochreous yellow.

The sailfish was first recorded from Australia rather tentatively by the British Museum ichthyologist, Gunther[3] as "Dorsal fin. N.S. Wales (?). Presented by Dr. G. Bennett." Thereupon it was listed in later catalogues of the fishes of this State and was confused from time to time with marlin swordfishes. If we refer to the original account by Dr. G. Bennett,[4] however, we read:

"A large dorsal fin of a Sword-fish was given to me in Sydney, New South Wales, by Charles Smith, Esq., a merchant in that city, and which I have since presented to the British Museum: it differs from all I have yet seen. In shape it approximates to that of *Histiophorus* . . . . When this fin is dried, its peculiar black colour and dense structure, with the strong rays, would, to a vivid and romantic imagination, suggest its being a stray wing of one of Peter Wilkin's *Gowries* . . . . . The dorsal fin above alluded to, was taken from one harpooned at Pitt's Island, Southern Pacific Ocean . . . . . The dorsal fin measures 3½ feet in height and 4 feet in length."

Thus Bennett's example was not Australian. There are three Pitt's Islands in the Pacific: one in south-eastern Papua, one in the Gilbert Islands, and another (the least likely to produce a sailfish) in the cold waters of the Chathams, eastward of New Zealand.

Reports of sailfishes from Western Australia in the Year-book of that State for 1900-1, p. 271, were followed by other records from New South Wales, Queensland, and north-western Australia, scattered in newspapers, natural history literature and museum files. They are tabulated on page 381.

A good specimen, about 6 ft. 8 in. long from Port Stephens, New South Wales, was recorded in 1911, preserved (cut into sections) in the Australian Museum, described and figured.[5]

Sailfishes apparently come down both sides of Australia in the summer months (December to April), the southernmost

[3] Gunther, Cat.Fish.Brit.Mus. ii, 1860, p. 513.

[4] Bennett, *Gatherings of a Naturalist*, 1860, p. 24.

[5] Stead, Proc.Linn.Soc.N.S.Wales xxxvi, 1911, p. 44; McCulloch, Rec.Aust.Mus. xiii, 1921, p. 137, pl. 24.

report being from lat. 35° 22'S., off Ulladulla, New South Wales (two 20 lb. fish) on 22nd March, 1955. There are no authentic records from New Zealand, but several from Fiji, Tonga, the Solomons, Tahiti, and New Guinea waters. In other parts of the world, the range of the sailfish has been generally considered to be in tropical and temperate seas, between latitudes 40°N. and 30°S., and in the western parts of those seas. Northern Hemisphere sailfishes have been noticed as moving northward in the northern summer. Many of these fishes seem non-migratory, but some wander far afield. The American species has crossed the Atlantic to Devon, and a Red Sea species has penetrated to Israel waters through the Suez Canal. In Florida, many fish have been tagged and released (which seems far more sensible and sportsmanlike than slaughtering them) by game anglers, but only a small percentage has been recaptured so far. One Floridan fish was recovered thirteen months later only forty-three miles from its tagging locality.

Apart from game-fishermen, adult sailfishes probably have few enemies. Only large sharks or killer whales may be considered big enough to prey on them. However, they are afflicted by a variety of parasites. Small flat crustacea slither over their bellies or attach themselves to the fishes' gills; worms find a snug harbour in their gullets and stomachs and even, at times, in their muscles. How do these parasites get inside the sailfish? By means of the fish upon which the sailfish feeds: the fish are digested but the tougher parasites merely change hosts and continue their comfortable living. Those little "hitch-hikers of the sea", the Sucking Fishes, especially *Rhombochirus osteochir*, often attach themselves to sailfishes for a free ride.

The Australian Sailfish (*Istiophorus ludibundus*) is said to grow to 10½ feet long and 200 lb. in weight. The world's record fish at the time of writing (August, 1955) was a Pacific Sailfish (*I. greyi*), 10 feet 9 inches long, weighing 221 lb., from the Galapagos Islands, caught by Mr. C. W. Stewart, 12th February, 1947. However, the French zoologists, Cuvier and Valenciennes[6] had a sailfish's head 2 feet 10 inches long from the Seychelles and estimated it must have come from a 14 feet fish.

The eggs of the sailfish, according to American investigators, are produced in very large numbers. Young ones are so far unknown from Australasian seas but are well-known in Atlantic waters and have been found in other seas. The smallest known larva, 3.9 mm. in standard length and evidently newly-hatched, was described from the Bahamas by Voss.[7] At this stage, its jaws are equal in length and have teeth and there are four long spines at the back of the head. Not until the baby fish is about an inch long is the sword-like snout prominent; it still has teeth, whilst the characteristic sail-like dorsal fin is recognisable. As the growth-stages of marlin swordfishes are incompletely known, there is just a possibility that some of the juvenile forms attributed to sailfishes in literature may be young marlins. The number of species of sailfishes in the world has still not been satisfactorily determined, though many have been named, so it is very difficult to identify larval specimens.

Baby sailfishes feed on copepods and, as they grow, other crustacea and very small fishes are eaten. Adults feed on larger fishes (garfish, mackerels, long toms, hair-tail, herrings, trevallies), nautili and squids; rarely do sailfish eat mullet or flying fish, except when offered to them as bait. William Beebe[8] quotes Charles B. Wilson as saying: "I have gradually come to regard the copepods as holding the same relation to the fishes that milk does to the mammals. No matter what the ultimate food of the adult may be, the newly born young subsist for a time upon the same food: milk for mammals and copepods for fish."

(*Continued on page* 382.)

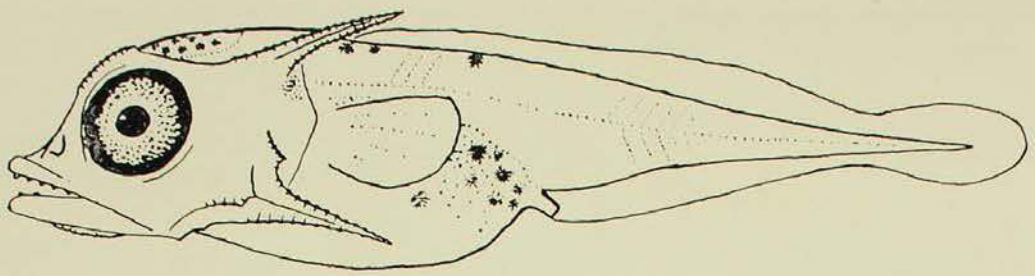
[6] Cuvier & Valenciennes, Hist.Nat.Poissons viii, 1832, p. 298.

[7] Voss, Bull. Marine Sci. Gulf & Caribbean iii, 1953, p. 210, fig. 1A.

[8] Beebe, Zoologica xxvi (20), 1941, p. 220.

CHRONOLOGICAL LIST OF RECORDS OF SAILFISHES FROM AUSTRALIA.

Locality, with date, when known	Length (Ft. in.)	Weight (lb.)	Authority
"New South Wales?" *i.e.*, Pitt's Island.			Gunther, 1860, Cat.Fish.Brit.Mus. 2:513: Bennett, 1860, Gatherings of Naturalist: 24.
Indian Ocean off Western Australia.			Woodward, 1902, W.A.Year-book, 1900-01:271, as *H. pulchellus*.
Port Stephens, N.S.W.	6 8		Stead, 1911, Proc.Linn.Soc.N.S.W. 36:44; McCulloch, 1921, Rec.Aust.Mus. 13:137, pl. 24.
"Tropical waters," *i.e.*, N.W. Australia.			Auckland Weekly News, 1929 or earlier; Aust.Mus.lantern slide 4231.
Between Ninetymile Beach and Broome, W.A.			Fin in Aust.Mus., no.IA.4123.
Moreton Bay, Q. 27.iii.1930.	7 1		H. A. Longman, MS. Qld.Mus.no.4652.
Shark's Bay, W.A. May, 1931.	6 4		L. Glauert, MS.
Near N. Keppel, Q.	5 0		Central Qld. Herald 15.iv.'37:37, fig. F. W. King, Walkabout, July 1937:64,fig.
Off Gladstone, Q.	9 3	125	Queenslander, 25.i.1939.
Off Lady Musgrave Id., Q. Dec., 1938.	10 6	135	Courier Mail (Brisbane) 29.xii. 1938 & 3.i.1939 & photo.
N.W. Australia.	4 2		Sydney Morning Herald, 17.viii.'40.
North Australia.			Tennant, 1944, MarvelsG.Barr.Reef.:44, fig.
Maroochydore, Q.	8 0		World's News, 29.iv.1944.
Cairns, Q.		200	Marshall, 1945, Market.Fish.Cairns:7; Coates, 1950, Fish.Barr.Reef:19, fig.; & Ogilby, 1954, Commerc.FishQld.: 91, fig.
Off Mackay, Q. 11.ix., 1947.	8 9		Daily Mercury (Mackay) 16.ix.1947 (spear 21 inches long).
Off Seal Rocks, N.S.W. 16.iii.-1951.	7 9	65	D'Ombrain, Outdoors & Fishing, May 1951: 36, figs.
Flat Rock, Point Lookout, Stradbroke Id., Q. April, 1951.			P. Goadby, MS. photos.
Off Escape Reef, Q. 8.i.1955.	7 11	45	Of which we treat.
Ulladulla, N.S.W. 22.iii.1955.		20	Sydney Morning Herald, 23.iii. 1955: 7. (Two specimens.)



The smallest Sailfishes known: larval specimens of *I. gladius* from Florida have the jaws about equal in length and toothed, and long spines at the back of the head.

After G. L. Voss. X 25.

The genus to which sailfishes belong was first named *Istiophorus* (a sail-bearer), often emended to *Histiophorus*. The classical species is *Istiophorus gladius*, a name usually, but wrongly, attributed to Broussonet who merely gave it a vernacular, not a scientific, name in the eighteenth century. It seems unlikely that all the sailfishes in the world belong to only one species, first validly named *gladius* by Bloch. Bloch's description was an amalgam of East and West Indian examples of sailfishes, but the coloured plate which he published[9] was based mainly on a drawing by the Dutch soldier Prince Maurice of Nassau-Siegen (1604-1679) who painted fishes from eastern Brazil, which may accordingly be selected as the type-locality for Bloch's species. So this, the best-known species from eastern United States to Brazil, first figured in the middle of the seventeenth century by the Prince's surgeon, Piso, should retain the name *I. gladius* (Bloch) and some later names may fall like ninepins as synonyms.[10]

We may sort the other nominal species geographically. From Peru to Lower California and the Galapagos comes *I. greyi*. From Hawaii *I. eriquius* has been named and from Tahiti *I. brookei*, with *amarui* a synonym. *I. dubius* was briefly noted from China; *orientalis* and *japonicus* from Japan. *I. triactis* and *immaculatus* have been figured from the Red Sea and *granulifer* was named from South Africa. *I. ancipitirostris* and *gracilirostris* were names based on unlocalised "swords" or heads and have yet to be reconciled with known species. Some of the foregoing may even prove to be marlins rather than sailfishes. The Australian sailfish has been called *ludibundus*.[11] *I. indicus* was discovered in "Indian seas" [probably off Sumatra] by Sir Joseph Banks.

Records of "*Histiophorus gladius*" from Australia and New Zealand in old books refer to marlin swordfishes, not sailfishes, and evidently so do *I. audax* from Chile, *brevirostris* from Seychelles and elsewhere, *ensis* and *nigricans* from France, where *Istiophorus* is unknown, unless brought home by sailors.

