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**Hawksbill Turtle, *Chelonia imbricata*.**

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# THE AUSTRALIAN MUSEUM

## HYDE PARK, SYDNEY

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# THE AUSTRALIAN MUSEUM MAGAZINE



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

● OUR FRONT COVER: The Hawksbill Turtle (*Chelonia imbricata*) is the most striking in appearance of the three so-called shell-back turtles which are found in the tropical and sub-tropical waters of all the oceans. The name is derived from the curved beak-like shape of the upper jaw. Thick horny, overlapping plates cover the back, which has a minimum of underlying protective bone. The plates are richly marked in yellow and brown and are the raw material from which the commercial "tortoise shell" combs and trinkets are fashioned. Body dimensions are comparable to those of the other two shell-back turtles but depth and weight are much less. The species has carnivorous habits and although generally considered non-edible, is greatly relished as food by Aborigines of the Gulf of Carpentaria region. Articles on turtles appear on pages 278 and 283.

[Photo. A. Embury.


VOLUME XI, NUMBER 9. MARCH 15, 1955.

A masterpiece of shell architecture. Simple yet exquisite symmetry of spiral coils and keels, and the delicacy of its smooth, cream-tinted texture, produce this object of rare beauty. The shell, *Thatcheria mirabilis* Angas is found only in the Seas of Japan. When first named, in 1877, it was regarded as a unique specimen which certainly puzzled the conchologists of the day. Still extremely rare and much sought after, it has come to light in recent dredgings of fairly deep water round Japan. Its length is approximately $3\frac{1}{2}$ inches.

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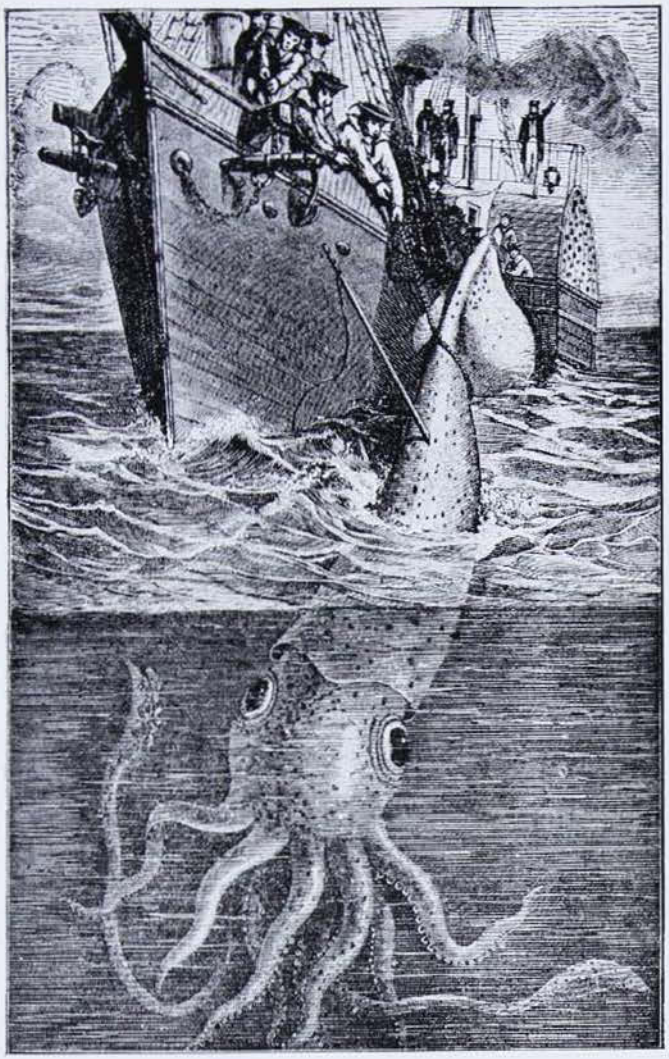
# The Kraken—Legendary Terror of the Seas

By JOYCE ALLAN

> Below the thunders of the upper deep,
> Far, far beneath in the abysmal sea,
> His ancient, dreamless uninvaded sleep
> The Kraken sleepeth.
>
> —Tennyson, *The Kraken.*

OF course you have heard of the Kraken, the mythical monster of the ancients, described in Volume I of *Martyn's New Dictionary*, 1785, as " a marine animal of enormous dimensions ". So certain were the old naturalists and litterateurs of the existence of a sea-monster of prodigious size which haunted the northern seas that their writings and tales contained breath-taking stories of ships being dragged to watery graves and the crews never heard of again, or some such similar fate. We know to-day that many of these tales were purely fictional, although it is an undisputed fact that giant cephalopods, mostly squids, but sometimes cuttle-fishes and octopods, are present in our oceans, since, on occasions they are washed ashore and scientists are able to measure and check them, and also identify them. It is also an undisputed fact that great battles are waged between giant squids and sperm whales, since the latter feed on squids, and it is unlikely that the squid—the largest living invertebrate—would permit itself to be taken, even by the largest living mammal, without putting up a tremendous fight. Its whole body is equipped for such defence—wonderful eye-sight, strong tearing beak, claw or sucker studded grasping arms of great length and strength, and jet-propelled movements.

The stories were partly based on a giant cephalopod that undoubtedly eye-witnesses had seen; their imagination, aided by fanciful illustrators of the time, did the rest. (After all, a well-known editor of a Sydney daily newspaper was once heard to say to a young reporter, " Where's your imagination? You don't have to be at a fire to write about it ".) And so fantastic story followed fantastic story. Pliny relates the history of an enormous cuttle-fish that haunted the coast of Spain, destroying fishing grounds; when finally captured, its body weighed 700 lb., arms were ten yards long, and its head, which, incidentally was handed to Lucullus as a great gastronomic treat, weighed another 700 lb., and was so large it filled 15 amphorae (a two-handled Roman vessel holding some 5 gallons of liquid, generally wine). Credit for the Kraken's existence appears to date back to one Pontoppidon, a Bishop of Bergen, Norway, who, in his *Natural History of Norway*, said of the Kraken: " Its back, or upper surface, which seems an English



A gigantic squid caught by the French corvette *Alecton* after a long struggle near Teneriffe.

After Louis Figuier's *The Ocean World*.

mile and a half in circumference (some have affirmed more) looks at first like a number of small islands surrounded with something that floats like seaweed ".

The monstrous tale built up by Pontoppidon had its origin round a simple tale of some fishermen who came across a body of a giant cephalopod in the northern seas and related their experience. They were supposed to have seen what appeared to be an island, but when fleets of ships advanced to it, the so-called, or so-thought island proved to be a " terror of the sea " which collected ships and crews until " with a horrible whirling of the whole ocean, island and ships and men disappeared for ever ".

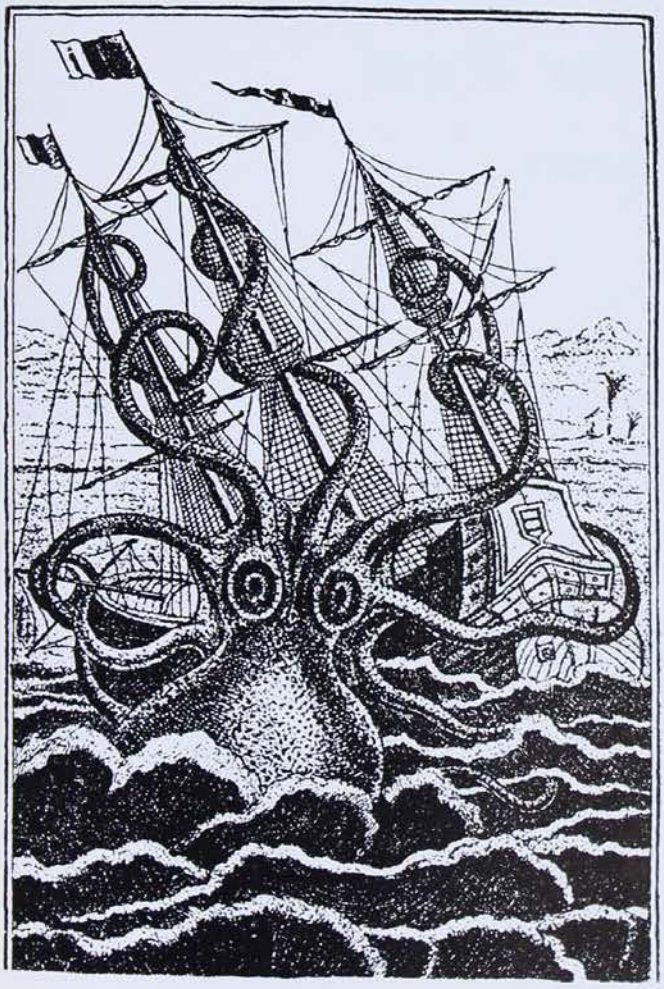
In his firm belief in the reality of this monster, Pontoppidon compared it to a floating island and said in his writings that a whole regiment of soldiers could easily manoeuvre on the back of the Kraken. In fact, it was even said that a church service had been held on one by a bishop as it lay basking in the water, and most thoughtfully, it did not reveal its true identity until the service had concluded, when it disappeared under the water. It is hoped the congregation had reached shore safely!

It is interesting to note that the great Linnaeus evidently admitted the existence of the Kraken, since he included it in his first edition of *System of Nature*, though he deleted it from his catalogue in subsequent editions. Throughout literature the reader finds numerous references to the behaviour of this colossus of the deep, the Kraken of old Norse legends; wildest fables of outrageous creatures that ordinary minds, certainly modern ones, could never conceive. We must realise, however, how much smaller ships were in earlier days, how relatively slow their passage and how nearer they would be to the waterline than now. Therefore, if a giant squid, such as we recognise to-day, shot to surface waters with its jet-propelled speed, grasped part of a small craft with its tremendous arms, and with its added weight behind it, brought any pressure to bear, it is not unreasonable to assume the craft would turn turtle.

That the stories were based on giant cuttle-fishes and squids is evident, but that the authors permitted their imaginations to run away at times is also evident. Two naturalists of the Renaissance period, Olaus Magnus and Denis de Montfort, magnificently added to the list of fanciful tales. Montfort's " Collosal Poulpe " provided the famous tale of a gigantic creature embracing a three-masted ship in its vast arms. To show the fabrication of this, when delighted with the reception his story (and the artist's interpretation of it) received, he remarked: " If my Kraken takes with them, I shall make it extend its arms to both shores of the Straits of Gibraltar".

And to another he said: " If my entangled ship is accepted, I shall make my Poulpe overthrow a whole fleet ". And we have all heard of Jules Verne's *Twenty Thousand Leagues under the Sea* and Victor Hugo's *Toilers of the Sea!*

One story does appear to have some foundation. The French steam corvette *Alecton* many years ago was said to have encountered a gigantic squid between Teneriffe and Madeira, and as the Captain wished to collect it for science, the ship engaged it in battle. After repeated attacks with musket shot and harpoon, a rope was finally passed round the posteror part of the animal. This, however, cut it in two, the head and arms dropped into the sea and made off amongst foam, blood and a strong smell of musk, and the posterior parts and fins were hauled on board. These weighed 40 lb. The creature was believed to have had a total length of about fifty feet, and a circumference of approximately twenty feet, the whole estimated at about 4,000 lb. in weight. Some credence must be given to this as M. Sabin Berthelot, French Consul at the Canary Islands at the time, reported it to the Academie des Sciences, as related by Lieutenant Bayer of the *Alecton*.



Like many fables, stories concerning the giant legendary Kraken, although nonsensical in modern days, yet contained a grain of truth. Illustration of a giant octopus embracing a three-masted ship in its arms.