When at sea in tropical waters I have searched in vain for weeks for signs of sailfishes, but I have at least seen a fresh

[9] Bloch, Nat.ausland.Fische vii, 1793, p. 81, pl. 345.

[10] Viz., *albicans, americanus, guebucu, pulchellus, velifer, gladifer, platypterus* and, probably, *maguirei, volador* and *wrighti*.

[11] Whitley, Rec.Aust.Mus. xix, 1933, p. 83.

The ventral fin of the Escape Reef Sailfish (*Istiophorus ludibundus*), with its membrane unfurled, is 1 ft. 2½ in. long and 2¼ in. at its widest part.

G. P. Whitley del.

specimen of our Queensland species, besides, years ago, a Tahitian *I. brookei* in the Academy of Natural Sciences, Philadelphia, and the type specimen of *I. volador* from Florida, which is in the Los Angeles Museum.

There is not a great variety of common names. Guebucu, the old Brazilian name, was corrupted to boohoo or woohoo by English sailors, by coincidence very like the Sumatran name, Joohoo. The sailfish is also known as the Bayonet Fish, because of the slender sword, and was dubbed Crown Prince of the Gulf Stream by American anglers. Its native names in various languages refer to the fan- or sail-like fin; the Tamil name meant peacock fish and the Hawaiian, comb of a cock. I like the Tongan name, *sifisifi*, best.

Book Review

EVOLUTION OF THE VERTEBRATES. By Edwin H. Colbert. John Wiley & Sons, Inc., New York, Chapman & Hall, Limited, London. $8.95. 480 pages, 122 figures.

This book is a fascinating account of the history of back-boned animals through time. It is the story of vertebrate evolution during more than 400 million years of geological history and is based on the revealed fossil evidence.

Professor Colbert informs us that it was written as a general text-book on vertebrate palaeontology for the general student rather than for the specialist or the lay reader. Highly technical terms have been avoided wherever possible and it is refreshing to read in a book of this type such statements as the one on page 98 when in describing the flat skulls of the Triassic stereospondyls he writes they were "about as flat as the proverbial pancake."

The presentation of each vertebrate family in a brief but comprehensive manner, free of confusing details, is an excellent one. These chapters are dealt with in such a logical and interesting way that a layman would derive considerable pleasure and knowledge when reading them. If all text-books were as interesting the life of a student would be a happy one.

There is no one more fitted to write on vertebrate evolution than Professor Colbert. For the past twenty years he has been engaged on research on fossil vertebrates, particularly the fossil reptiles and mammals from North America, South America, Asia and Africa.

Any basis for criticism is impossible to find in this book and even the almost inevitable misprints seem to be lacking. One is reduced to expressing slight regret in finding no mention of *Clycotosaurus* sp., collected from the Hawkesbury Sandstone of the Middle Triassic, near Sydney, New South Wales. This specimen is the only complete stereospondylus labyrinthodont known. The remarkably well preserved skeleton is eleven feet in length and the skull is nearly three feet long by twenty inches in width.

Mention must also be made of the excellent and specially drawn illustrations which amplify the text. Many restorations add interest and a touch of life to a variety of creatures now extinct. Since its recent arrival in our library this book has been in constant use.

—H.O.F.

RECEIVED: Atlas of Outline Drawings for Vertebrate Anatomy. (Second edition.) By Samuel Eddy, Clarence P. Oliver and John P. Turner. John Wiley & Sons, Inc., New York. $3.25.

A squirter earthworm (Genus *Notoscolex*) from Eungai, northern N.S.W. One of the giant native species, this specimen was thirty inches long, unstretched.

Squirter Earthworms

By ELIZABETH C. POPE

MOST people express the greatest surprise when told that there are at least two thousand different species of earthworms known to science and probably a few hundred more that are undescribed.

There is a good reason for the layman's ignorance of the variety of earthworms. A comparatively small number of species has migrated with Man (probably travelling undetected in the soil around the shrubs and trees he took with him) to all parts of the globe and wherever these worms have managed to survive they have quickly come into competition with endemic local species and ousted them. These globe-trotting earthworms are known as the peregrine species, because they have travelled so widely round the world, and it is these that one most frequently digs up in gardens or compost heaps. It is no wonder then that garden worms all round the world look alike. They are alike. The same species may be found in gardens in Australia, New Zealand and Africa, and almost anywhere in the northern hemisphere.

Australia can boast of a very interesting earthworm fauna and there is still a number of native species to be found if one knows where to look. To a great extent these native earthworms occur no longer in cultivated areas though the depletion of native worm stocks as the result of competition with introduced species, has probably not advanced so far in Australia as in other countries which were settled or visited by Europeans many centuries before this continent was discovered.

Most Australians already know that one of our native species, The Giant Earthworm of Gippsland, *Megascolides australis*, is the longest earthworm in the world, growing up to eleven feet in length (unstretched). There are, however a number of other native earthworms which, while they are much shorter than the Gippsland Giant, are still very much larger than the common or garden kinds with which we are all familiar.

Besides the Genus *Megascolides* there are several other Australian genera including large species of worms. Two well-known worms are *Notoscolex grandis* from Burrawang, New South Wales, and *Didymogaster sylvaticus*, which is fairly widely distributed in the sassafras brush areas of eastern Australia. There is a published record of a *Notoscolex grandis* reaching a length of 42 inches when in a highly contracted state and recently an earthworm was sent to the Australian Museum from the State Forest, Kyogle, which was even longer and looked like a length of garden hose.

The illustration to this article shows another large native species of earthworm which was captured near Eungai, beneath a rotting log. When crawling along the

bench in the laboratory it measured 30 inches. As its diameter is only about half that of the Kyogle worm it seems reasonable to believe that the latter was probably six feet long or more when it was alive and in size was more reminiscent of a snake than a worm.

The proverbial "worm that turns" is represented in our local fauna by *Didymogaster sylvaticus* which lives under rotting logs in the patches of brush forest that are scattered around the outlying areas of Sydney and in other eastern areas of New South Wales. It is quite common in National Park, on the Blue Mountains or on the north side of Sydney Harbour where this type of "jungle" occurs. This worm's reply to disturbance or to rough handling is to squirt out a series of pairs of jets of fluid from a line of pores opening down each side of the body. The effect can be most spectacular for the worm is usually from 8 to 10 inches long, a deep reddish-purple in colour and it can emit upwards of twenty or so jets of pale fluid at one time. These jets rise as high as eighteen inches or two feet into the air so that the display reminds one of a miniature float letting off rockets at a Venetian carnival.

Instinctively one draws back from such a barrage, impressed by the offensive action taken by the worm, and because of this display it enjoys the popular name of the Squirter Earthworm. Recently a report appeared in a Sydney newspaper issuing a warning against the "spitting" worm and stating that the fluid it ejected was corrosive in its action on the human skin and could cause blindness if it got in the eyes. In fact the fluid comes from the worm's body cavity, or coelom, and is squirted out by violent contractions of the body-wall which force the fluid out under great pressure through the pores in the sides. The fluid is only slightly alkaline and contains some dissolved salts, body wastes (like urea) and some proteinous materials and cells. There is apparently nothing here to "corrode" the skin or cause such dire injury to the eyes as is suggested in the press account.

From personal experience the author can state that the only sensation she experienced after receiving a squirt in the eye from a *Didymogaster* worm was the kind of discomfort one feels when soap or strong saline gets into one's eyes. She has also seen squirting worms handled by various people who suffered no ill effects thereby. In the records of the Museum there is no account of anyone being injured by, or even suffering discomfort from, the fluid sprayed out by *Didymogaster sylvaticus*.

It is thought that in natural surroundings the coelomic fluid secreted by the worms may be used to line or lubricate their burrows. This is claimed definitely for *Megascolides australis*—a species on which extensive research has been done—and it seems reasonable to suggest that the fluid is put to the same use also by *Notoscolex* and *Didymogaster*.

The native worms mentioned above are all squirters of some ability but it is significant that only the species which occurs in numbers near Sydney, and is therefore able to display its prowess to a large public, is famous as The Squirter Earthworm.

• A member of the Museum staff would be pleased to purchase the following numbers of THE AUSTRALIAN MUSEUM MAGAZINE which are now out of print:—Vol. I, Nos. 1, 2, 3 and 5; Vol. II, Nos. 5, 7 and 8; Vol. III, Nos. 1, 2, 4 and 5.

If any reader has copies of these numbers, in good order, which he or she would like to sell, please let us know.

The Argyle Cut, where Argyle Street passes under the concrete arch over which traffic travels towards Sydney Harbour Bridge. The light coloured stains on the right-hand side of the cutting are the travertine formations.

Right: A close-up view of the small columns and shawl formations on the side of the Argyle Cut.

Travertine

By R. O. CHALMERS

MOST of us have visited limestone caves and admired the variety of formations in them, the stalactites, stalagmites, helictites, shawls, cascades and, besides these, the unusual or bizarre shapes which are named after any object from a leg of mutton to a set of bagpipes, which they are supposed to resemble.

As has been described before in these pages[1] such formations are deposited by percolating water containing calcium carbonate in solution. It is not generally so well known that calcareous formations are deposited from water under a variety of conditions, not necessarily always in sheltered places like caves. All such calcareous material, whether cave formations or deposited in other ways, is grouped by geologists under the names of travertine, calcareous tufa or calc-sinter. Usually the name travertine is applied to the massive variety and the other names to the more friable types. For example, the waters from springs in limestone country often deposit calcium carbonate as they flow over twigs and other vegetable matter that may grow round the spring. This process is sometimes known as petrifaction but this is not quite correct because the objects are merely coated with a relatively thin layer and are not entirely replaced by mineral matter. The late E. C. Andrews[2] described a spectacular occurrence of this nature from

[1] Anderson, C. A Visit to Belubula Caves, AUST. MUS. MAG., ii, 1, 1924, 12. Hodge-Smith, T. A. Limestone Cave in the Museum, AUST. MUS. MAG., vi, 2, 1936, 39.

[2] Andrews, E. C. Report on the Kiandra Lead., *Miner. Resources No.* 10, *N.S.W. Geol. Sur.*, 1901, 15.

Lobb's Hole, near Kiandra. Here a bed of limestone overlies a dense quartzite which forms sizeable cliffs. Small streams flowing through the limestone dissolve calcium carbonate. As the streams flow over the edge of the walls the calcium carbonate is re-deposited in the form of travertine, particularly on the lower portions of a species of tea-tree scrub growing not only on the top of the walls, but also out from the vertical quartzite faces. As deposition takes place, the tea-tree continues to grow and the travertine forms very extensive masses growing out from the quartzite cliffs. The travertine is very light and porous when first formed but in time the

Travertine from Warialda, N.S.W. (twice natural size) formed by the deposition from a spring of calcium carbonate on twigs.

vegetable material inside dies and decomposes, and more calcium carbonate fills the cavities. Thus in time the travertine becomes quite massive. It is thought in the case of similar occurrences elsewhere in the world that the plants may in some way actually influence the deposition of the calcareous material on their stems and this may also be the case at Lobb's Hole.