From de Montfort's *Histoire Naturelle générale et particulière des Mollesques.* Reprinted in R. J. Daniel's *Animal Life in the Sea.*

The point is, gigantic squids, cuttles and octopods such as we know do exist in world seas to-day, must have been present in the same seas in earlier times when naturalists and writers were telling their fanciful tales of attack and behaviour. They were exaggerations, colossal fishermen's tales in other words, so why should we spoil little boys' fun! I have seen giant squids, one estimated to have been, when unmutilated, seventeen feet or more in total length, and it was impossible to lift its head and portion of the arms unaided, so weighty were they. Round Cook Strait, New Zealand—as close to home as that—giant squids up to fifty feet or more wash ashore at times. Imagine a rowing boat or small schooner striking one of those as it was rising to the surface, naturally equipped to defend itself against the large sperm whale! Fortunately giant squids prefer deep ocean waters to further inshore. Speaking of these giant squids, David G. Stead throws an interesting light on the age-old question of sea-serpents in *Giant and Pigmies of the Deep*, 1933; he considers that our well described Australian sea-serpents seem to fit in well with the giant Calamary (squid).

The Kraken then was an old Norse legendary name, and would have applied to any giant cephalopod that appeared as a monster or a terror to people of long ago. The name would have no place in modern zoological nomenclature. Even to-day, as every museum knows, it is difficult to gain a clear or uniform description of any strange creature, however large, momentarily sighted in the water. The famous Loch Ness monster, for instance, which every now and again appears in the lake, has not yet been identified. If you ask

any of the local residents the reply is always the same: Someone saw it that morning, or the day before, or a week ago, or some such thing; it generally comes round about 10 a.m. so wait around; or it's just the sort of day it likes, it's sure to be about; there's it's favourite spot, watch there; it just lies quietly on the surface and so on. But although I paid many visits to the lake in the hopes of seeing it, it did not appear. Had I had the luck, who knows, I might now be writing, as did those earlier writers, a fantastic tale of having seen it rise and pull lovely Urquhart Castle into the centre of the lake. One thing, we have no record of a freshwater giant squid, so it cannot be the Kraken of old.

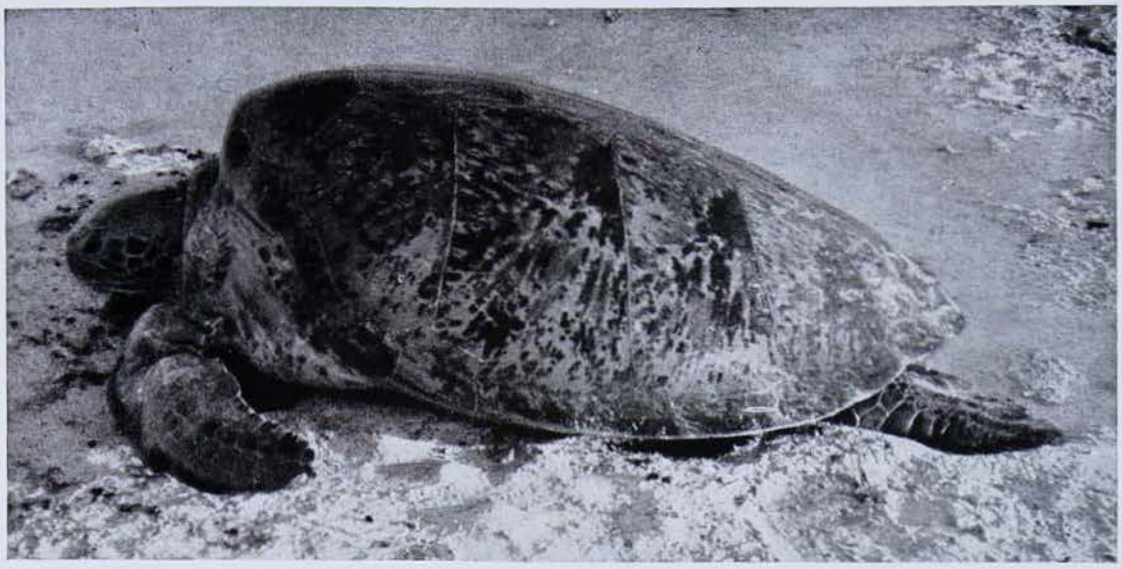
# Saving the Green Turtle of the Great Barrier Reef

By FRANK McNEILL

IN a corner of Gladstone Harbour, Port Curtis, "the creek" is a backwater flanked by a big sprawling mud bank. From seawards it gives ready access to town for dozens of fishing and pleasure craft which moor at the small wharves and jetties or tie up along the opposite bank to numbers of tall piles provided for their accommodation. Most activity centres around the so-called town jetty, and on a steaming hot mid-day in January, 1950, this place presented a sorry sight. Lying helplessly on their backs upon the decking under the sub-tropical sun were eleven live Green Turtles. All were in an exhausted and pathetic state, with mucus streaming from eyes and nostrils. The spectacle was only too familiar to most local residents and caused them little or no concern. But by a strange quirk of fate, this particular occasion was not to pass unnoticed. It was to prove fortuitous for future generations of green turtles along Australia's Great Barrier Reef—a day which was to mark the turning point in the heartless suffering and trading of harmless creatures long prized as one of our major tourist attractions.

By chance some strangers were destined to come upon that deplorable scene. They were among a number of passengers who disembarked from the motor cruiser *Capre*—holidaymakers homeward bound to a southern State from coral-girt Heron Island in the Capricorn Group. Away from the tempering sea breeze, the general discomfort of the still heat caused an immediate and sympathetic reaction to the plight of the suffering turtles. The newcomers watched resentfully while a miserably small stream of water from a hose was played on the captives by a woman in attendance. Instead of alleviating the creatures' distress, it seemed only to aggravate their disablement. They impotently responded by thrashing about with their flippers and struggling in a hopeless way to escape from their tormentors. Here was proof of an ill-considered and cruel exploitation—a practice calculated to endanger the very existence of a quaint edible marine reptile in one of its last world-strongholds.

Cruelty of this kind has a way of continuing unabated until noticed by somebody determined enough to take decisive action. There were two people among



Female of the edible Green Turtle (*Chelone mydas*). Adults of this larger of the sexes weigh as much as 2½ cwt. and their "shells" (carapaces) may attain a length of 48 inches and a width of 42 inches. The young are carnivorous in the very early part of their lives and then turn to a herbivorous diet. Horny plates over the bony back are thin and meet edge-to-edge; they are semi-transparent and carry a dappled yellowish-green to brown pattern.

Photo.—Otho Webb.

those eye witnesses from the *Capre* who made an immediate resolve to bring to official notice the alarming details of a trade that was long overdue for correction. One was a university Professor of Zoology; the other a museum curator having accredited affiliation with the government-sponsored Great Barrier Reef Committee of Brisbane. No time was lost in gathering convincing data for the strongest of protests. It was learnt that a dozen to eighteen green turtles came through Gladstone every week during the summer egg-laying season and passed on south by rail to Brisbane. The agony endured by the luckless overturned reptiles during lengthy and changing forms of transport must have been intense. Some crude rope bridles looped behind the front flippers and still attached to the captives seen at Gladstone were proof of the painful manner in which they were dragged and hauled about on their backs. The tragedy of the trade was the senseless capturing of only breeding females as they came ashore to deposit their eggs in the sands of the coral island cays; the smaller bodied males avoid the land and are quite inaccessible. While ashore the females face the risk of being rudely overturned and rendered helpless, often immediately upon leaving the water and before their eggs are laid.

Inquiries made in Brisbane disclosed that the turtles arriving there were slaughtered and shipped to England, and probably elsewhere in Europe, as a luxury export. A news item, detected in the local press of a few weeks before the Gladstone incident, carried an illustration of overturned turtles lying forlornly on a factory floor. Finally, in Sydney, more details were gathered from reliable sources, and a protest sent in the strongest possible terms for consideration by the Great Barrier Reef Committee. This had been preceded by a report to the Royal Society for the Prevention of Cruelty to Animals. It was represented to the Committee that over the previous forty years the green turtle population of the Capricorn Group area had been systematically exploited with either indifferent or no planned official supervision. The result had been a marked reduction in numbers, slow but inexorable. No sooner had the population partially recovered from one period of concentrated butchering than another began. At least three island processing factories had been operating prior to 1930, and had failed—two on North West Island and one on Heron Island. In addition, certain large meat works on the mainland had, over the years, been buying turtles from fishermen. These turtles were sent as carcases

Newly hatched, irrepressibly active, green turtles in an aquarium tank.

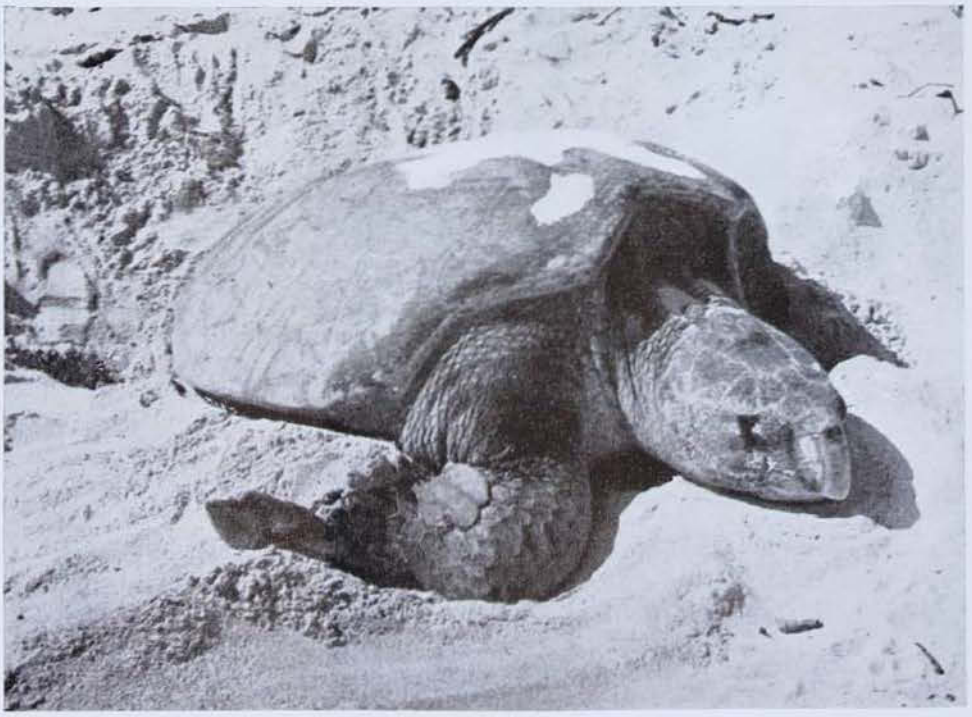
Photo.—Otho Webb.

overseas direct in the refrigeration holds of ships which transported export beef. A special point made to the Committee was that reasoning local residents had expressed their distaste of the cruel trade. Some had voiced their relief that only a few fishermen had been tempted to cooperate. They predicted dire results if higher payments were to attract a greater number of turtle hunters.

The ambitious nature of the newly-exposed luxury trade was disclosed by a proposition made to the management of an island tourist resort. Hundreds of turtles were asked for over the period of a single egg-laying season, but there was no response to this ridiculous request of the uninformed. It is a fact that a single female turtle comes ashore to lay her eggs at least six times during the summer months. Thus the visits of an estimated 4,000 females to one island could be attributed to only a few hundred individuals (under 700). This reasoning assumes, of course, that each turtle restricts its visits to a single island. On the other hand, if individual females visit more than one island during an egg-laying season, as they undoubtedly do, the actual number in the area could be far less than estimated. Therefore it can be readily seen that, were it possible to capture, for instance, 500 turtles in a single season, the hunters could quickly exterminate the population of the adjoining sea. Taking also into account that the only possible captives would be breeding females, even meagre replacement would be impossible. Quite apart from those turtles arrested in their mission of egg-laying, those that could carry out this function unmolested would produce no marked effect. Admittedly the clutches are extraordinarly large (approaching a maximum of 200 in a single laying) but only a small percentage of the eggs hatch and only a few of the resulting young survive. These face the hazard of voracious waiting gulls during any daylight trek from nest to waterline; at night marauding sand crabs (*Ocypode*) wreak havoc among their ranks. Later, in the sea their growth rate is so slow that for years they have to contend with the ever present danger of attack from predatory fishes. Another serious issue arising from the capture of female turtles is that the male population becomes numerically too strong, with deleterious effect. This was borne out by two reliable observers. During the previous five years they had noticed the conspicuous dominance of males over females at the beginning of the breeding season when turtles foregather in numbers in the very shallow inshore reef flat waters of the coral islands of the Capricorn Group.

The deliberations of the Great Barrier Reef Committee on the question of turtle slaughter took place in May, 1950. By that time newspaper publicity had attracted the attention of the Queensland Government Department of Harbours and Marine, a body concerned with the control of fisheries and relevant matters. The combined interest in the humanitarian campaign produced spirited and lengthy discussion. The cruel nature of the trade was given particular emphasis. A parallel was drawn between it and whaling, sometimes stated to be one of the cruelest forms of hunting. It was disclosed that green turtles were protected in Queensland waters by government regulation for two months of the year—October and November—and that some sort of investigation on their numbers and habits had taken place, but had not been completed. A healthy reflection voiced at the meeting was that the tourist trade was likely to outweigh the turtle trade by ten to one. On a sounder basis it was argued that in the past every form of exploitation of other than domestic animals had been unconsidered, and that this lack of concern had led in all instances to population disturbances which had had a very deleterious effect upon the trade concerned. It was felt that, as the revived turtle trade was in an early stage of development, it should be placed on a reliable and scientific basis before it increased.

The final and welcome outcome of the Committee's discussion spelt success for the campaign. Recommendations (carried unanimously) were that an investigation into the ecological and economic status of the green turtle along the Great Barrier Reef should be undertaken, and that, pending the investigation, the green turtle should be placed on the list of protected animals under the relevant Government Act. Crowning success came on September 7, 1950, when a Queensland Government Order in Council was gazetted. This rescinded the earlier Order relating to the taking of green turtles and stated that the law "doth absolutely forbid the taking of any of the species of Turtle known as 'Green Turtle' (*Chelone mydas*) or the eggs thereof in Queensland waters or on or from the foreshores of or lands abutting on such waters." Commendation came in a letter to the author of this article (who was the main instigator in the campaign) from the Premier (then Acting) of Queensland, the Hon. V. C. Gair. It read: "I can well imagine that, in view of your interest in this matter and your association with the Great Barrier Reef, you would obtain considerable satisfaction from seeing your ideas implemented in a practical manner."



Females of the Loggerhead Turtle (*Thalassochelys caretta*) compare in size with females of Green Turtles but appear more bulky; they have very thick necks and large heads, and a markedly aggressive nature. The species is an omnivorous feeder and appears to be as abundant as the Green Turtle. Being non-edible, it is rarely interfered with. Edge-to-edge thin, horny plates cover the bony back and are a drab grey to dense brown in colour.

Photo.—Author.

Everything considered, an indefinite postponement of turtle trading is a wise and timely move. Decimation of numbers must be expected from the intermittent illicit slaughter of turtles that will occur along a sparsely populated coastline and on the many lonely islands of the Great Barrier Reef. There remain the aboriginal turtle hunters of Arnhem Land who still fend for themselves. These will not appreciate a white man's law depriving them of a practice which for centuries has been a natural right but the effect of their hunting on the Green Turtle population will be of little moment.

• Part of a series of twelve dioramas exhibited recently in a Sydney store in aid of the Spastic Centre. The dioramas were the work of Mr. Ken Mayfield, an Australian Museum preparator, who not only painted the scenic backgrounds but modelled the figures and dressed them in authentic costumes. Mr. Mayfield began his hobby of "dressing dolls" three years ago and since then has received many requests to exhibit his collections here and abroad.

Our picture shows (left to right): A New Guinea warrior; a New Guinea woman carrying wood in a net bag slung across her head; a duck-billed woman of Africa. Each figure is six inches high.

# Aboriginal Turtle Hunters

By FREDERICK D. McCARTHY

TURTLES and tortoises provide a tasty and much relished food for the Aborigines of Australia and they are eagerly sought by both the men and the women. In the days when native culture was undisturbed by the white man, the killing of many hundreds of these animals every week by the Aborigines exercised a considerable check on their numbers. Today, the natives still hunt turtles at Palm Island and along the northern coast from eastern Cape York to north-western Australia and in these areas white exploitation of turtles should be rigidly controlled so that this source of food for the Aborigines is protected.

The tortoises which inhabit the fresh-water lakes and streams are dragged out of their hiding places in reed and lily beds by the women and children who probe for them on the bed with their feet or with a pole. In billabongs in northern Australia it is not uncommon to see a dozen or more searchers bobbing up and down in the water in their quest for the long necked tortoise.

The big greenback, hawksbill, leather-back or Luth turtles of the open sea, however, are men's game, and one of the commonest sights in the old days, although not so much nowadays, was that of a party of aboriginal big-game fishermen seeking turtles, dugongs and large fish, all of which are caught by the same methods.

I have enjoyed many outings with turtle fishermen on Groote Eylandt in the Gulf of Carpentaria. The trip is usually a pleasant one because the fishermen go out only when the wind is not too strong. Two men, one at the bow and one at the stern, man a dugout canoe which is paddled or sailed to a likely spot for turtles. The round bottomed craft, with no outrigger but with its fairly large sail set for'ard, is a tricky craft to handle in a swell, but capsizes are rare with these experienced seamen, one of whom trims the sails and canoe as it races along before the wind at a good speed, the other man bailing most of the time. The harpoon consists of a wooden or metal head attached to a line

A native hunter waits to throw a second harpoon at a large turtle straining on his line. (Groote Eylandt.)

Carrying a large hawksbill turtle in to the beach. (Yirrkalla.)

and set in a socket at the head of a soft-wood shaft about fifteen feet long. It lies along the seats beside the gunwale; the thick two-ply cord is coiled in the bow, and several spare harpoon heads are stuck in the front seat, the gear thus being ready for instant use.

As turtles are often found near submerged rocks the sail is furled in the vicinity of a reef and the hunters cruise about in the canoe watching for their game to rise. Turtles are difficult to see in a choppy sea and on grey days, but the experienced native fishermen are extraordinarily quick to detect them. Immediately this happens the bow-man balances himself on the bow, his feet astride the gunwales and the harpoon poised above his head, signalling directions with one hand to his companion paddling the canoe. The harpoon is thrown from a distance of about twenty feet and when renowned turtle hunters are engaged the throw rarely misses. Exceptional skill in turtle hunting is rewarded with a special title associated with prestige. The native jumps into the water as he throws the weapon, to add weight and power to the delivery. He scrambles back into the canoe as quickly as possible and either one or both men play the turtle on the line, allowing it to tow the canoe until it tires and surfaces when another harpoon is used if it is a big animal. A large turtle may take up to five minutes to capture but a small one will be hauled in by one man in one or two minutes.

The turtle is pulled up the side of the canoe until its head rests upon the gunwale, the head being bashed with a short heavy club until the brain is exposed, care being taken not to be bitten as such a wound is believed by some tribes to be fatal. The turtle dies with a few weary

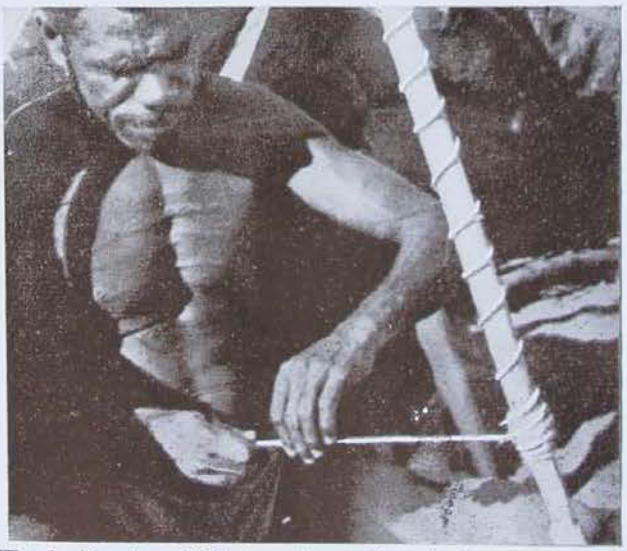
The turtle has been cooked in the pit oven (lower left) and the men are getting ready to distribute the eggs. (Yirrkalla.)

A party of women returning from an early morning excursion to gather turtle eggs, of which they have secured enough to fill four string bags. They are carrying a bottle and tins of drinking water. (Groote Eylandt.)

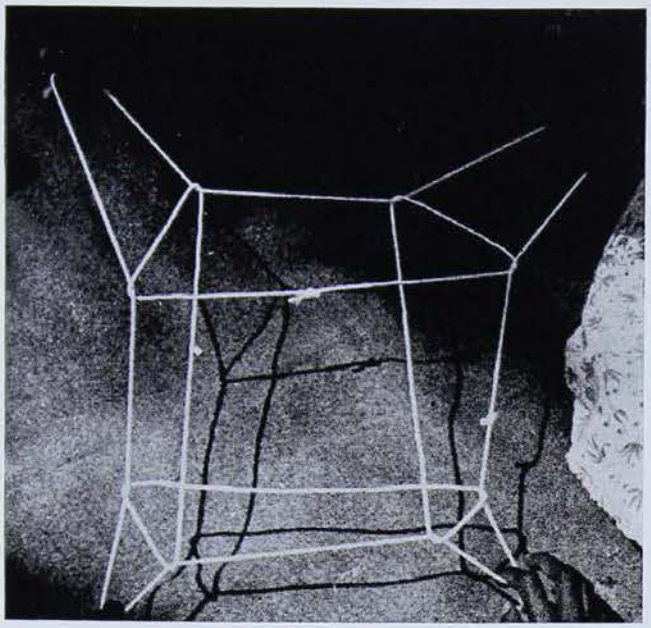
and pathetic wheezes and is dumped into the bottom of the canoe, where its blood mingles with the dirty water, and various appliances reflect its death as they become discoloured with the dirty red liquid. The detached shaft of the harpoon is retrieved and as the fishing party returns one member blows a conch-shell trumpet to announce success.

Captain Cook, in 1770, described a similar method of turtling in the Endeavour River area of northern Queensland, where the turtle was hauled ashore on a line made fast to a canoe. The Mallanpara and other tribes who lived between the Tully River and the tip of Cape York, employed a refinement of the above method of harpooning turtles. Like some of the Melanesians in the nearby Pacific Islands they attached a sucker fish (*Remora*) to a line and dropped it into the water as close as possible to a turtle, to which the fish attached itself. The hunter paid out the line very carefully and harpooned the turtle when it came within striking distance. The sucker-fish was thus merely a guide to the movements of a turtle and was not used in any way to pull it into the canoe. The natives found sucker-fish sticking to rocks and to their canoes, but were able to keep them in rock pools and troughs for a few days. Prior to the introduction of metal harpoon heads by Indonesians in Arnhem Land and by the white man elsewhere, barbed wooden heads were in use and the turtles had to be hit in the soft parts of the neck and flippers because the carcase was too hard to pierce.

Methods of course vary in different localities. The Tully River hunter in north-eastern Queensland carefully coiled



Turtle line is a thick two-ply cord made from the fibres of the inner bark of a small Kurrajong tree which grows in the sand dunes. (Groote Eylandt.)