In various parts of Italy, particularly at Tivoli in the vicinity of Rome, vast lake deposits of travertine occur. It is a pale cream, somewhat cellular, porous rock showing an abundance of thin wavy bands which are the original layers in which the travertine was deposited. This, known to the Romans as lapis Tiburtinus, is the principal building stone of both ancient and present day Rome. The immense bulk of the Colosseum, for example, was built of travertine, likewise numerous palaces, public buildings, churches and cathedrals. During the fifteenth and sixteenth centuries much travertine was taken from the Colosseum itself and used in the construction of other buildings, but this practice was stopped and the historic structure preserved.

Blocks of Roman travertine are imported to Sydney, sawn up into slabs, and are used quite extensively in city buildings. In its unpolished state it forms the flooring slabs of David Jones' main store, but it is more often polished and used as a decorative stone, lining vestibules, and street frontages of shops and business premises. By far the most imposing example in Sydney is the front of the eleven-storied Royal Exchange building. Before placing in position on the fronts of buildings the holes in the polished slabs are filled with suitably coloured cement. This quite attractive practice may have originated in Sydney.

There is also a choice decorative variety of travertine occasionally seen in this country as objets d'art and museum specimens. This is the massive, laminated, translucent variety known as "oriental alabaster" or "Mexican onyx" (both, incidentally, misnomers). It usually occurs in beautiful rich shades of green, brown or red.

Yet another type of travertine can be seen in Sydney. It occurs naturally, yet there is no limestone anywhere within the boundaries of our city. It is indirectly caused by human agency. In sheltered positions, on the rough hewn sandstone sides of railway cuttings or road cuttings, small masses of travertine can be seen. Small stalactites, stalagmites, complete columns and sheet-like masses with wrinkled surfaces (the so-called "cascade" formations of limestone caves) mark the place where continual oozing of calcium-bearing waters has caused the deposition of these formations. As a guide to those who wish to see for themselves, these formations

only occur where large concrete walls or bridges overlie the sandstone walls. One of the important constituents in cement is calcium silicate and when water is added to it in order to pour it in the form of concrete, chemical change takes place and a small amount of calcium hydroxide forms. This is easily soluble and rainwater or drainage seeping through lines of weakness in the concrete dissolve the calcium hydroxide. When the water charged with this constituent finally soaks through to the open air and trickles slowly down the side of a road or railway cutting, the calcium hydroxide is converted into calcium carbonate by the chemical action of the carbon dioxide present in the atmosphere. Interesting examples formed in this way can be seen where there are massive concrete structures such as at North Sydney railway station and in the Argyle Cut.

Collecting and Preserving Insects and Their Allies

By A. MUSGRAVE

(*Continued from page* 367.)

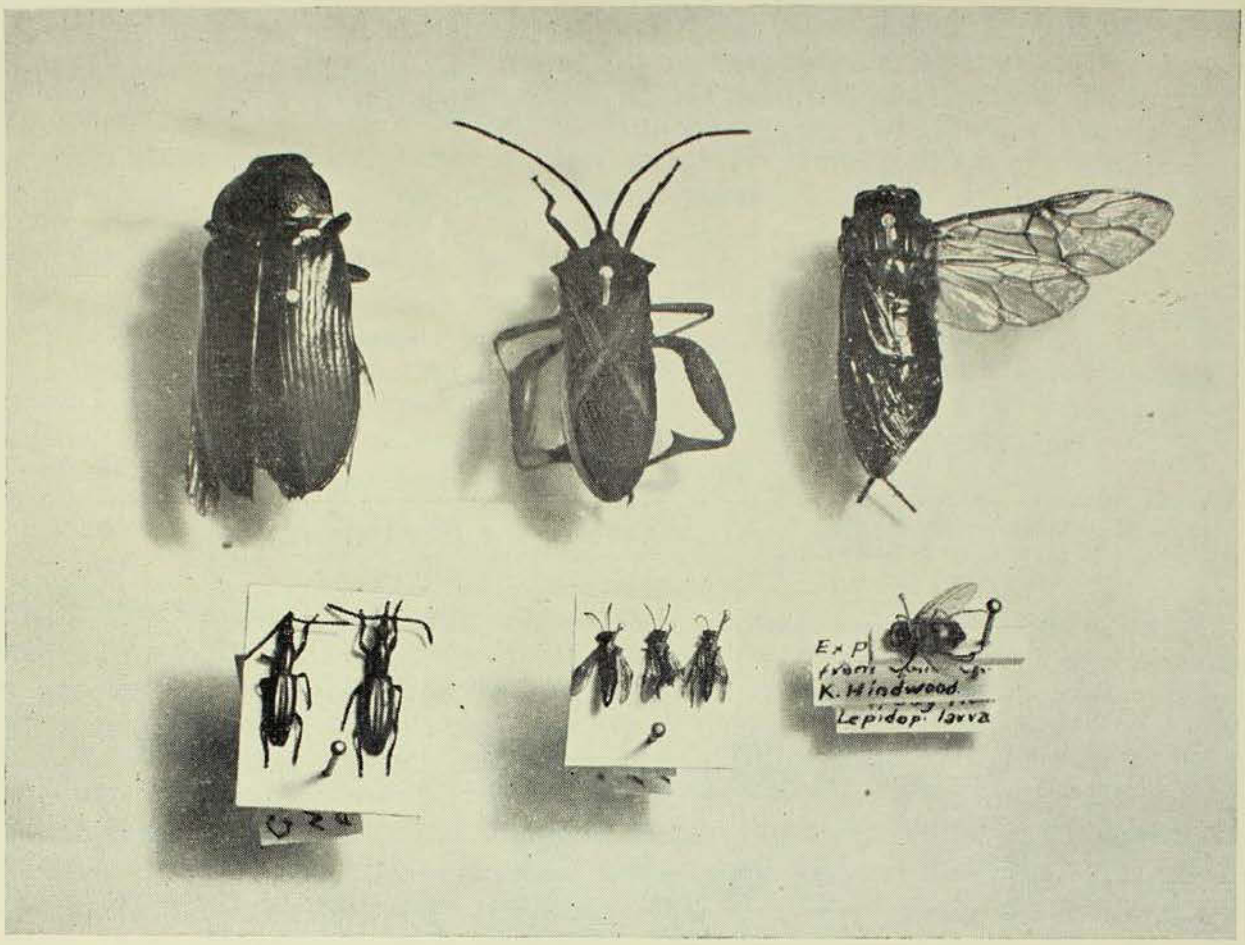
PRESERVING AND SETTING

APPLIANCES.—Entomological pins (various sizes). Setting boards various widths). Tracing paper or "cellophane." Lillikin pins (or similar small office pins) for holding down tracing paper. 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" or nitrocellulose in ethyl acetate. Polyporus pith. Store boxes, 17 x 12 in., 14 x 10 in., or entomological cabinets. Flaked naphthaline, crushed moth balls, or paradichlorbenzene. Jar with damp sand for relaxing. Trichlorphenol.

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 require to be relaxed (*see page* 391).

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 and Continental, the lastnamed being longer and more slender than the British pin, with a rounded head. British pins are manufactured by D. F. Tayler & Co. Ltd., in white (silvered) or black (japanned) and are used for larger insects. Continental pins of black or silvered stainless steel are also used for certain large insects. They are not available locally and must be imported. For very small insects such as flies very fine pins or stainless steel pins are employed. Entomological pins are numbered according to length and thickness.

Insects are not all pinned the same way; moths, butterflies, flies, wasps and many others are pinned through the thorax, plant bugs through the scutellum, and beetles through the upper part of the right wing-cover (elytron). It is advisable to keep the specimens at about the same height on the



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.

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 or mounted on polyporus pith. Small bugs, beetles and other hard-bodied insects may be fastened on to a piece of card with "Seccotine" or similar adhesive, with legs arranged neatly so as to show the characters. Some collectors find that nitro-cellulose dissolved in ethyl acetate makes a satisfactory adhesive for gumming insects on cards. This substance is virtually the same as colourless nail polish, and some collectors find that a small bottle of nail-polish lasts a long time and saves the trouble of manufacture. However it has the disadvantage of drying very rapidly. Small flies and other delicate insects may be impaled on a fine entomological pin or stainless steel point which is inserted at one end of a piece of polyporus pith; a larger entomological pin is passed through the other end of the piece of 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, should be attached to the pin beneath the specimen. These labels may be written in indian-ink with a mapping pen, and if prepared under a magnifying glass or binocular microscope the letters may be reduced in size and a more pleasing effect obtained. Some collectors type the label and then photograph it down to the required size. Labels may also be printed in pearl or diamond type by a printer; if a gap be left for the date, particularly if there are a variety of dates for a given locality, this may be written in later in indian-ink.

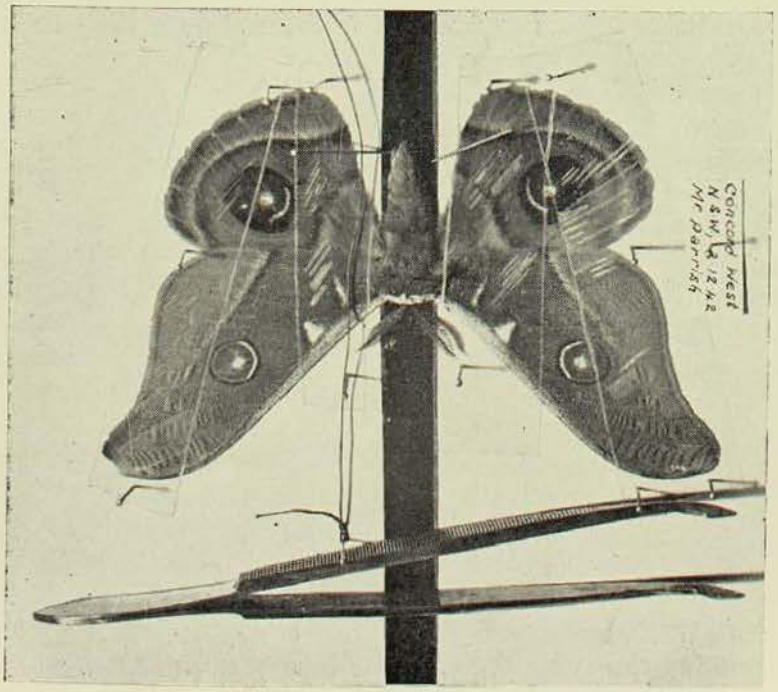
Setting.—Winged insects, such as butterflies and moths, dragon-flies, ant-lions, mayflies, grasshoppers, and cicadas, are set on a setting-board with the wings spread out flat. Sometimes, in order to conserve space, only the wings on one side of the body are set.

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 the Australian Museum, and the measurements are given below:—

	Length in.	*Breadth* in.	*Height* in.
For large insects:			
Base of setting-board (3-ply)	12	6¼	3/16
Pieces (2) of pine or redwood	12	2 9/10	⅝
For medium-sized insects:			
Base of setting-board (3-ply)	12	3¾	3/16
Pieces (2) of pine or redwood	12	1¾	11/16
For small insects:			
Base of setting-board (3-ply)	12	1½	3/16
Pieces (2) of pine or redwood	12	⅝	⅝

The two pieces of pine or redwood in each series are so glued 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 pressing the folded wings apart. 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 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 hindwing is then drawn forward



Emperor Gum Moth on setting board. Illustration shows setting forceps; cotton for holding down wings; strips of cellophane held in position by office pins; label.

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. The abdomen is supported by means of pins crossed beneath it and the antennae are held in position by pins.

To set a dragon-fly, 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 setting boards for about two to three weeks. Labels with all particulars as outlined under "labelling" 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 per cent. 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.

(*To be concluded.*)

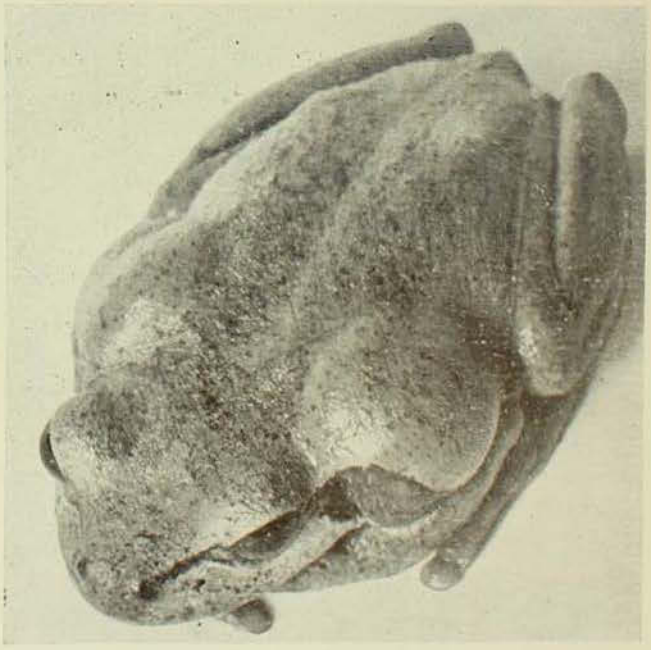
Notes and News

Captain Cook Relics Transferred.

The Australian Museum has recently transferred part of its collection of Cook relics to the Mitchell Library where the specimens will be more appropriately associated with the extensive series of Cook documents and illustrative material already housed there.

The items transferred include navigation instruments (including the compass from the *Endeavour*), a writing desk, Oriental box, cabin tea caddy, glass tumbler, ammunition belt, ivory rule, knives, forks and spoons, dress sword, shoe buckles, hand-lines and stern-plate from the *Resolution*, Bible (used on the three voyages), a copy of Boswell's *Corsica* (autographed by the author as a presentation copy to Cook), photographs and lithographs, grant of arms, various medallions of Cook and others (including the beautiful miniature of Cook painted on ivory by Copley, which was reproduced as frontispiece to the December, 1954, issue of this MAGAZINE.).

The anthropological specimens in the Cook Relics, which came from Sir Joseph Banks' collection, have been retained by the Museum, but ten volumes with contents relating to Cook's voyages—newspaper cuttings, drawings, maps, and official correspondence—have been transferred from the Museum Library to the Mitchell Library.



A frog (Hyla sp.) from the Blue Mountains, N.S.W., infested with an unusually large number of frog-fly larvae (Batrachomyia). There were four larvae in the swelling on the right and two in the left swelling. A brief description of frog-flies was given in the September *Notes and News* columns.

The Minister for Education (the Hon. R. J. Heffron) with (right) Mr. H. B. Mathews, President of the Australian Museum Board of Trustees. Mr. Heffron visited the Museum on 12th August for a preview of the "Age and Animals" exhibit designed as the Museum's contribution to Education Week.

Research on Freshwater Mussels.

The Assistant Curator of Shells, Dr. Donald F. McMichael, returned to the Museum last August after two years in America where he gained his Ph.D. degree for a thesis on the freshwater mussels of Australia. Dr. McMichael left Sydney on a Fulbright Travel Grant and a Fellowship from Harvard University to study under Dr. William J. Clench, Curator of Molluscs at the Museum of Comparative Zoology.

Polynesian Fishes.

A collection of more than 400 fishes made by Dr. and Madame R. Catala in the Gilbert Islands has recently been returned to the Museum. It had been submitted to Dr. J. E. Randall of the University of Hawaii for study. Dr. Randall took some of the fishes to Washington for comparison with related species which had been collected from Bikini Atoll by the Americans during "Operation Crossroads."

Surfer's Enemy.

A new exhibit of topical interest has been added to the Invertebrate Gallery of the Museum. Life-like models (the making of which gave scope for ingenuity in the use of plastics, tell visitors the facts about the stinging "Bluebottle"—*Physalia* of local seas. The bluebottle occurs all along the eastern coasts of Australia, brought there by warm currents, and is particularly abundant off the New South Wales coast when north-east winds prevail in summer. Bathers know only too well the discomfort of surfing when bluebottles are washed inshore. The exhibit shows the whole unusual animal community and also its various parts in enlarged detail. Special emphasis has been laid on the mechanism of a microscopic stinging cell. Such cells occur in the trailing tentacles.

Additions to the Stanley Collection.

In 1943 a remarkable collection of fossil insects, including type specimens, was presented to the Australian Museum by the late Mr. Malcolm S. Stanley. Mr. Stanley was well known for his enthusiastic and painstaking collecting of fossil insects from Permian rocks at various localities in the Belmont and Warner's Bay district of New South Wales. He was one of the pioneer workers in this area and the vast number of fossil insects he collected contributed materially to the present knowledge of what is now a world famous Permian insect locality.

Additional material has now been presented by Mrs. Stanley. As well as further beautifully preserved insect remains an extensive collection of anthropological material is included in this new and much valued gift. Over many years Mr. Stanley himself collected aboriginal stone axes in New South Wales, adding others from many parts of Australia—a valuable collection

for distributional studies. He obtained in all some 400 specimens of great variety of shape and manufacture, including some very large and some rare types.

During a visit to the Solomon Islands Mr. Stanley acquired another fine collection, made by the Rev. A. J. Voyce, of some 420 polished adzes and axes, representing practically all the known types from Bougainville Island, and some from Guadalcanar. He collected a third series of adzes from New Guinea, New Caledonia, New Zealand and other islands, together with many fine examples of wooden weapons from those regions. A large series of chipped stone implements from Murramarang, on the south coast of N.S.W., includes over 900 stone spear points and 40 fish-hook files. The anthropological material now received from Mrs. Stanley is thus valuable from all points of view, enriching considerably the archaeological material in the Australian Museum and filling gaps in parts of its collections.

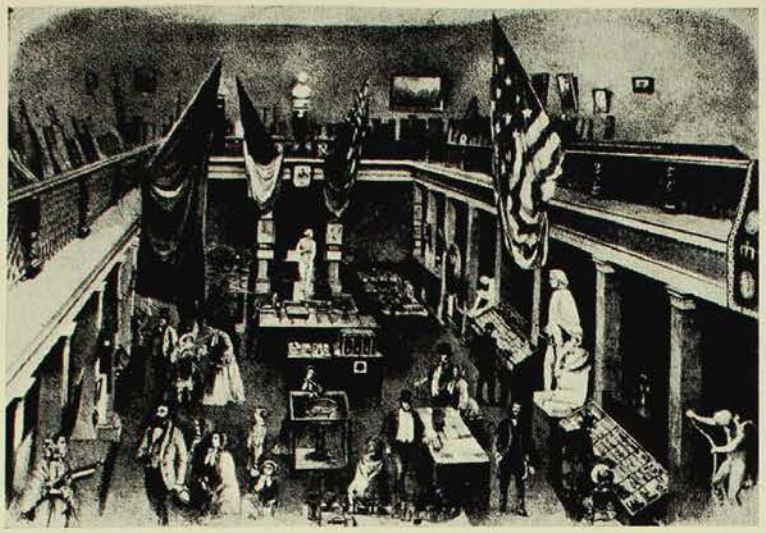
Our First Exhibition.

When the French Government decided that a "Universal Exhibition of the Natural and Industrial Products of all Nations should take place in Paris, in the month of May, 1855," the Australian Legislative Council acted promptly in setting up a Commission to undertake the work of collecting the Colony's entries and voted £3,000 (later increased to £6,000) for its execution. The Trustees of the Australian Museum were requested, "by special instruction" to give every assistance in supplying specimens of natural history, and the Trustees "obligingly lent the large Hall of that Institution (which the greatest exertions were required to complete in due time) for the Local Exhibition."

This display, pictured overleaf, was the first exhibition to be held in the Museum. It included goods intended for Paris and other articles "illustrative of the resources, natural or industrial, of the Colony," and the Governor-General, Sir Charles Fitz-Roy honoured the Commissioners " by his sanction and presence" when it was introduced to the public on 14th November, 1854.

Apparently the colonists in general were somewhat indifferent to the fate of the exhibition but as Sir Alfred Stephen, Chairman of the Board, commented in his opening address, what had been collected was "at least Colonial:—intended to represent, simply, what our productions are; not

Unpacking a New Caledonian greenstone adze blade presented to the Australian Museum as part of additions to the Stanley Collection. Other rare and unusually large axes and adzes from Australia, the Solomon Islands and New Guinea are shown in the illustration.



The first exhibition held in the Australian Museum, 14th November, 1854. A reproduction of this scene "taken from a daguerreotype by Gow, 348 George Street," hangs in the Museum Library. (See letterpress on previous page.)

what we would have them supposed, if admiration were the object, and not truth."

The Catalogue of the Exhibition, from which the extracts above are made, shows that contributions ranged from raw and refined sugar from the Australian Sugar Company, copper and minerals from the Bathurst Copper Company, acids, indigenous woods, wines, fossils, gold, biscuits, wool and preserved meats to a "Log of Wood with Leaves," manna, antiseptic fluid, published music, artificial teeth and "Inspissated Juice of a Native Fig-Tree."

Mr. Joseph Kingsley.

When Mr. J. Kingsley retired in August last he had completed forty-two years in the Museum's Department of Preparation, of which he was Officer-in-Charge for the past eight years. During that time he saw methods of preparation change from the simple ones of the "old school" to the complicated and exacting methods used in the modern presentation of natural history exhibits. Mr. Kingsley was able to follow and to adopt new methods which came his way and so was able to provide the Museum with exhibits which were the acme of the work at the time.

In 1940 he visited the United States with the aid of a Carnegie Grant and received training in the use of plastics. As a result he was able to develop new designs in habitat group construction and new methods in the manufacture of accessories such as celluloid leaves, plastic fish eyes and fins.

Mr. Kingsley's work will be remembered by the many examples of his excellent modelling and casting technique. Among these are the full-scale model of the extinct Giant Kangaroo (*Palorchestes ariel*) which can be seen in the Museum galleries. This was reconstructed by him on the basis of information gathered from fossil remains in the Museum collection.

His knowledge of human anatomy is shown to advantage in the six models of the native races of the Western Pacific. These one-third scale models show the typical features of body build, facial features, dress and weapons of the Australian Aborigine, the Maori, the Papuan, the Malay, the Pygmy Negrito and the Tasmanian.

In preparation for the Black Cockatoo Group Mr. Kingsley led an expedition to the Barrington Tops district to collect the birds and specimens of the trees, flowers and rocks of the area. Replicas of the latter were reproduced in celluloid and papier mache and incorporated into the exhibit on a predetermined plan.

Other outstanding examples of his work are the Thresher Shark, Sailfish (see frontispiece), the models of the Tapeworm life-history, and the reconstructed head of the extinct giant lizard *Megalania priscus*. Special mention should be made also of the Limestone Cave exhibit and the models illustrating the evolution of the horse. All these and other exhibits show excellence of technique and design and will remain as lasting memorials of this work.—R.D.M.