String-figure of a green turtle. (Yirrkalla.)

the line in a basket hanging from his neck, holding a few coils in his hands for the throw. After he had harpooned a turtle he bent forward to allow the line to run out of the basket, the end being secured to a thwart or seat in the canoe. At Cape Grafton one man may dive into the sea to try to chase a turtle to the surface where it is harpooned by his companions. In these northern waters also, upon a turtle being harpooned, several men jump into the sea and tie a rope around one of its flippers, turning the turtle on its back and if necessary pushing it up to the surface to ensure that a heavy and powerful animal will not slip off the harpoon when it is dragged into the canoe. At Princess Charlotte Bay a bristle is pushed into the brain to kill a turtle.

South of Keppel Islands, on the east coast of Australia, and along the southern, western and north-western coasts, the detachable harpoon was unknown when the white man arrived in these regions and turtle meat was not such a frequent item on the menu as it was along the northern coast where this device was in use.

In a simple method in use at King Sound, Western Australia, several men swim quietly under a turtle while others approach it noisily. When it attempts to dive its head is pushed upwards by one of the men. Another man pulls it backwards by the front rim of its carapace and if it is a large animal he mounts and sits astride it until it is killed or stunned with a club. The Keppel Islanders captured swimming turtles with a knot slipped on to a flipper, and in the estuaries and rivers of the east coast it is probable that they were caught in nets, or driven ashore by a ring of shouting and splashing swimmers. Female turtles, of course, are turned on their backs when they come ashore to lay their eggs and remain in this helpless plight until their turn comes to be cooked.

String-figure of a long-necked freshwater tortoise. (Yirrkalla.)

All photos. by Author.

Cave paintings in red of turtle hunting. In the original the striped turtle is 3′ 6″ long. (Groote and Chasm Islands.) Recorded to scale by author.

Along the Arnhem Land coast a turtle to be cooked is singed on a big fire, its neck being broken beforehand. The intestines are eaten by the cooks (usually the successful fishermen) and any eggs removed. Hot stones are then dropped into the body through an aperture which is cut in the neck, and then blocked with grass. The turtle is baked for several hours on its back among red-hot stones in a pit oven. When cooked the breast-plate is removed, the fore and leg quarters cut out and shared, with the eggs, among the various families concerned; the rich soup remaining is soon consumed by the cooks and their friends. Nowadays turtles are cut up and cooked in 40-gallon drums.

From October to February, when female turtles come ashore to lay their eggs in the sand, turtle eggs are a staple and esteemed item in the diet of the northern coastal tribes. The native women collect the eggs in baskets, string bags and bark containers, frequently going out at dawn to get them before the dingoes raid the nests. The eggs are eaten either raw or baked in hot ashes.

Ritually, turtles and tortoises form totems of clans and local groups in various tribes; in central Australia, the Northern Territory, Kimberleys, and eastern Queensland and New South Wales, special ceremonies are performed for the purpose of scattering their spirits on all sides and so increasing their numbers in the tribal territory and in the sea fringing it. Unfortunately none of these turtle or tortoise ceremonies has been recorded.

Turtles and tortoises are usually depicted from above, as they are most commonly seen by aboriginal artists. In the Sydney-Hawkesbury River district of eastern New South Wales, they form a rare subject among the outline rock engravings,

the outstanding example being a profile view of a huge turtle, almost twenty-four feet long, probably representing an ancestral giant of the turtle clan in the Dreamtime period before man lived on the earth. It is interesting to note that the leatherback, which grows to nine feet in length and is largest of all turtles, was plentiful in the Hawkesbury River in the early days. The turtle is a popular subject of aboriginal cave artists along Queensland and northern Australian coasts where it is an important source of food. Here it is painted in outline, occasionally with the carapace pattern indicated or depicted in a monotone silhouette, or in two or three colours. On Groote and Chasm Islands, in the Gulf of Carpentaria, many fine compositions of men in canoes hauling in turtles on lines are portrayed in caves, the turtles often being much larger than the men and their craft. In north-eastern Arnhem Land similar subjects are illustrated in bark paintings.

# Bather's Itch, or Schistosome Dermatitis

By ELIZABETH C. POPE

AMONG the many hundreds of people who will go wading this summer, while prawning or fishing in the coastal lagoons of New South Wales, there will be an unfortunate few who will be infected and suffer from that uncomfortable skin complaint, schistosome dermatitis. While the name of this disease is new to many, the condition it describes has been known for many years under a variety of names such as Bather's or Surfer's Itch, Toukley Itch, Tuggerah Itch, Pelican Itch, Weed Itch, and, overseas, Clam-digger's Itch. Several of these names record the localities where it occurs.

The very fact that such a variety of names exists for the one disease tells us that very little has been known up to now about its true cause. The credit for solving the riddle of the local outbreaks of bather's itch must go to Mr. A. J. Bearup, parasitologist at the School of Public Health and Tropical Medicine in Sydney. It is from his recent writings and from personal communications that the present story is taken.

Just as it is often possible to guess the subject of a picture in a jigsaw puzzle when only about half the pieces are in place, so in this present instance enough evidence has been gathered by Mr. Bearup to allow him to identify the animal causing bather's itch. Further patient and detailed research will need to be done, of course, before his theory is proved up to the hilt, but enough is now known for us to understand the cause of the trouble and, consequently, to know how to avoid infection; how to treat the disease and how to take measures to wipe it out.

An example of schistosome dermatitis on the forearm of a patient experimentally infected by cercarial larvae from *Pyrazus australis*. Ten red, itchy lumps may be seen.

Photo.—A. J. Bearup.

In passing this information on to the public it is hoped that interest will be aroused in this investigation so that local pharmacists (who generally know of outbreaks in their districts) or the victims of attacks by this schistosome worm, will let us know if it turns up in districts not mentioned in this article. It will be through such co-operation that the incidence of the disease in New South Wales will be mapped for later investigation.

Reports of the disease were first brought to the Museum's notice in 1945, during field excursions to what was in those days the tiny fishing village of Toukley, on Tuggerah Lakes. Prawn fishermen told of "bad" years for the itch, when many of them broke out in itchy sores on the parts of their skin that had been exposed below the waterline, as they waded about pulling nets. Paddling children and swimmers were also infected.

Later a pharmacist who was also an enthusiastic marine naturalist (Mr. H. Chalmers of The Entrance, Tuggerah Lakes) came to the Museum for information as to the cause of what he called "Tuggerah" or "Pelican Itch." He had seen many cases and been asked for medicines or lotions to use on the affected parts. Mr. Chalmers subsequently acted as spy-on-the-spot for Mr. Bearup and reported when outbreaks of the itch occurred.

Several summers later, cases of bather's itch cropped up in Narrabeen Lakes, just north of Sydney, and it became obvious that proper scientific investigation was needed to discover the organism responsible for these outbreaks. Victims were blaming all kinds of marine animals, ranging from water fleas and sea lice to broken up fragments of the notorious Bluebottle, *Physalia*.

In a very interesting account published recently,* Mr. Bearup unfolded the story of the cause of Bather's Itch and, as a result, we now know that the correct name for all the marine itches mentioned is schistosome dermatitis. The itch and sores are the reactions of human skin to the attack and attempted entry of the cercarial

Rock platform favoured by gulls and pelicans at Toukley, Tuggerah Lakes, N.S.W. It is while wading in the adjacent quiet waters that fishermen have contracted schistosome dermatitis.

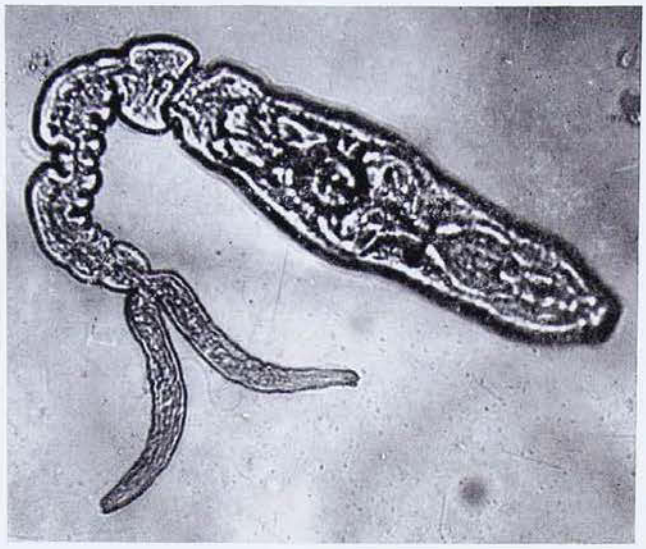
Photo.—F. J. E. Wilson.

larvae of a schistosome flatworm which during the next stage of its life history normally parasitizes aquatic birds. Entry into human skin is in fact a mistake on the part of the larvae.

Schistosomes are parasitic flukes or flatworms which spend part of their complicated life histories parasitizing snails, and part in some backboned animal such as a bird, or a human. Bilharzia is about the best known of these worms. The species causing the local outbreaks of dermatitis belong to the series which have snails and aquatic birds as their hosts. In such a life cycle it is largely a matter of luck whether a proper host is met with at the appropriate stage of the parasite's development. The actual dermatitis is caused when the larva of a schistosome, that should be in a bird strays from its normal final host and burrows into human skin.

The relationship between the parasite and its true host is so delicately and specifically balanced that the bird-parasitizing

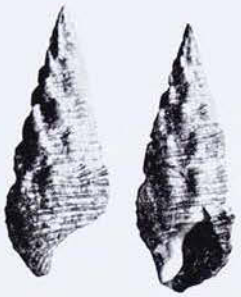
**Schistosome Dermatitis (Surfer's Itch)* in *Health*, Journal of the Commonwealth Department of Health. Sept. 1954, Vol. 4, No. 3.



From a photomicrograph supplied by A. J. Bearup.

*Left:* The cause of surfer's itch—the cercarial larva (very greatly enlarged) from the "snail," *Pyrazus australis*.

The small snail-like whelk, *Pyrazus australis* (natural size); the intermediate host in the life history of the schistosome which causes the dermatitis in our coastal lagoons.



worm cannot complete its life history when its enters a human host. Likewise the humans' reactions to the bird parasite set up the irritation which causes the dermatitis. Such irritation does not seem to occur when a parasite enters the skin of its normal host.

A feature of the rash induced by this parasitic larva is that it can occur only in those parts of the body which are submerged in infected waters and there is consequently a distinct water-line beyond which it cannot extend. While the parasites are actually boring through the skin a prickling sensation is felt. After an hour or so this subsides and soon small, red, inflamed patches appear on the skin. These gradually change into raised red lumps and finally to small, blister-like vesicles. These changes in the skin are accompanied at various times by intense itching but, if the victim does not scratch and infect himself secondarily, the rash will gradually die away and after a week or two subside altogether. A second dose of schistosome dermatitis may, however, prove very much more severe in intensity than the first one, due to the patient's allergic reactions to the proteins from the cercarial larvae of the worm.

Mr. Bearup is working out the details of the life history of the local worm and his results so far show that the "snail" in which some of the intermediate larval stages of the life cycle is spent is *Pyrazus australis*, which is illustrated here. This snail is extremely common in our coastal lagoons and estuaries, where it lives among the "grass" or weeds—chiefly *Zostera*.

The worm eggs reach the water in the excrement of the birds and out hatches a small miracidial larva. This larva has to have the good luck to find a *Pyrazus australis* snail within a few hours if it is to develop into the next stage of its life history. Having entered a snail's flesh it passes through several more larval stages and, several weeks later, there emerge from the snail tissues the peculiar, fork-tailed cercarial larvae which swim about in the water and search for the next or final host, which as mentioned earlier, is a seabird. At present seagulls, terns and black swans are known to be infected by adult schistosomes. *Larus novae-hollandiae*, the gull, has the species *Austrobilharzia terrigalensis* parasitic in it, and the black swan, *Chenopis atrata*, is infected by a species of *Trichobilharzia*. The cercarial larvae from *Pyrazus australis* have produced dermatitis when experimentally allowed to infect human volunteers, but it will not be known to which adult species these cercariae belong until the scientific investigations are finished. It may be even a species not already mentioned here.

A second species of *Pyrazus*, *P. ebeninus*, and the commoner periwinkles occurring in our coastal lagoons have also been investigated, but only *P. australis*

seems to be implicated as the intermediate host for the dermatitis-causing worm. Complaints of skin itches have, so far, come always from areas favoured by flocks of seabirds and the particular snail, *P. australis*, *i.e.*, sheltered coastal sand flats where the necessary weeds provide food for the snails. It is a point of great interest that the coastal lagoons in New South Wales, although cut off from the sea for varying periods, have a salinity which is generally very near to that of normal seawater, whereas in other localities schistosome dermatitis is known to occur chiefly in fresh or brackish waters. It is reasonable to expect our dermatitis to occur also in our estuaries and inlets, as well as in the lagoons, unless the condition of fairly still water is required to produce outbreaks of the kind recorded up till now.

Schistosome dermatitis seems to occur chiefly in the summer months when, naturally, more people wade or swim in coastal lagoons and the warmth of the sun raises water temperatures to a height which stimulates the cercariae to emerge from the snails' flesh and seek a new host. Control measures suggested are:

1. Removal of weeds (and consequently of the snails which feed thereon) from bathing areas.

2. The wearing of waders or thick, long socks to above the waterline while fishing in areas known to be infested with cercariae.

3. Brisk towelling of the skin when leaving the water to wipe off any cercarial larvae which may be adhering to the limbs after wading.

4. Repellents have been suggested but most of them contain copper and would scare away the fish which most of our lagoon waders are seeking to catch.

From this short account it will be seen that we have to add yet another name to the roll of marine organisms which can harm humans in New South Wales waters, but the newcomer is unpleasant rather than dangerous.

# BOOK NOTE

The Literature oe Australian Birds: a history and a bibliography of Australian ornithology. By Hubert Massey Whittell, O.B.E. Paterson Brokensha Pty. Ltd., Perth, W.A., 1954. 788 pp.; 32 pls. 70s.

*The Literature of Australian Birds*, by Hubert Massey Whittell, O.B.E., is a most excellent and scholarly contribution to Australian ornithological literature, which has involved intensive reading and research. As the title suggests, it is considerably more than a bibliography; it is a guide to Australian ornithology.

Part 1 deals with the history of Australian ornithology from 1618 to 1850, referring to the earliest mention of our birds in a letter written by Captain Haevick Claeszoon, of the *Zeewolf*, and then in turn dealing with the work of De Vlaming, Dampier, Cook, Forster, Gould, Macgillivray and others. This section is most interesting and informative reading.

Part 2 is a bibliography of Australian ornithology from 1618 to 1950, referring in detail to authors and collectors.

The author, Major Whittell, rendered very distinguished service to Australian ornithology, and was always willing and ready with advice to younger or less experienced ornithologists; it is indeed a tragedy that his untimely death prevented him seeing the published work, the fulfilment of his lifetime ambition.

*The Literature of Australian Birds*, crammed with essential references, should be on the shelves —or rather on the work table—of every ornithologist.

—J. R. Kinghorn.

# The Australian Museum's Marlins

By GILBERT P. WHITLEY

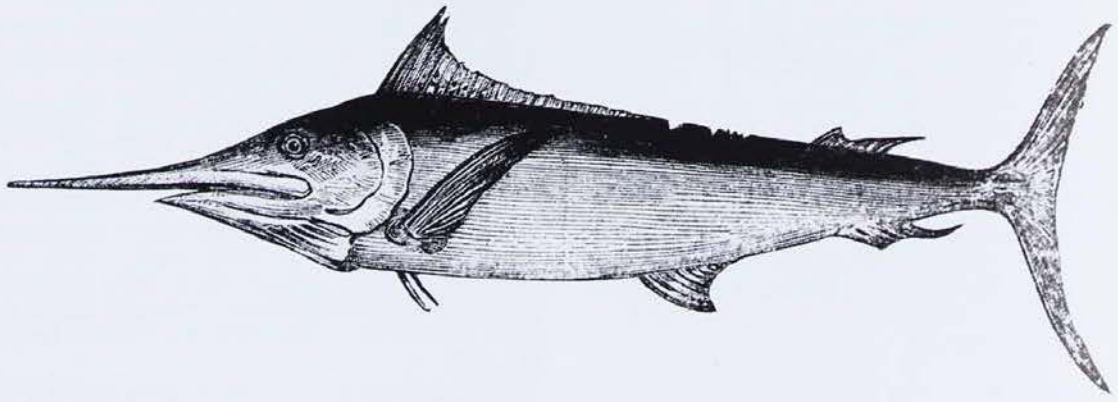
BECAUSE of their large size, sharks, rays, swordfishes and other huge sea-creatures are rarely preserved for exhibition in museums; they are more or less competently (though often inadequately) measured, described and photographed on the spot and perhaps a zoologist is called upon later to identify their species from unsatisfactory material. One ideal of a modern museum is to have a coloured, life-like cast of each species of these giants, but such casts take some time to prepare from fresh, good specimens, are expensive to case, and take up a good deal of room. From a zoological point of view, a small specimen which would fit into a tank or bottle—one which might be regarded with contempt by a game-fisherman intent on records—is less unwieldy and far more interesting than a big one. In fact it is time somebody with a spark of originality offered a titanic trophy for the *smallest* specimen of each game-fish, the object being to capture one not more than an inch or two long of each kind.

For all the bombast associated with their slaughter, very little is known about the food, migrations, spawning and other activities of marlin swordfishes and even the various species are still only tentatively classified and named. Catches, once weighed and photographed, are usually discarded without any detailed record of their measurements, stomach-contents, state of roes, etc. Some of our sportsmen are honourable exceptions to the rule and are tabulating data which will yield useful information in time, notably Mr. Athel D'Ombrain of Newcastle, N.S.W., Colonel J. K. Howard, an American visitor, Mr. P. Goadby of Brisbane, and certain anglers at Port Stephens, Bermagui, and elsewhere.

During the last century, the Australian Museum has secured examples or portions of specimens of a dozen or so marlins, but we particularly desire a good Striped Marlin and a D'Ombrain's Marlin for casting, to say nothing of the related Sailfish and the Broadbill Swordfish. Some of our specimens are very old, yet remarkably well preserved, and it is with them that this article treats, for they can still make their contribution to natural history knowledge.

The first marlin taken in Australia was caught more than a century ago and was anonymously described in the *Illustrated Sydney News*, vol. i, No. 23, March 11, 1854, p. 179 and fig., as follows:

The Tetrapturus Australis (Macleay), Or, Australian Sword Fish.



The first Marlin (*Istiompax australis*) caught in Australia, taken by William Newton in Broken Bay on 21st February, 1854. Length, 9 feet 2 inches.

Woodcut from the contemporary *Illustrated Sydney News*, by courtesy of the Public Library of New South Wales.

D'Ombrain's Marlin (*Istiompax dombraini*), 140 lb. weight, from off Port Stephens, N.S.W. Note the rigidly extended pectoral fin, slender sword, blue bars down the back and a broad blue patch over the pectoral fin and on lower part of body under Mr. D'Ombrain's left hand.

Photo. from A. D'Ombrain.

On the 21st ultimo, Mr. William Newton, a fisherman of Port Jackson, presented to the Australian Museum an enormous fish of an entirely new species, belonging to the genus *Tetrapturus*, and the first of the family taken in the Australian waters. It was captured by Mr. Newton, whilst fishing with a hook baited with mackerel, in Broken Bay. It measures 9 feet 2 inches, and its weight, when caught, somewhat exceeded 2 cwt. The colour on the back and fins is of a blueish black, exhibiting iridescent blues and purples in various lights; while the belly and lower portions of the body are silvery white. The snout or sword projecting from the upper jaw is 2½ feet in length, and of enormous power and hardness. Of course, so formidable a fish is a dangerous enemy to a boat, and instances are known of individuals receiving their death wound by being transfixed with its sword. Much credit is due to Mr. William Newton for his intrepidity in capturing so terrible a creature in the manner he did; and this addition to our knowledge of the various fishes inhabiting the Australian seas is a very important one, not only to the Naturalist, but to the public at large, the flesh of the *Tetrapturus Australis* being an excellent article of food, much resembling that of the true Sword Fish or *pesce svada* (*Xiphias gladius*) of the Mediterranean. The Sword Fish division of *Scombridae*, presents, as is well known, the largest of all true fishes; the term *true fishes*, excluding, of course, sharks, rays, and other *cartilaginous* species. The fish of which we have the pleasure to present our readers with a drawing, being only 9 feet 2 inches, is rather a small one. The length of the body is about 5½ times the height of same at pectorals. The length of head is nearly one-third of length of body. The girth about the pectoral fins is 3 feet 8 inches. Two characters shew it not to be a true *Xiphias* or Sword Fish: for instance, the presence of ventrals, one on each side, consisting of a bony style or stiletto, about one half of the length of the pectoral fins; this, with the two crests or little wings on each side of the tail prove it to belong to the genus *Tetrapturus* of Rafinesque; who possibly thought *Tetrapterurus* a word too long. The dimensions given above, however, show our fish to be a species quite different from the *Tetrapturus belone* of Rafinesque, a Sicilian fish, which is the only species of the genus hitherto accurately known. The fish in the Museum comes very close to the *Tetrapturus indicus* of Cuvier and Valenciennes, and may very possibly turn out to be the same species with it; but as this fish of the coast of Sumatra, was only known to Cuvier by a drawing in the possession of Sir Joseph Banks, and consequently by no accurate specific character, not even by the usual formula, our fish caught by Mr. Newton, may for the present be considered as a new species to be called *Tetrapturus Australis*. Its formula is as follows:—B.7/D.37.7/P.9/V.1/A.12.7/C.8, in each lobe.

A new species of *Echineis*, or sucking-fish, with 16 laminae was found adhering to the belly, being

of the same silvery colour with it. Besides, the *Tetrapturus* had its body covered with a new species of Cuvier's curious parasitical genus *Tristoma* (which may be called *Tristoma Album*) and also with an entomostracous crustacean, allied to *Caligus*, which is evidently the *oistron* described by Aristotle, as tormenting the sword fish of the Mediterranean to madness, but which Cuvier appears to have erroneously fancied from Aristotle's description, might prove to be the *penella* of Oken, one of the *Lernaeidae*.

It is our intention to give figures and scientific descriptions from time to time of such new or remarkable objects of Natural History, as may come before our notice.

Because of its unique piscatorial and historical importance, the above article has been reproduced in its entirety. It was probably written by W. S. Wall, who wrote another article on swordfish in the same journal, same year.[1]

The specimen from Broken Bay, illustrated over one hundred years ago, may be the smaller of two Black Marlin suspended from the Fish Gallery in the Australian Museum. This fish, labelled as 9 feet 7 inches long, from "New South Wales" was catalogued as an "old collection" exhibit as far back as 1890. The fine skin of a marlin below it, nearly 14 feet long, was purchased for £10 in 1880 and came from Wollongong. We have also a specimen from Lord Howe Island and a skeleton from Port Stephens and another species, to be mentioned later, from the Arafura Sea, but these duplicates are stored and inaccessible to the public, as too, are portions of skin, scales, roes and other pieces of a D'Ombrain's Marlin from Port Stephens, of several Striped Marlins from New South Wales, and the magnificent Howard's "Blue" Marlin from Bermagui, which is being cast, for later public exhibition. Most of the these specimens have been described elsewhere.