Pyrosoma Plagues in Surf

By ELIZABETH C. POPE

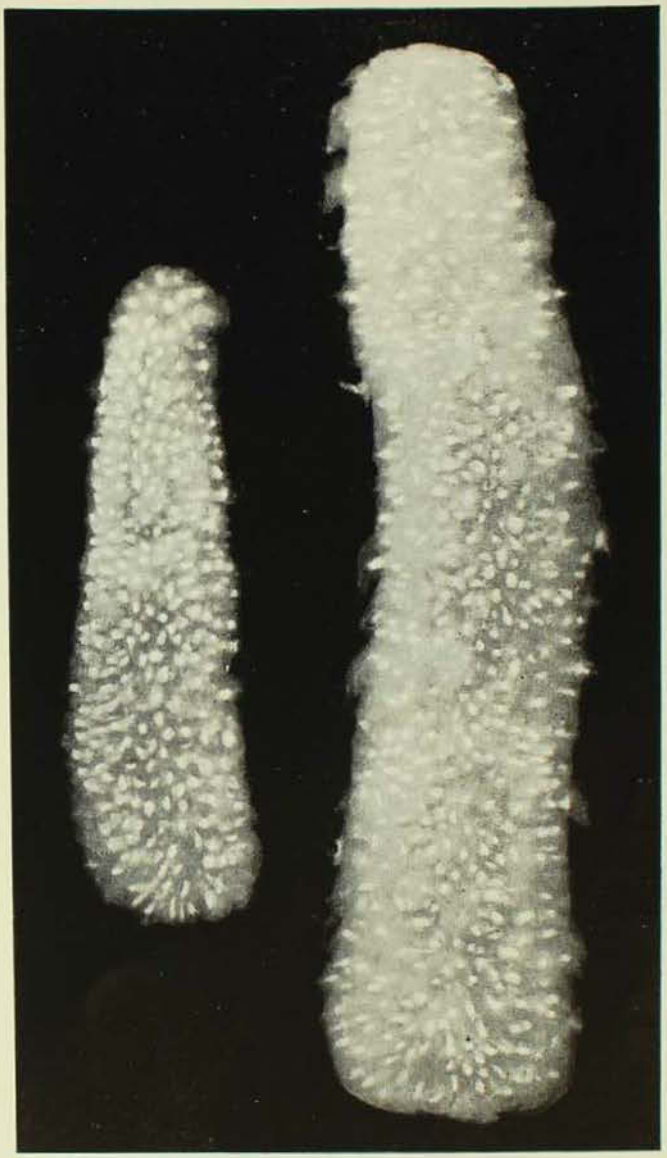
IT is well known that many animals show great fluctuations in numbers and we can all remember years when we could hardly think clearly for the shrilling of cicadas, or years of mouse plagues in country districts. Last summer an unusual animal occurred on surf beaches near Sydney in considerable numbers and the Australian Museum received as many as ten inquiries concerning it in one week. Most of the inquirers wished to know whether the animal could sting.

Its scientific name is *Pyrosoma atlanticum* and, although its flesh feels like that of a jellyblubber, it is in no way related to jellyfish and cannot sting as they do. In size it may vary from a few inches in length to several feet and the colour is generally a pinkish- or greyish-white. The shape is best likened to that of a thick-walled finger-stall for it is tubular and closed at one end.

The animal is a compound ascidian (the cunjevoi on the coastal rocks also belongs to this group) but unlike the cunjevoi instead of each one being a single individual it consists of hundreds or even thousands of individuals grouped together in a clear kind of matrix. In the illustration each of these appears as a white fleck and from several of them, which happen to be in silhouette on the edge of the colony, flap-like structures are seen to project. These aid in diverting food currents into the mouths of the individuals near them.

All the mouths open outwards on to the outer surface of the colony and the atrial openings lead into the barrel-like cavity inside the colony. This in turn communicates with the surrounding water through one main opening. In the illustration this opening is on the lower side of each colony shown.

A notable fact about *Pyrosoma* colonies is their ability to produce flashes of light when stimulated by the joggling of waves or rough seas. The light is a cold, luminescent glow and is all the more remarkable because it is produced by symbiotic bacteria living in certain cells of the body. One animal seems to "set off" others, in a manner not yet understood, and the colony may, as it were, "infect" others, so that groups of colonies look like ghostly sausages floating in the sea. This power to emit light fades as a colony dies; it disappears rapidly in colonies kept in small aquaria.



Two of the smallest *Pyrosoma atlanticum* colonies washed up on Sydney beaches (approximately life size).

The flash of light is thought to scare off attackers for it has been noticed that fish will eat a colony which does not light up, because it is dying, whereas they tend to drop any that emit flashes when touched.

In Dakin and Colefax's book on the plankton of New South Wales coastal waters *Pyrosoma* is listed as rare. However, Dr. H. Thompson, writing a few years later on the pelagic tunicates off the east coast of Australia, states that *Pyrosoma atlanticum* is a regular inhabitant of warmer seas and appears as far south as southern New South Wales, though only in the warmer months of the summer. At this time the warm current that flows down our coast from the tropics keeps closely inshore and extends further south than in winter.

This year has been remarkable in that the warm current remained close inshore for a longer period than is usual and as late as April the local press recorded sea temperatures for the surfing beaches that are normally considered within the range of high summer—in February. The phenomenally warm surf, then, seems to coincide with the appearance for the first time in years of *Pyrosoma* colonies off Sydney beaches and may account for the local abundance. It may be many years before another such visitation occurs.

The Koala

By ELLIS TROUGHTON

AUSTRALIA was first known as the land of the kangaroo and egg-laying platypus, but the quaint and lovable koala has since become the most widely-known and admired of all pouched animals. This remarkable creature certainly merits the protective affection of Australians old and new because the lonely little fellow is truly a marsupial orphan, with an ancestry veiled in antiquity and a family all to itself. The koala is bound to the wheel of its arboreal routine more helplessly than any slave of human duty, so that the great anatomist Wood Jones described it as an over-specialized or zoologically "senile" member of the family of phalangers or Australian possums.

The koala is sometimes classified along with the ringtail possums, but loss of the prehensile tail is proof of a prolonged period of earthbound existence which it once shared with the tunnelling wombat. Although loss of the tail in the two marsupials cannot be regarded as positive proof of their common ancestry there remain traces of a similar muscular control over the lost appendage. The koala differs from all the phalangers in having functional cheek-pouches, associated with mastication of its bulky fibrous food, and rudimentary evidence of such pouches is traceable in the wombat. There is similarity also in the form of the actual pouch, which differs from that of any possum in expanding upwards, and from most in the presence of only two teats.

If the koala and wombat had a common origin, their ancestral stock must have outgrown the sheltering tree-hollows and gradually essayed a more terrestrial existence, associated with a bulkier diet of coarse grass, roots and bark. The wombat adopted the burrowing habit which sheltered it from the marsupial-wolf and other prehistoric predators, while the sluggish old koala resorted to the trees again. Loss of its prehensile tail has been amply compensated by the strong sharp-nailed fingers, the first and second of which are opposable to the outer three for grasping branches like a double thumb. The monkey-like great-toes also combine in making the

Mother and well-grown "cub," showing the devotion which makes a tame koala so responsive to human companionship. The tiny "gum-baby" outgrows its cosy pouch after eight months, afterwards travelling pick-a-back or being hugged closely while resting. The combined 2nd and 3rd toes with divided nails, now useful as a hair-comb, are actually a climbing adaptation shared with the phalanger-possums; they also form an ancestral link with the tunnelling wombats.

Photo.—(The late) Noel Burnet.

koala a remarkable tenacious if rather sloth-like climber.

It was lack of a prehensile tail, and the misleading early comparison with foreign mammals such as monkeys and sloths, which prompted the inappropriate name of "native bear." This popular comparison with foreign bears is also reflected in the koala's generic name *Phascolarctos* from the Greek meaning a leather pouch and a bear, provided by the French naturalist de Blainville in 1816. A year later the German naturalist Goldfuss supplied the specific name *cinereus*, referring to the ashy-grey colour of the original specimens from the tablelands south-west of Sydney; and so, one is provided with an early indication of the international acclaim which tended finally to check commercial trading in koala pelts, and may ensure its ultimate survival through total protection.

Original Discovery

Because of its natural dependence on the eucalypt forests, koalas were not seen in 1770 by Captain Cook's naturalists in the scrublands about Botany Bay, and they were not reported by settlers for a decade after arrival of the First Fleet. The earliest reference is generally attributed to the "anonymous" account of the journey of a young man into the Blue Mountains in 1798, printed in the *Historical Records of New South Wales* a century later. However, in the course of research amongst original diaries and letters, concerning the discovery of the Lyrebird, it was recently established by Mr. A. H. Chisholm[1] that the earliest reference made to the koala was by John Price, a young free-servant to the Governor, Captain John Hunter.

It was while on an exploratory trip in 1798 into the tablelands south-west of Sydney, under the guidance of a young ex-convict James Wilson, who had lived for several years with the aborigines, that young Price wrote of shooting the first specimen of the "Pheasant" or lyrebird.

[1] Chisholm, *The Emu*, Royal Australasian Ornithologists Union, Vol. 55, part 1, pp. 1-15, March, 1955.

He also referred to an animal which Wilson called a "Whom-batt" and wrote: "There is another animal which the natives call a Cullawine, which much resembles the Sloths in America." Evidently, it was near the present town of Bargo, about 60 miles from Sydney, that the earliest observations of three of the most remarkable members of Australian fauna were made, by appropriate coincidence on January 26, the date eventually observed as Australia's national day.

The next account in the *Historical Records* is that of the young explorer Ensign F. Barallier, written originally in French in 1802, saying that natives had brought in "portions of a monkey" which they called "Colo." In exchange for spears and a tomahawk, the feet only were obtained and sent to the Governor "preserved in a bottle of brandy"—quite a tribute to the "spirit" of the times as well as the Ensign's keenness. The first published account of a live koala, evidently obtained by Barallier for Governor King to send to England, appeared in August, 1803, in the *Sydney Gazette*, a few months after the first issue, as follows:

> An animal whose species was never before found in the Colony is in the possession of His Excellency. When taken it had two pups, one of which died a few days since. This creature is somewhat larger than the Waumbat [*sic*], and, although it might at first appearance be thought much to resemble it, nevertheless differs from that animal . . . . the graveness of the visage . . . would seem to indicate a more than ordinary portion of animal sagacity, and the teeth resemble those of a rabbit. The surviving pup generally clings to the back of the mother, or is caressed with a serenity that appears peculiarly characteristic; it has a false belly, like the apposum [*sic*], and its food consists solely of gum leaves, in the choice of which it is excessively nice.

This quaint account is of interest as showing an early appreciation of the koala's general resemblance to the wombat, as well as the limitation of its diet to eucalypt leaves. A further reference to the unusual occurrence of twins appeared in the *Gazette* of October, 1803, that: "Sergeant Packer, of Pitt's Row, has in his possession a native animal sometimes since described in our paper, and called by the natives a Koolah. It has two young, has been caught more than a month, and feeds chiefly on gum leaves, but also eats bread soaked in milk and water." Such keen local interest was soon reflected abroad when the great Professor Home wrote in 1808 that the "Koala is another species of the Wombat, which partakes of its peculiarities." Another account from the Lieutenant-Governor, Colonel Patterson, was quoted as saying that "The natives call it the Koala Wombat," and that the "New Hollanders" ate the animal which fed upon the tender shoots of the Blue Gum, of which it was specially fond. The first known record of the koala in Victoria was provided in 1855 by the explorer William Blandowski, who quoted the aboriginal name "Karbor" by which it was known in the region of the Murray River.