In an article, "Put to the Swordfish," issued some years ago[2] I illustrated and discussed the sword of a marlin which had been taken from the hull of a vessel at Tarawa, Gilbert Islands. Alongside that exhibit in the Museum gallery is another interesting sword with a fascinating history—a small marlin bill which was found protruding from a much larger Black Marlin. The story, kindly related to me by Colonel J. M. Bruce Steer, is:

On 12th January, 1953, Mr. Ronald Taylor, fishing with rod and line under International Game Fish Association Rules off Bermagui, took a Black Marlin (*Istiompax australis*), weight 218 lb., length 8 feet 4 inches, girth 3 feet 8 inches, and in good condition. Sticking out from the stomach just behind the pectoral fin, point *outwards* was this small marlin bill (less than 7½ inches long), with living barnacles on it. There was no evidence of any wound, but some roughening and reddening of the skin behind the place may have been due to the sword and barnacles flogging against the side of the large marlin. The small bill was sticking right through the muscle wall of the big fish, the flesh being fairly well healed round the hole. There was no trace of any injury within the stomach cavity. The small bill appeared to have been broken off and not eaten away by digestive juices.

I cannot account for this curiosity, except by suggesting that the larger marlin may have been attacked by the small one and the bill of the latter, after breaking off, was gradually working out through the bigger fish's tissues; or the big one may have eaten the little one, whose sword perhaps penetrated the stomach which afterwards healed. Certainly the little bill belonged to the smallest marlin ever known from Australia. Stingray and catfish spines are sometimes extruded from the muscular bodies of large fishes, and in Massachusetts a fish skeleton about ten inches long was once found in the meat near the backbone of a swordfish, probably having worked its way through a wound in the wall of the stomach.

Since the 1930's game-fishermen have been asking, "Have we a Blue Marlin in Australia?" Our anglers have tended to be bluffed by the assertion in American publications that the Blue and White Marlins do not occur in the Pacific. I have no knowledge of any White Marlin having been taken in Australian waters and it seems certain that the *Atlantic* Blue Marlin does not occur here. Nevertheless, there is no doubt in my mind that, apart from the common Black and Striped Marlins, we have more than one species of so-called Blue. A full account was recently given

[1] Reproduced in this MAGAZINE, vol. vii, No. 7, 1940, p. 240, ex *Illustrated Sydney News*, Sept. 2, 1854.

[2] This MAGAZINE, vol. vii, No. 7, 1940, p. 238, fig.

of one of these, *Istiompax howardi*, in the *Australian Zoologist* (xii, 1954, p. 58, pl. iii, fig. 3) and another was named *I. dombraini* after Mr. A. D'Ombrain, who has kindly supplied photographs of his species for reproduction here. The latter species has a rigid pectoral fin and a thinner sword than the Black Marlin. It has distinct pale blue bars on the upper part of the body and a conspicuous blue patch near the pectoral fin, sometimes with another blue patch farther behind this, as can be seen below Mr. D'Ombrain's left hand in the photograph. It has more numerous, large cobalt-blue spots along the dorsal fin than is usual in the Black Marlin, has a pale eye, and reaches 245 lb. in weight.

Below is given a key to the swordfishes now known from Australia, as an aid to their identification.

For seventy years or more the skin of an Indian spearfish, labelled "*Tetrapturus indicus*," has been exhibited in our gallery. I decided to examine this specimen in comparison with our Australian marlins and found that it belongs to a little known Indian Ocean species, *Tetrapturus brevirostris* Playfair, originally discovered in Zanzibar.

*Continued overleaf.*

ARTIFICIAL KEY TO THE AUSTRALIAN SWORDFISHES.

A. Sword broad across and flat, not circular in cross-section. No scales. One dorsal and one anal fin. No ventral fins. 26 vertebrae.

The Broadbill Swordfish, *Xiphias estara.*

AA. Sword almost circular in cross-section. Scales present. Two dorsal and two anal fins. Ventral fins strip-like. 24 vertebrae.

B. First dorsal fin extensive, sail-like, much higher than the depth of the body, which is cross-barred. Sword elongate.

Sailfish, *Istiophorus ludibundus.*

BB. First dorsal fin lobed in front, not high and sail-like.

C. Body with cross-bars, robust, not very compressed. Lobe of first dorsal fin higher than the body is deep, which depth is less than one-fifth length of fish. Vertebrae 12 + 12. Lateral line simple. Pectoral fin adpressible. Origin and end of second anal fin before levels of those of second dorsal fin. Eye goes about $11\frac{1}{2}$ in sword.

Striped Marlin, *Marlina zelandica.*

CC. Body usually plain, or with indistinct cross-bars. Dorsal lobe shorter than depth of body, which is more than one fifth length of fish. Vertebrae 11 + 13 or 12 + 12. Lateral line indistinct or complicated.

D. Pectoral fin rigidly erect, difficult to lay alongside body.

E. Spear thick, upturned; shoulders ofte n heavy or hunched. Generally no colour-bars; no blue patch near pectoral fin. Size very large, may exceed 1,200 lb.

Black Marlin, *Istiompax australis.*

EE. Spear slenderer, more tapering and horizontal; shoulders more sloping. Pale blue bars on upper parts of body and a blue patch near pectoral fin. More numerous, large blue spots on first dorsal fin than in Black Marlin. Generally less than 200 lb.

D'Ombrain's Marlin, *Istiompax dombraini.*

DD. Pectoral fin can be pressed down alongside body.

F. Middle dorsal spines short. Lateral line indistinct. Ventral fin shorter than pectoral. First dorsal fin spotted.

Howard's Marlin, *Istiompax howardi.*

FF. Middle dorsal spines long. Lateral line distinct. Ventral fin longer than pectoral. First dorsal fin dark, sometimes with lighter basal portion, but not spotted.

Short-snouted Spearfish, *Tetrapturus brevirostris.*

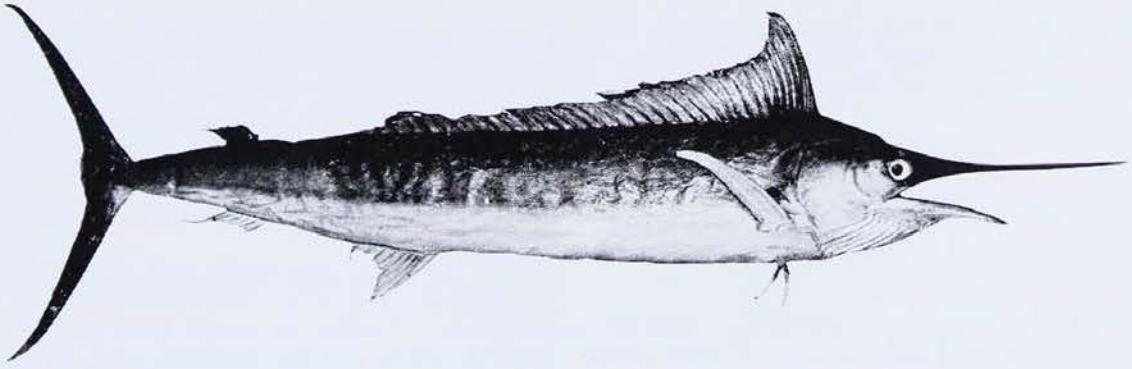
Another D'Ombrain's Marlin, 141 lb., from Port Stephens, has conspicuous blue spots on the lower part of the front dorsal fin.

Photo.—A. D'Ombrain.

The Indian spearfish is 5½ feet long and 20 inches in girth; the bill (tip of snout to border of eye) measures 12¼ inches; height of first dorsal fin, 7 inches; its median spines exceed 3 inches; pectoral fin, 8 inches; and spread of tail, 21½ inches. Its formula (in comparison with the Broken Bay specimen's quoted in 1854) is B.7/D.iv,35.7/P.20/V.2/A.iii, 10.7/C.15 main rays. The middle spines of the front dorsal fin are longer than in the bigger marlins and the pectoral fin is shorter, but these are characters which may well be modified during growth. The life-colours, weight, and internal features are unfortunately not ascertainable.

It is probable that the spearfishes of the genus *Tetrapturus* are merely the young of the great marlins—another reason why small and middle-sized fish are more interesting to the scientist that giant ones. The first spearfish or marlin to be received from the Northern Territory arrived at the Australian Museum in November, 1954, presented by the Commonwealth Fisheries Office. It had been sent down from the northward of Melville Island (11° 12′ S. Lat. by 131° 50′ E. Long.) by Captain F. E. Wells, having been caught in the first week of October, 1954, by trolling a line for queenfish, and was soon identified as *Tetrapturus brevirostris* by comparing it with our Indian specimen. The Arafura fish was smaller—5 feet 2 inches overall. Unfortunately it had been gutted, its weight in this state being only 18 lb. 14 oz. It differed from the Indian swordfish in trifling characters (slenderer form, slightly longer dorsal spines and rays, longer pectoral fin and higher first anal fin, and had the end of its tongue notched) but these were obviously due to individual growth-variation. According to Professor J. L. B. Smith, this marlin grows to at least 11 feet in length. The species is widely distributed in the Indian Ocean from East Africa to India, Ceylon and Indonesia.

Previous news of swordfish from the Northern Territory and adjacent waters was rather sketchy. In the seventeenth century the Dutch reported "sharks, swordfish and the like unnatural monsters." The late Zane Grey predicted that our northern waters would be a centre for



An Indian Spearfish (*Tetrapturus brevirostris*), 5½ feet long, in the Australian Museum.

game-fishing, but he depended on presumptive evidence. When I was in Darwin in August, 1949, the local newspaper reported that a swordfish had been caught recently off Gun Point. Well to the north of Western Australia, on 4th September, 1949, a swordfish, apparently about 3 to 4 feet long, was hooked on a tuna-jig trolled astern of the vessel *Stanley Fowler*, but unfortunately broke loose as I was hauling it in and remained unidentified. This was in the Timor Sea between Sahul Bank and Bathurst Island. Crews of pearling luggers have recently reported seeing a number of marlin from two to about twelve feet long, particularly from Goulburn Islands to the Wessel Islands. Now Captain Wells' specimen establishes a definite record which will be of great interest to anglers. One swallow does not make a summer, nor one swordfish a fishery, but at least the Museum's latest marlin is a pointer in the right direction.

More than thirty distinct species of swordfishes in the world's seas were distinguished in Jordan & Evermann's monograph, published in *Occasional Papers of the California Academy of Sciences*, volume xii, 1926. Since then some of their specimens have been considered to be varieties of others, but further new species have been erected. Disregarding the Broadbill and the Sailfishes, it is interesting to note that Deraniyagala in Ceylon has proposed the names *Tetrapturus acutirostratus* and *tenuirostratus* for a Cinghalese spearfish, and that a new genus from Japan, which I suggested in 1931 should be named, has been christened *Pseudohistiophorus* by F. de Buen, 1950. The true marlins have had new names showered upon them: *Makaira bermudae* from Bermuda, *M. perezi* from Uruguay, *M. nigricans tahitiensis* for the Tahitian Silver Marlin, *Kajikia formosana* from Formosa, not to repeat the three species of *Istiompax* from Australia. Truly the study of swordfishes is an ever-growing and intriguing one, and a book, rather than an article, could easily be written on these magnificent fishes.

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IT is with deep regret that we have learned of the deaths of two well-known Scandinavian scientists, Dr. Oskar Carlgren and Professor Torsten Gislen.

Although over eighty years old, Dr. Carlgren was still actively engaged in research at his Oslo home and during the last few years of his life had published much-needed revisions of the species of sea anemones and zoanthids from southern Australian waters.

Professor Gislen visited the Australian Museum in 1951 when the Danish Deepsea Expedition was in Australasian waters and, while here, arranged for rare zoological specimens to be exchanged between The Australian Museum and the Zoological Museum of the University of Lund, Sweden.

With the deaths of these distinguished marine zoologists The Australian Museum has lost two very good friends and helpers.

# Collecting on an Australian Museum Expedition

At the operating table: The author skinning a bird. A bandicoot lies on the table ready to be registered and preserved.

Photo.—G. Kingsford Smith.

By ROY D. MACKAY

FROM articles in past issues of this MAGAZINE* readers will have gained an idea of the route taken by the Australian Museum Scientific Expedition of 1952—roughly that taken by the 1953 Redex Car Trial. The varied terrain covered by the 11,000 mile journey presented many types of fauna, requiring different collecting techniques, and it is the purpose of this article to describe some of these as used by my colleague, Mr. Norman Camps, and myself.

While we attended to the specimens in hand, the rest of the party (Messrs. H. O. Fletcher, E. Rayner and A. J. Keast) would be out in the bush or tramping the desert sands collecting more birds, mammals, insects and reptiles. Mr. Fletcher and Mr. Rayner were particularly interested in, and employed themselves in collecting, rock and mineral samples or seeking fossils. Mr. Keast, as ornithologist and photographer, collected birds and made a movie and "still" photographic records of the expedition.

The principal collecting areas were at Jay Creek Aboriginal Reserve, Ayer's Rock, The Granites, Tanami, Forrest River, Port Keats and Cardwell. In each we spent at least two days. The longest period was spent at Forrest River, where we stayed for seventeen days. While on the road, collecting was done by shooting from the trucks or when at our overnight camps. A few glass tubes, small bags and a bottle of alcohol, were kept handy in the cabin of each truck so that any small animal encountered on the way could be

*AUST. MUS. MAG., X (12), p. 377; XI (1), p. 3; XI (2), pp. 37, 47; XI (3), p. 71.

A Hopping Mouse dug from a burrow in the red desert sands.

Photo.—R. D. Mackay.

attended to without appreciable delay in driving time. The first collecting was done at East Wells Station, South Australia, during the overnight camp. At stops such as this torches were used a great deal. By shining a torch from the side of the head and looking along the beam it was possible to see a glistening reflection from the eyes of spiders, possums and flying foxes. Spiders, centipedes and scorpions were immediately preserved in alcohol; insects were killed in a killing bottle and then pinned out in a special box lined with cork.

Gecko lizards were found by looking into rock crevices and in the cracks and holes in dead timber, or under slabs of rock. Many lizards were to be seen running over the surface of the red sand, dodging around tussocks of spinifex, or diving down into shallow tunnels. Those which went to earth were easily captured by digging out. Those which could not be approached were shot with a .22 dust shotgun. This gun proved its worth in the collection of small birds. Snakes were shot, too, and together with the other reptiles, were preserved in alcohol.

At our main collecting centres the natives were an invaluable aid in enriching our collections by bringing in specimens. Frog hunting was an activity which occupied us on a few evenings. The enthusiasm of the Aborigines at the Forrest River and Port Keats Missions helped us to get a good representative collection in those particular areas.

Birds were shot with shotguns—12 gauge, 16 gauge and 410 gauge—using various sized shot according to the size of the bird. A .22 dust shotgun was used on small birds at close range. All birds were made up into "study skins" immediately. Details such as colour of soft parts, measurements of wing, culmen and so on, and the stomach contents, were noted down on specially printed labels. A label, and a metal tag with a number stamped on it, were attached to each bird. The

Mr. H. O. Fletcher and Mr. N. Camps setting traps on the sandhills near Ayer's Rock.

Photo.—R. D. Mackay.

tag number corresponded to the number assigned to the particular specimen in the field register of specimens. The register recorded details of locality, date collected and special measurements.

Another collecting method used, when in an area for more than one day, was to set a line of traps for small mammals. These were set at dusk at the entrance of burrows or caves, or in heaps of boulders where the footprints of the hidden animals could be detected. The bait, used with great success, was a finely minced mixture of oatmeal, peanut butter, seeded raisins and bacon. The line of traps was marked with pieces of cotton wool in conspicuous places so that none would be lost. Specimens captured in this manner were retrieved before the sun rose high as otherwise the heat and flies would soon destroy them.

Certain specimens needed special collecting methods. Thus, wallabies, which we saw from a distance frequented almost sheer cliffs above the Forrest River. These had to be stalked from the other side of the river and shot from a distance of over three hundred yards. Then a dangerous climb had to be made to retrieve the specimens. Some rare crustacea were found by Mr. Keast and Mr. Camps by examining rock pools in a large weathered-out depression in the north-western side of Ayer's Rock.

As opportunity afforded, photographs were taken of live specimens. Sometimes such photographs help in the later correct identification of specimens whose colour pigments are destroyed by preservative.

When we visited coastal districts, new types of animals were found, such as fish, crabs, water-snakes, corals and shellfish. In the northern coastal scrubs, flying foxes, besides providing valuable material, afforded also a good test for markmanship.

A Desert Trapdoor Spider. Several were dug from burrows in the sandy soil near Jay Creek.

Photo.—R. D. Mackay.

They were shot by torchlight while feeding at night in the tops of fig and native berry trees.

As preserving cans were filled specimens were transferred to tins, which were sealed and despatched back to the Museum. The preserving cans were then replenished from our stock of pure alcohol which was then broken down to an 80 per cent. solution.

Back at the Museum all specimens had to be checked and identified. In six-and-a-half weeks' actual collecting time over 300 bird skins were prepared; 100 mammals, 900 reptiles and amphibians, and about 300 fish and invertebrates were collected, and as well some 450 mineral and fossil specimens.

# "Magic Fern," or Sea Cypris

By ELIZABETH C. POPE

THE use of small bunches of "Magic Fern," in small pottery troughs or vases, is a current Sydney craze for home decoration. "Magic Fern" (a trade name) is bright green and, as our illustration shows, has a most attractive feathery shape. The "magic" properties claimed for the "fern" are that it will grow slightly without water or soil and will retain its attractive appearance permanently.

It seems a shame to disillusion a public which so obviously wishes to believe in fairies but "Magic Fern" is purely animal in nature, the lovely green colour is due to a dye, and as to its power to grow—that is impossible since it is as dead as the proverbial doornail. One "frond" has been in our possession over a year and it has not stretched or lengthened, let alone grown. One sniff of the delicate "Magic Fern"—especially in hot weather—and one gets an unmistakeable whiff of its home of origin, the sea, and if the sniffer's sense of smell is acute enough he will be able to detect an underlying smell of decayed animal flesh.

"Magic Fern" is in reality the horny outer skeleton of a lowly hydroid zoophyte whose scientific name is *Sertularia cupressina* or, popularly, Sea Cypris. The word zoophyte (from the Greek words Zoon, an animal, and Phyton, a plant) needs no explanation when one has noted the plant-like shape of *Sertularia cupressina*, and observed that in spite of its shape, its method of feeding is distinctly animal (like that of its relatives the corals). Again like the coral, it is a colonial animal and, when alive, has a number of little polyps with actively waving tentacles which capture their prey. These polyps protrude from the horny skeleton in the living animal.

*Sertularia cupressina* does not grow in Australian waters but similar types of hydroid zoophytes may sometimes be seen growing attached to wharf piles or the bottoms of ships. The present batches of "Magic Fern" are being imported from Ireland and southern England, where it grows in deeper waters. It is dredged up, often by the owners of largish pleasure yachts who find it very profitable to do a little dredging "on the side," especially when they can make some hundreds of pounds as a result of fairly short operations. The "fern" is then preserved, treated and packaged for sale.

In the cooler climate of Great Britain "Magic Fern" lasts quite well and does not become too malodorous to live with. One wonders what will happen here after some of our muggy, very hot summer days. Still, like many other crazes, it is fun while it lasts.

# How Eskimos Live in the Arctic

THE frieze shown on this page illustrates the seasonal life of Eskimos in the Arctic regions of northern Canada. Sixteen feet long and 1 foot 6 inches high, it forms the highlight of the Museum's small but interesting Eskimo exhibit.

The frieze begins at the top left with summer (July to September) when food is abundant and varied and life is pleasant for the Eskimos. During this season they live in deer or seal skin tents along the shores of rivers, lakes and the sea. The men, using their kayak and umiak boats, harpoon seals, walrus, whales and narwhals. Salmon and other fish are caught in stone-walled traps and dried on racks for winter use. The women collect dried moss for fuel.

When the tundra is becoming covered with snow in autumn (September to November) the Eskimos migrate to their sealing grounds, where they live in skin tents surrounded by low walls of ice blocks, or in snow-houses (*igloos*) in which the blocks are skilfully built into domed dwellings. The men spend many hours harpooning or spearing seals and fish in cracks in the ice, or in the scattered holes made by seals for breathing purposes. As winter approaches the Eskimos cache their skin tents and migrate on dog sledges to their winter quarters on the now frozen fjords or shores, where the ice is not too thick for seals and walrus to break through and make their breathing holes.

During the winter months (December to February)—a period of continuous night and bitter weather—the Eskimos live in either underground or snow-houses, depending upon their stores of deer-pemmican, seals and fish for food. When this stock of food is exhausted, the men go out hunting seals, polar bears, musk-ox and hares, but if the weather is too severe for hunting, the families are forced to eat their dogs and some perish from starvation and cold.

When the ice thaws in the spring (May to June) the Eskimos return to their summer cache and re-erect their tents. An abundance of food is now available in the sea. They migrate on foot over the tundra, carrying their tents and chattels, to the salmon fishing grounds. Caribou deer are hunted from late spring to autumn, whenever the opportunity occurs. The aim of the Eskimos is always to build up a store of food for the precarious winter months.

The frieze was painted by Mr. John Beeman, Museum artist, in collaboration with Mr. F. D. McCarthy, Curator of Anthropology.

# Insects of Captain Cook's Expedition

## Part III.

By A. MUSGRAVE

THE BUTTERFLIES.

NO less than twenty-seven species of butterflies were described by Fabricius from the material in the Banksian collection, which is now preserved in the British Museum (Natural History). We also learn from the paper by Mr. T. G. Watkins, previously cited, that nine other Australian species of butterflies were included, but not described, in the Banks collection, thus making thirty-six species in all.

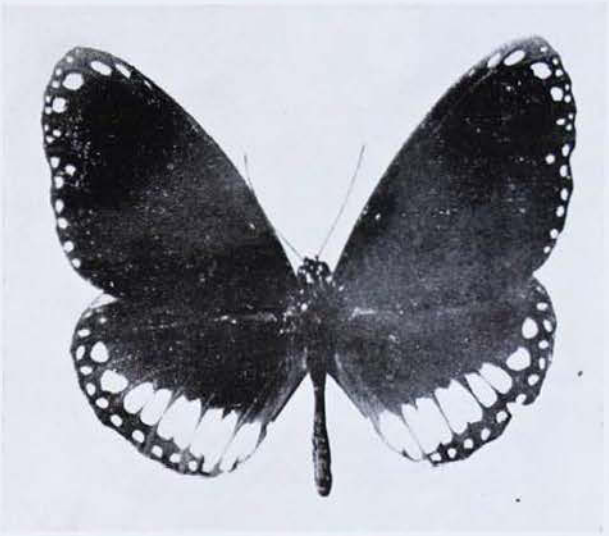
While in Cooktown and the neighbourhood in 1951 I collected some of both these series.

Of the family Danaidae, which includes those butterflies whose caterpillars feed upon plants with a milky sap, I took five representatives. The members of this family have already been dealt with by me in the MUSEUM MAGAZINE[4] and need only be touched upon briefly.

The Black and White Tiger, *Danaus affinis affinis* Fabricius, occurred at Keating's Gap, but was not common. The Lesser Wanderer, *Danaus chrysippus petilia* Stoll, which is widely distributed over Australia, was one of those captured at the Endeavour River, but not described by Fabricius. My specimens came from Keating's Lagoon and Hope Vale.