Diet and Distribution

The distribution of its food-trees enables the former range of the koala to be traced, even over to south Western Australia where semi-fossil remains of the living marsupial have been recorded from the Mammoth Cave on the Margaret River. Of recent years its scattered and ever-shrinking range is said to extend from the south-eastern border of South Australia, through Victoria and the coastal forest regions of New South Wales and Queensland, north to about Bowen. The favoured food-trees include about twelve kinds of eucalypts, of which smooth barked trees of high oil-content are preferred, such as the Manna-Gum of Victoria, the Forest Red-Gum (N.S.W.) or the Queensland Blue-Gum. In his book *Call of the Koala*, Ambrose Pratt referred to chemical analyses indicating a cumulative poisonous effect due to the release of hydrocyanic acid from the chewing of the young "tips" of eucalypts growing in certain soils, such as is known to produce fatal results in sheep. However, there is little doubt that natural discrimination in the choice of its food-trees would avoid fatal consequences for a koala except in limited areas where the variety of eucalypts has been drastically reduced. This is another potent argument for the provision of adequate sanctuaries.

It is often said that the koala possesses the largest known "appendix" of any animal, from 6 to 8 feet long, to aid in digesting its gum-leaf food and to ensure an adequate intake of carbohydrates, proteins, and fats. But this additional intestinal sac or caecum is not anatomically comparable with the now useless human appendix, though it is an essential supplementary organ for digestion of the bulky diet. Due possibly to its remarkably specialised anatomy and diet, the koala is subject to a variety of ills including kidney troubles, intestinal parasites, and even pneumonia in spite of its eucalypt food. The first drastic shrinkage in population, apart from reductions caused by man and bushfires, apparently resulted from the introduction of some strains of ophthalmic disease. Also a "lumpy-jaw" periostitis of the skull, is reported to have swept away millions of the koala in 1887-9 and 1900-3.

Danger of Extinction

It now seems incredible that a civilised community tolerated for a further quarter-century the massacre of so harmless and lovable a marsupial in the interests of trade and revenue. In 1908 some 60,000 pelts passed through the Sydney market alone and, despite the obvious threat to survival, the infamous tally steadily increased until in 1924 the enormous total of over two million skins was exported from the eastern States. When the koala had been practically banished from Victoria and New South Wales its last Queensland stronghold was invaded and in 1927 during an "open season" some 10,000 *licensed* trappers destroyed such numbers that 600,000-odd skins were exported for sale.

Since then, the koala has mercifully been assured perpetual protection under the faunal Acts of the three eastern States, not only to ensure its survival but for the reason that its slaughter was the most brutal occupation a man could undertake. A most encouraging example of inter-State co-operation on faunal problems was provided by the effort to re-establish the koala in its ancestral haunt in south Western Australia. As reported in April, 1951, in the Melbourne *Argus*, six koalas went on a pioneering venture by aeroplane, with the blessings of the Victorian authorities, to join three of their fellows already established under ideal conditions in Yanchep Park, near Perth.

Birth and Development of Young

The koala's pouch, as in the wombat, differs from that of the phalangers in opening from the rear so that the "pocket" expands upwards and outwards, and the edge is not snagged in climbing. The mating season extends from September to early autumn and, so far as known, the gestation period averages about 35 days. There are two teats but a single young is usual despite some early reports of twins. Like all marsupials, the newly-born is extremely small, measuring barely $\frac{3}{4}$ in. and weighing about $5\frac{1}{2}$ gr., with the forelimbs the more developed for clinging to the mother's fur on its instinctive journey upwards into the pouch. On leaving the teat at about six months the animal is well-furred and about 7 inches long; it continues on in the pouch for another two months, afterwards clinging to its mother's back and being hugged closely to her when resting, until about a year old. According to observations recorded by Mr. David Fleay, and Curator Minchin of the Adelaide Zoo, there is an unusual feeding process during the weaning stage when the young eat the "emulsified" droppings of the parent. This doubtless bridges the transition from milk to eucalypt-leaf diet.

In their wild state koalas are rather solitary and quite inoffensive creatures, but may display anger when handled, scratching severely and biting with a grinding action of the jaws. The young have a whimpering cry when frightened, while the call of grown males when enraged, or in the mating season, has been described as a loud grating cough, like a saw ripping through timber.

In captivity, the young or injured become most affectionate pets, disliking to be left alone and seeming strangely dependent on human society.

Such was the experience of Mr. and Mrs. A. S. Faulkner with a six-months old "cub," rescued from its dying mother in Queensland. It cried and needed constant petting until resting contentedly on a

cushion of roughly preserved koala skin. It grew up in a semi-open enclosure at Albany, Western Australia, thriving on leaves of the York, Flooded, and White gums. Its meal included lapping-up a half-pint of cow's milk, and it also had the wild koala's habit of licking up soil or gravel as a digestive aid, possibly a habit retained since its wombat-like term of terrestrial existence. This animal lived contentedly for about twelve years and died of pneumonia in Adelaide during a very severe winter. By this time, as shown by the condition of its teeth and its fur, it was near the end of its normal period of life.

THE INNOCENTS ABROAD

The remarkably sustained world-appeal of the Australian "Teddy Bear" was demonstrated in January, 1952, on the arrival of four living koalas at the San Diego Zoological Gardens, California, for inclusion in a film depicting life around the first settlement at Botany Bay. Merits of the film apart, the San Diego Zoo authorities had cherished the slim hope of exhibiting and establishing the koala in California, ever since their last pre-embargo specimen died in 1929. With this in view, thriving stands of eucalypts had been established over a 200-acre tract in the Zoo, where any natural choice of the new arrivals was carefully studied. Three kinds of eucalypts were included in daily feedings of 2½ lb. each per day, the koalas showing no awareness of change though favouring a hybrid of *melliodora-rostrata*, in addition to the Manna, Blue, and Grey gums. The only unnatural food supplied was one pint of milk mixed with four teaspoons of dextrose.

The presentation of the koalas as a permanent gift from the Government of New South Wales in June, 1952, was hailed as "a gracious act of international goodwill." It was hoped that the exiles would establish a colony within the large enclosure, cheered by the laughter of kookaburras, and thoroughly at home to a host of American admirers. Welcoming the koala party as "Aussie Ambassadors" in the Journal *Pacific Discovery*, Ken Scott, Jr., aptly stated that in most toy shops you will find a variety of ursine species generically termed "Teddy Bears," acknowledged namesakes of Theodore Roosevelt. But the favourite among them is not really a bear at all, but none other than *Phascolarctos cinereus*—the koala of south-eastern Australia.

As the American author concludes, though all such childhood companions may be made of plush-covered excelsior or sawdust "The Koala embodies every feature of its nursery counterpart—a convenient armful of woolly body, short clinging limbs, and a melon-shaped head, complete with fringed ears, patent leather nose, and shoe button eyes. And in addition, the magic of life has been breathed into it. Externally, it resembles no other living creatures, and its relationship to the kangaroos, opossums, and other pouch-bearing beasts is not in the least obvious."

This charming tribute to the unique marsupial emphasizes that "koala" rather than "native bear" is the most appropriate name for popular use. Based on variations of an aboriginal word, it is said to mean that in the wild state it does not need to drink, apparently deriving sufficient moisture from the gum-leaf diet and dew. According to myths of the Victorian aborigines their name "Kur-bo-roo" is associated with a story that the koala once stole all their drinking vessels (*tarnuk*) and drained all the creeks, creating such a scarcity of water that the women and children cried aloud. However, it is not made clear whether Kur-bo-roo seldom drank afterwards as a penance for monopolizing the water supply! But sad to relate, the aborigines who named it in the long ago have departed since settlement from the vanishing eucalypt forests where the koala clings on in tragically diminishing numbers.

Enslaved to its ever-shrinking environment, not even the platypus is in greater need of every measure of conservation that public opinion and legislation can provide. The last real stronghold of the koala may well be the dense coastal forests and national reserves of Queensland because, with the exception of such sanctuaries as Flinders Chase on Kangaroo Island, which may become overstocked (with resultant

disease) or suffer from bushfires, survival of the southern koala is nowhere assured. The fascinating creature is utterly harmless and what a keen delight it would be for us all should it again be plentiful enough to haunt the outer suburbs and homesteads. Granted perpetual freedom of the trees perhaps their numbers will increase and they will once more browse in the sheltered peace of great forest reserves, along with other marsupials which are the Australian heritage.

School Children and the Museum

By PATRICIA M. McDONALD

IN recent years the presence of school classes has become increasingly obvious in the Australian Museum galleries. Last year over 8,000 school children with their teachers attended organized classes there. It is the purpose of this short article to explain just what these children do and why they do it, and to indicate other means the Museum could employ to help children.

The topics studied by children at school can very often be illustrated by exhibits at the Museum. Realizing this, the teacher makes arrangements with the Education Officer at the Museum for the class to see these exhibits. Such details as date and time of the visit, the topic to be studied, the aptitude of the pupils and their previous knowledge of the subject are discussed and the entire visit planned in advance.

Schoolboys with their teacher study the aboriginal exhibits.

When the class arrives, it is taken to the Lecture Hall, where the children and the Education Officer discuss the various features of their particular topic. The salient points are illustrated with lantern slides or film strips, and a movie film. The most important part of this section of their visit is that the children can handle the specimens under discussion. Objects which they had known previously only as pictures in a book are there for them to see and touch. The class is then taken to the gallery containing the material they are studying. Here each child is given a sheet of questions, to be answered by studying the labelled exhibits.

This method of conducting a class visit has proved very popular with both children and teachers. An excursion of this kind is a break in school routine, so it is planned to make the time they spend at the Museum as unlike an ordinary, set lesson as possible. While in the galleries, the question sheets encourage the children to find things for themselves and the enthusiasm which accompanies this task fully justifies its use. The degree of popularity can be judged by the fact that there has been an increase of 250 per cent. in the numbers attending over the past three years.

Another Museum service for school children is the showing, free, of natural science films in every school vacation, as described in a previous article.*

With the enormous increase in the numbers of children visiting the Museum, it has become imperative to provide more space and more facilities for them. For this reason space has been set aside in the galleries for a special Children's Room, where young students of natural science can follow their particular interests. The room will be provided with plenty of work space for children to paint, draw and model, pin out their insects, or study the latest addition to their lizard collection. One of the features of the room will be a series of aquaria for keeping live animals, such as different kinds of fish, tadpoles, newts, tortoises and so on, as well as other equipment for housing small terrestrial animals. A section of the room will be devoted to a library of reference books suitable for children. It is also hoped to install a slide and a movie projector.

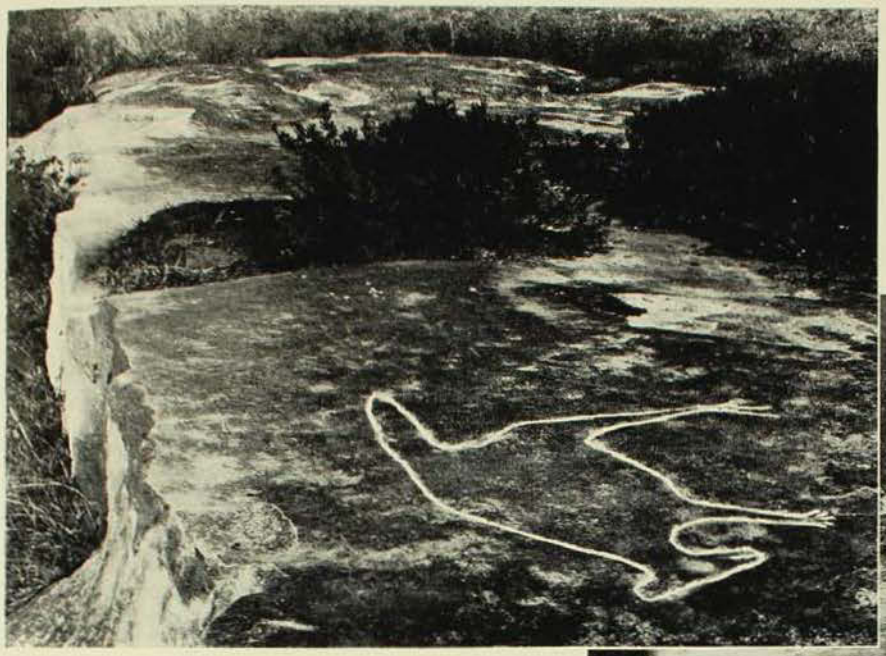
As the situation is now, children in outlying suburbs and in the country cannot come to the Australian Museum regularly because of the great distances they would have to travel. The logical thing to do, therefore, is to bring the Museum to them. Thus many specimens of animals, fossils, and ethnological material are being gathered together to form a loan collection. There is already a very fine collection of animal photographs for loan and this will receive considerable additions.

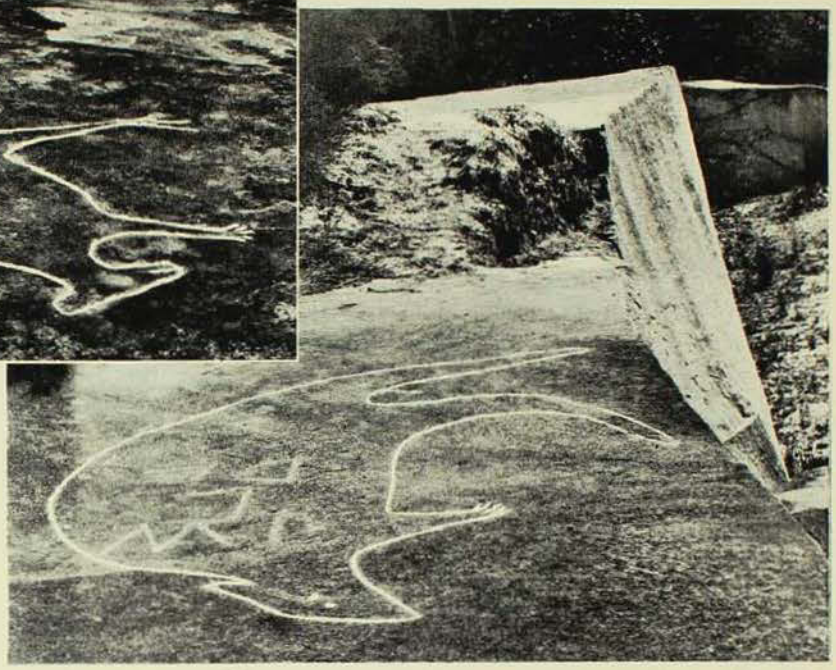
This nucleus loan collection could be expanded in several directions. Habitat groups are a more attractive and instructional way of presenting material than single specimens, and simple groups could be built into small cases for carrying by hand. Larger groups and other exhibits could be built into a panel van or other vehicle and, accompanied by a guide-lecturer, sent on tours of country centres. In this way a very attractive and interesting service could be given to country people and schools.

The needs of physically handicapped children could also be met. Special models for blind children have been used for some years at the National Museum, Melbourne, and there is no reason why we cannot provide similar ones here. Spastics' and children's hospitals could also be visited by a lecturer with exhibits suitable for handling by the young patients.

Although these plans are only in the early stages, it is expected that they will grow to practical realities in the not too distant future.

*"Films at the Museum." AUST. MUS. MAG. xi (4), 134.





Remnants of two groups of engravings, at Brookvale (left) and Narraweena (below). In both cases other figures were removed during quarrying.

Damage to Rock Engravings

FROM time to time our attention is drawn to damage done to rock engravings in the Sydney-Hawkesbury district. Initials and names disfigure many galleries of engravings and paintings and with unprotected relics in the bush it is impossible to combat this type of vandalism. Among the worst offenders are irresponsible children who add to the outlines and details of aboriginal carvings and irrevocably destroy their artistic and scientific value. Other thoughtless visitors to such galleries re-chip the outlines with a pick.

In some areas the use of sandstone for house fences and foundations has been responsible for the destruction of fine groups of engravings. To our knowledge this has happened at Narraweena (Dee Why West), Collaroy and Brookvale (all in the Manly-Warringah district) and at Waitara. Where a number of figures previously existed at these sites one now finds the tail of a fish, half a kangaroo, or the fin of a whale on the edge of a quarry face —mute evidence of a complete disregard for the historical and scientific values of these examples of aboriginal art on the part of quarrymen and those responsible for issuing quarry leases. One fine group in Allambie Road, Brookvale, was saved from destruction some years ago by the prompt action of the late W. J. Walton, who obtained the assistance of the Australian Museum and the Anthropological Society of New South Wales to have the section of rock bearing the engravings reserved (from quarrying operations) by the Lands Department.

Engravings are often done on fine textured sandstone useful for building purposes, and for this reason groups in some areas have been cut out by quarrymen who have ignored the carvings. While it is impossible to save all these figures (about 4,000 are known) in the Sydney-Hawkesbury district, it is felt that a number of them could be hewn out in a block by the

quarrymen and preserved at the Museum, or set in the lawns at the Zoo or Botanic Gardens. The two figures shown in the illustrations are cases in point.

Many of the groups of carvings in the inner suburbs of Sydney, recorded by the late W. D. Campbell in his monograph in 1899, are now under houses and other buildings. Obliteration of such groups is continuing in some areas as Sydney's outer suburbs expand.

Fences have been erected around groups of engravings at Longueville Point (where the unique figure of an emu feeding is to be seen), Bald Head and Ben Buckler (Bondi), and along the front of an extensive group beside Wakefield Highway, Brookvale; but in many cases local councils either will not, or claim they cannot, vote funds for such work, and are quite content to allow these relics to be destroyed under their very eyes, as it were. We can only appeal to councils, progress associations, conservation organisations and private individuals to do their utmost to preserve these relics of a people extinct in this area for over a hundred years.

—*F. D. McCarthy.*

Coral Paradise of One Tree Island

By FRANK McNEILL

A NUMBER of us had visited remote One Tree Island. We had been a privileged university and museum party spending a vacation at the small resort on nearby Heron Island in the Capricorn Group of coral cays at the southern end of Queensland's Great Barrier Reef. The trip was an unexpected one to a lonely spot of land atop the seaward quarter of a vast coral bank. Full details of the excursion were published in the June issue of this Magazine.

The final stage of our approach to the island had been made at near flood tide, cruising for three-quarters of a mile through shallows covering a tracery of coral enclosed lagoons. In fascinating change, the underwater scene had tempted closer inspection, but regrets had to be suppressed in favour of the main objective. Upon rejoining the launch after exploring One Tree Island, none of the party had any idea that the visit would be only part of the day's adventures.

When only half-way across to the open water it was doubtful if we could pass over the last of the many coral barriers forming the margins of the reef lagoons. The varying shallows of such places make it difficult to assess the rate of falling tide waters and there was an ominous scraping of the launch's keel when still hundreds of yards from the deeper water beyond the reef edge. Passengers with heavy footwear quickly dropped overside and eased the craft back into one of the coral lagoons.

Such was our predicament in the early afternoon of a fine summer day—we were destined to remain reef bound for the next twenty-two hours. Not until the arrival of the second of the subsequent high tides was there enough water to float us free of One Tree Island reef. There was no real danger—weather signs were promising and the launch would remain afloat within its coral surrounds at the lowest ebb of the tide. Ahead of us was that coveted inspection of an unusual reef formation and its many interesting denizens. We transferred by dinghy to the margin of "our" lagoon and began wading in the clear shallows. This margin was like a causeway, one hundred or so feet wide, and curved away to link with the margins of similar lagoons beyond. To left, right and behind

Westwards towards the mainland the coral reef bank of One Tree Island is composed of deep lagoons with causeway-barriers. The low tide scene shows how these barriers meander away to the distant fringe beyond the anchored launch.

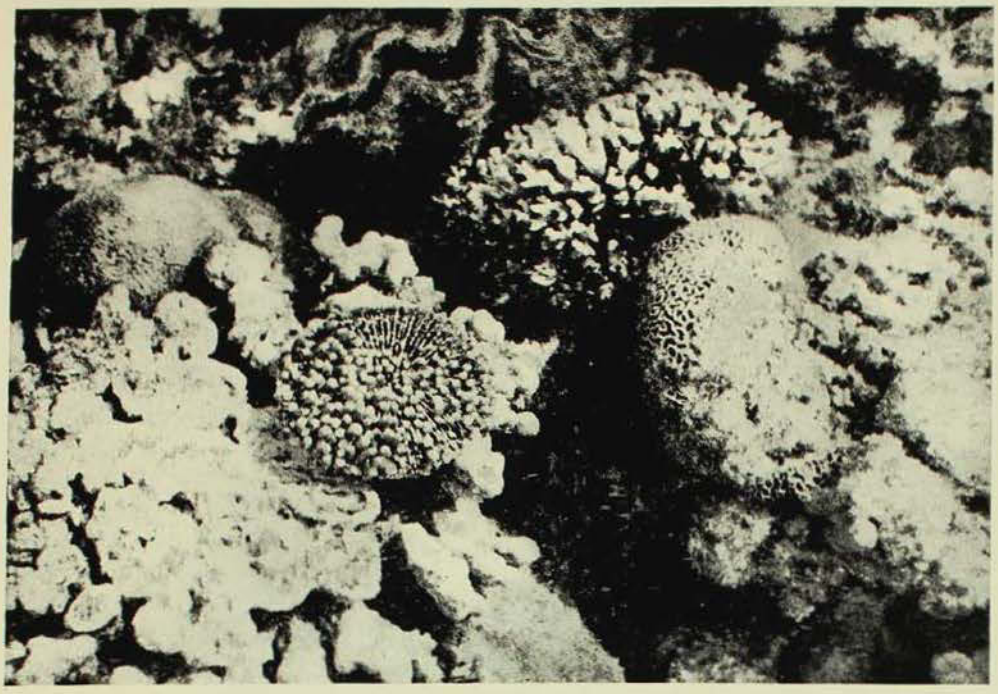
Photo.—Allan Keast.

as well were other enclosed bodies of water, varying in area and forming a lace-like pattern.