The Common Australian Crow or Oleander Butterfly, *Euploea core corinna* Macleay, earlier referred to, was captured by me at Cooktown and Keating's Lagoon.

Eichhorn's Crow, *Euploea alcathoe eichhorni* Staudinger, 1884, ranges from the Herbert River, south of Cairns, to Cape York. I found it not uncommon at Keating's Lagoon, near Cooktown. Cooktown is the type locality, where it was first taken by Mr. Carl Eichhorn, a resident of that town, and, I believe, brother-in-law to A. S. Meek, a collector for the late Lord Rothschild of Tring Park Museum. Many of Meek's specimens were collected at Cedar Bay, south of Cooktown, in the 1890s. This butterfly seems to have escaped capture by Cook's party.



Eichhorn's Crow, *Euploea alcathoe eichhorni* Staudinger, a butterfly common to the Cooktown district, but not collected by the *Endeavour's* party.

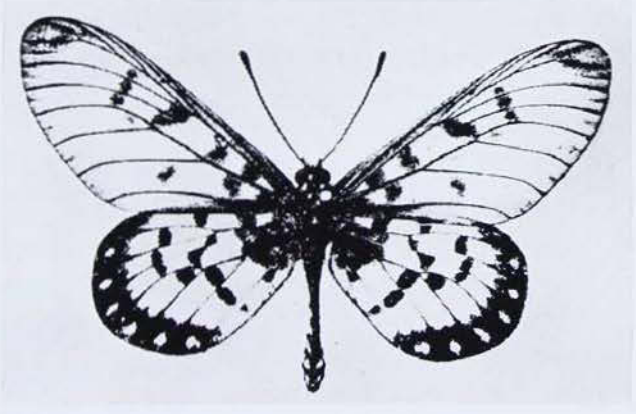
The pretty little Cairns Hamadryad, *Tellervo zoilus zoilus*, was also taken by me at several places, viz., Keating's Gap, Helenvale, and Hope Vale (north of Cooktown). It is a small black and white spotted butterfly with a wing expanse of about 1 5/6 inches. This species, which was among the Banksian material, must surely have been taken at the Endeavour River by Cook's party.

[4] A. Musgrave, *Some Butterflies of Australia and the Pacific.* Family Danaidae—Danaids I-II, AUSTR. MUS. MAG., ix (8) Sept. 1948, pp. 270-275, illustr.; *op. cit.*, (9) Dec. 1948, pp. 309-314, illustr.

In the largest family of the butterflies, the Nymphalidae, five species were described by Fabricius from New Holland, though the group is poorly represented in Australia, only twenty-five species being recorded in comparison with the fifty-one species in southern India. Only three Nymphs are common about Sydney: the Meadow Argus, *Precis villida calybe* Godart, 1819, which was described by Fabricius in the *Systema* as *villida* but from the Island of Amsterdam (Tonga Tabou); the Australian Painted Lady, *Pyrameis cardui kershawi* McCoy, 1868; the Australian Admiral, *Pyrameis itea*. Three other species have been taken near Sydney and five in northern New South Wales. All the species have been taken in Queensland with the exception of two from Port Darwin.

I secured in the Cooktown district two of those described by Fabricius, as well as another, apparently not secured by the *Endeavour's* party, the Blue Argus, *Precis orithya albicincta* Butler, 1875. Butler merely records it from Queensland, but it is now known to range from Brisbane to Cape York and the islands of Torres Strait, Darwin and Wyndham. It was quite common at Cooktown on the dusty roads, like the Meadow Argus about Sydney. It is therefore difficult to account for its absence from the material taken to England by the *Endeavour*.

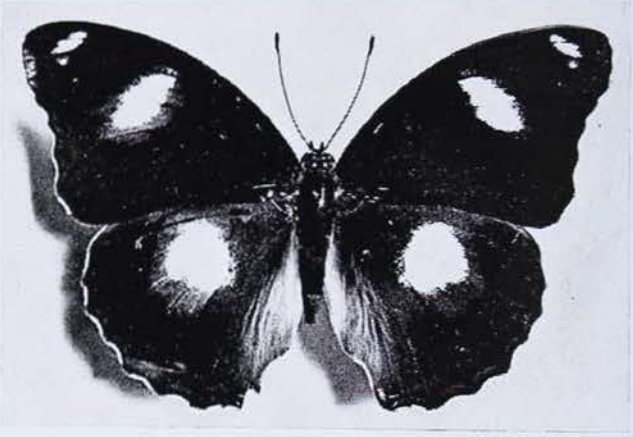
Of those Nymphalids described by Fabricius, the Glass-wing or Small Greasy, *Acraea andromacha*, was one I captured at Cooktown. It ranges from Cape York to Sydney, and is known from Port Darwin, Wyndham, and Derby. The larvae feed on wild passion vines. This butterfly has the wings transparent, and the hindwings with black borders.



The Glass-wing or Small Greasy, *Acraea andromacha*, has a wide range down the coast to Sydney.

Photo.—Author.

The Blue-banded Egg-fly, *Hypolimnas alimena lamina* Fruhstorfer, 1903, was amongst those insects taken by Cook's party, but not described by Fabricius. It ranges from Mackay to Cape York and the islands of Torres Strait. It is a not uncommon species.



The Common Egg-fly, *Hypolimnas bolina nerina*, male, a common Nymphalid in tropical and subtropical Australia.

Photo.—Author.

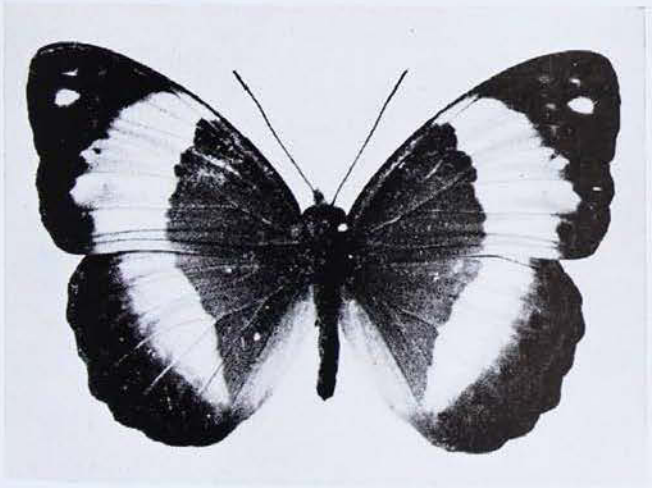
The Common Egg-fly, *Hypolimnas bolina nerina*, is a butterfly "common everywhere in tropical and subtropical Australia", as the late Dr. G. A. Waterhouse points out in his book, *What Butterfly is That?* The male is black with white spots in the centre of the wings and the spots are margined with purple. The female is very variable, so that Dr. Waterhouse writes, "no general description can be given which would include all the variations of the female". The larvae feed on Paddy's Lucerne, *Sida rhombifolia* (=*retusa*), and *Portulaca*.

The Red Lacewing, *Cethosia cydippe chrysippe*, ranges from Townsville to Cape York. It is one of the finest butterflies of north Queensland. The larvae feed on a species of passion vine.

The Common Egg-fly, *Hypolimnas bolina nerina*, female; a highly variable butterfly.

Photo.—Author.

The Australian Rustic, *Cupha prosope prosope*, ranges from the Richmond River in New South Wales to Cape York and occurs also on Banks and Murray Islands in Torres Strait. I have captured it at Yeppoon on the coast near Rockhampton. It is said to be common at Cairns.



The Australian Rustic, *Cupha prosope prosope*, occurs on the islands in Torres Strait and ranges down the east coast of Australia to the Richmond River, N.S.W.

Photo.—Author.

In the family Satyridae (The Browns) seven species were described by Fabricius from New Holland, but of these *Heteronympha merope* was almost certainly taken by the expedition at Botany Bay as it does not occur at the places on the Queensland coast visited by the *Endeavour*. Of the remaining six species, three were secured by me at Cooktown.

The Evening Brown, *Melanitis leda bankia*, is found from Cape York to Port Macquarie, New South Wales, and is found also on the islands of Torres Strait and at Port Darwin. It flies only at dusk unless it is disturbed, when it may fly a short distance to settle on the ground. The late Dr. Waterhouse has worked out the life-history of the insect, which feeds in the larval state on various grasses and sugar-cane. Helenvale yielded two specimens.

The Orange Bushbrown, *Mycalesis terminus terminus*, ranges from Cape York to Mackay, and occurs on the islands of Torres Strait. It is common at Cooktown, and Dr. Waterhouse states in his book that he has "specimens from northern Queensland caught in every month of the year". I secured specimens at Keating's Lagoon and Helenvale.

Of the Family Pieridae (The Whites and Yellows) six species were described by Fabricius, and two other forms not described by him are in the Banksian collection. While at Cooktown I secured none of these eight species, but on the other hand I collected two common forms not taken by Cook's party. One of these was the Common Grass Yellow, *Terias hecabe sulphurata*, Butler, 1875, which extends south to Sydney. It occurs about Sydney in the autumn, but is common throughout the year in the north. The larvae feed on *Breynia oblongifolia*, *Cassia*, &c. I took three examples at Cooktown.

The family Papilionidae (Swallowtails) is represented among the Banksian material from "New Holland" by only one species, the Big Greasy, *Cressida cressida cressida*, common in eastern Australia from Cape York to the Richmond River, New South Wales, but rare to the south. The male has the forewings transparent with a series of red spots on the hindwing. The female has been likened to a "well-worn male",

and the wings are almost entirely transparent. The larvae feed on the plant *Aristolochia*, popularly termed "the Dutchman's Pipe". I secured specimens of this butterfly in the Cooktown district.

### Order Coleoptera.

The Coleoptera (beetles) taken by the Expedition comprise seventy-eight species, and, if treated in detail, would furnish material enough for several articles.

In the Tenebrionidae we find *Adelium porcatum* (Fabricius, 1775, *Carabus*), a species widely distributed in New South Wales, though Fabricius in placing it in the genus *Carabus* evidently thought that its affinities were with the beetles of the family Carabidae (ground beetles), though the classification of the beetles into the present system of "families" had not then advanced so far. Many of the genera in Fabricius' day were just convenient dumping grounds for species.

The Chrysomelidae (leaf-eating beetles) include fourteen of the seventy-eight species, and of these mention may be made of *Aspidomorpha deusta*, a specimen of which I secured at Finch's Bay. The genus *Aspidomorpha* has a wide distribution beyond Australia, but most of the forms described from Australia are tropical in their range. *A. deusta* is found in North Australia as well as Queensland.

The family Curculionidae (weevils) was also well represented in the material collected in New Holland by Cook's party, and seventeeen species are recorded. The best-known of these is the Botany Bay Diamond Beetle which received mention earlier. This family is widely distributed over the world and Imms in his *Text-book of Entomology* states that sixty-five thousand were known up to 1948. In Australia more than three thousand were known up to 1926, but many new forms have been described since that year.

### Order Diptera.

The Order Diptera (flies) was represented in the *Systema Entomologiae* by only seven species from "New Holland".

Two of these were members of the family Bombyliidae, *viz.*, *Ligyra sylvanus* and *L. satyrus*. *L. satyrus* ranges south to Newcastle, New South Wales, and occurs in the Northern Territory, Torres Strait, and New Guinea. Dr. Illingworth and Mr. A. P. Dodd have shown that this fly is a hyperparasite on *Campsomeris radula*, that useful wasp enemy of the grubs of Scarabaeid beetles attacking sugar cane. The members of the family Bombyliidae have been called "bee flies" because many are parasitic in the nests of bees, but the larvae are also predaceous upon moths of the family Noctuidae (=Agrotidae) and on solitary mud-building wasps.

*(To be concluded.)*