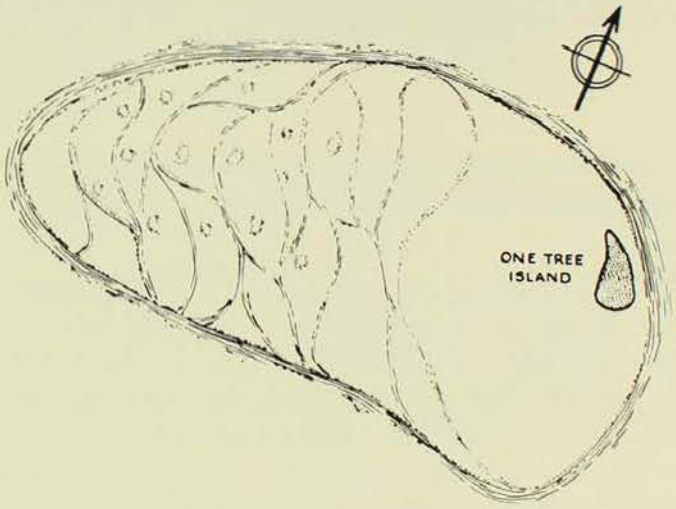
The structure of the One Tree Island reef bank is probably unmatched along Queensland's coral-fringed coast. As with like formations, the location can determine shape and character under the influence of prevailing winds and the flow of tidal waters. The same conditions also account for the position and size of the small island cays found atop of so many of the coral banks along the length of the Great Barrier Reef. The ever-changing variance of structure makes a fascinating study, and the reef bank system of One Tree Island provided an example of exceptional beauty and interest. It runs roughly east and west, tailing away from the easterly weather quarter where the rugged islet surmounts the fringe facing the open sea. The tracery of lagoons occupies approximately two-thirds of the leeward reef area. Development of its unusual character has obviously resulted from the effective protection afforded by the island mound thrown up by the sea along its ocean edge. At low tide each of the lagoons retained from twelve to fifteen feet of water. The larger ones were fully one hundred yards long and fifty yards wide. Their walls were clothed with rich and diverse coral growths reaching from surface level to floors of the whitest of coral sands. Here and there were columnar masses of growth springing from the floors, their tops barely a foot underwater. Even the broad causeways dividing the lagoons were colourful and abundantly peopled with reef life.

Rarely is it possible for visitors to enjoy ideal conditions for an unrestricted survey of a coral reef so far offshore. Vagaries of the tide normally limit the time for wading and the area for inspection. Nothing could have been more advantageous than having time to spare, and with headquarters safely located on a launch in the midst of the coral field—a protected field left unmarred by the damaging cyclone that had raged through the Capricorn Group during the summer of the previous year (1949).

Right into the twilight we picked our footsteps over acres of the uneven surfaces of the causeways. Skirting the terraced edges of the lagoons, groups tarried to watch schools of multi-coloured fish flit like butterflies among the branches



Coral growths were plentiful in depressions of the lithified surface of coral barriers dividing the lagoons. The central circular object is a six inch mushroom coral (*Fungia*), its long plump tentacles partially withdrawn after being touched.
Photo.—Allan Keast.



This sketch gives a general impression of the One Tree Island system of confined lagoons and the columnar coral structures occurring therein.

of staghorn corals. There were the small rounded demoiselles (Pomacentridae) that never venture far from their protective coral screen—some of them iridescent blues or greens; others banded with bright hues or carrying prominent eye-shaped patterns (ocelli) on their sides. Sharing the same sheltered surroundings were other small striped and elongate parrot fish glaringly conspicuous in their painted finery. The scene as viewed through limpid clear water was like the reflection of bright objects from the surface of a mirror. Among groups of demoiselles several larger Chaetodon fish displayed their bright yellow coats, some banded with brown but all rounded in outline and as flat as plates. One particular variety with ridiculously elongated snout delicately pecked invisible food from the surface of the coral branches. Glimpses were had of still larger fish as these emerged from overhanging ledges and swam leisurely to the shelter of some new position under the coral growths. The brilliance of the parrot fish was glaringly apparent. It seems that they are the rightful overlords of the coral banks; large and small, their colours stand out in most striking contrast against the milder hues of their habitat.

On the lagoon floors a number of sluggish giant beche-de-mer ("Curry Fish") rested in bold relief against the white of coral sands. Their plump yellowish hued and brown spotted bodies were as much as two feet long and five inches across. Other close but superficially unlike relatives were the many jet black needle-spined sea urchins (*Centrechinus*), all restlessly swaying their six to eight inch long armoury in the confined spaces they occupied amongst the coral.

The low tide inspection of one of those lagoons gave the impression of a vast natural aquarium whose denizens were present by choice for the short period of restricted activity between tides. Here was the ideal setting for underwater exploration and photography. Every

Rich terraced coral growths of the lagoon walls provide sanctuary for numerous varieties of brightly coloured demoiselles and parrot fish.

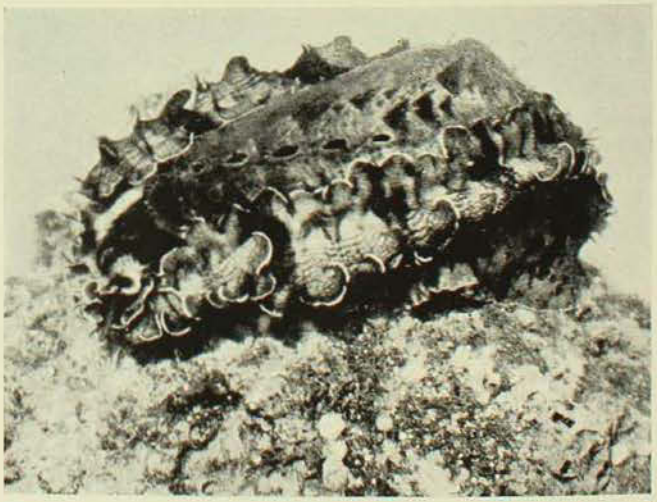
Photo.—Otho. Webb.

desirable facility was available—a protected anchorage where in good weather a launch tender could lie for days at the centre of operations; level sandy floors in quiet water: ideal subjects everywhere along the coral walls; and complete freedom from anxiety about attacks from sharks or other giant fish. An occasional timid shark in a confined space would today be scoffed at by our underwater aqualung explorers. A subsequent broadcast on the untold interest of the area induced a photographer of the American magazine "Life" to go there and he secured the best of all his series of pictures taken along the Great Barrier Reef.

The unprepared nature of our party's visit deprived us of the joys of diving in those fascinating lagoons. We were, however, able to examine close at hand the rich fauna of the causeway shallows. In the depressions delicate corals were in abundance, and lying haphazard among them were examples of an intriguing variety of the Mushroom Coral (*Fungia*). Normally the tentacles of this solitary type of giant single polyp are contracted in daylight deep down in the spaces between the limy skeleton. It was an unusual sight to see fully expanded, crowded three inch long tentacles protruding from and obliterating the basal skeleton; so much so that they were at first mistaken for the tentacles of certain brown reef anemones.

Another object of special interest was a light grey and red blotched octopus. Numerous lairs that were investigated had piled around their entrances the tell-tale remains of meals—empty shells of molluscs and the hard carapaces and limbs of crabs.

Late afternoon brought with it the slow inexorable rising of the tide waters, so surely sensed by all the reef dwellers. Fish milled around with renewed activity, invading the shallower water over the edges of the lagoons. The questing arms of the octopuses protruded from their lairs. From



The green hued and cream splashed ear-shell (*Haliotis*) reaches an overall length of five inches, and is a common mollusc of coral reef banks. The shell is attached to an enormous fluted-edged body and basal crawling foot.

Photo.—Otho. Webb.

every crevice and unsuspected places of hiding snaked the fine bristled arms of brittle sea stars, hypersensitive to the touch of food being brought in by flooding tide waters. Such a revitalized state of reef fauna has to be seen to be believed; usually a wading onlooker has to be more concerned at this stage with departure for a distant island shore or the rejoining of a waiting launch.

That evening the party shared a rationed meal from the balance of the midday luncheon victuals, and settled down as comfortably as possible to see out a still tropical night under a brilliantly star-lit sky. At about 1.0 a.m. a searchlight beam was brought to bear on our anchored craft from beyond the encompassing reef. It was rightly surmised that this came from the Heron Island resort's big cruiser "Capre." Anxious for our welfare, the craft had been brought over twelve miles of sea with an extra supply of food and water. This was collected by four willing hands who set out to row and drag the dinghy across alternate reef barriers and lagoons to the "Capre," but the journey proved so strenuous that a return trip could not be attempted before dawn. With the first rising of the sun another low tide arrived. It gave members of the party a further opportunity to reacquaint themselves with the scenes and sights of the previous afternoon, but by midday the tide had risen sufficiently to float us free of the reef and thus ended an adventure that was a memorable highlight in the more or less prosaic lives of all concerned.

SCHOOL VACATION FILM PROGRAMMES

Films will be shown at the Australian Museum, College Street, Sydney, during the last three weeks of the January, 1956, school vacation. The films have been chosen especially for children, but parents are also invited to attend. The thirty-minute sessions will commence in the Lecture Hall at 2.30 p.m. daily (Monday to Friday).

Monday, 9th January.—*See How They Run.* (Different methods of moving in the animal kingdom.) *Wood Ants. Protect Your Birds*—Colour.

Tuesday, 10th January.—*The Rock Pool. Beetles. The Ladybird*—Colour.

Wednesday, 11th January.—*Old Man Possum. Birds of the Seashore*—Colour. *The Chameleon*—Colour.

Thursday, 12th January.—*Mother Duck's Surprise.* (Story of a family of ducks, especially for kindergarten age.) *Nature in the Garden*—Colour. (Insects and other animals commonly found in a garden.) *Songs and Ceremonies*—Colour. (Music of the Australian Aborigines.)

Friday, 13th January.—*Beware Snakes.* (Venomous snakes of Australia). *Koala. The Gould League of Bird Lovers*—Colour.

Monday, 16th January.—*He Would a-wooing Go.* (The life story of a frog.) *How Animals Move. Everything from Nature*—Colour. (Life of the Australian Aborigines.)

Tuesday, 17th January.—*How Animals Defend Themselves. The Impossible Map*—Colour. (Shows the impossibility of making an adequate flat map of the World.) *Living Off The Land*—Colour. (Life of the Australian Aborigines.)

Wednesday, 18th January.—*Point Pelee*—Colour. (Animals and plants in a Canadian Reservation.) *Arctic Jungle*—Colour. (The Eskimos in the far north of Canada.) *Chants Populaires.* (French Canadian songs illustrated with puppets.)

Thursday, 19th, Friday, 20th January.—*Central and North-west Australia*—Colour. (A record of an Australian Museum expedition.)

Monday, 23rd January.—*The Growth of Flowers*—Colour. *Feathered Fishers*—Colour. (Birds of the Great Barrier Reef.)

Tuesday, 24th January.—*Birds of Canada*—Colour. *How to Build an Igloo*—Colour. *"Come to the Fair"*—Colour. (Using puppets, this famous song is brought to life.)

Wednesday, 25th and Thursday, 26th January.—*Australia's Coral Wonderland*—Colour. (A film on the Great Barrier Reef.)

Friday, 27th January.—*Deadly Spiders.* (Funnel web and red back spiders.) *Keith the Wombat. Art Life and Religion*—Colour. (Australian Aborigines and their religion.)

Except for the Museum Expedition feature, films shown will be from the libraries of the N.S.W. Film Council, Australian Instructional Films and the Canadian Film Office.