

The
**AUSTRALIAN
MUSEUM
MAGAZINE**

EDITED BY C. ANDERSON, M.A., D.Sc.



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Whaler Shark (*Carcharhinus macrurus*) effectively meshed in a shark net.

[Photo.—T. C. Roughley.]



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VOL. III., No. 5.

JANUARY-MARCH, 1928

Control of Pests.

IN Australia as in other lands man wages an unceasing war against various animal and vegetable pests. It is estimated that the blowfly penalises the Australian sheep-owner to the extent of £4,000,000 annually; St. John's Wort has ruined a million acres of good land in Victoria; prickly pear is in effective occupation of 60,000,000 acres in Queensland and New South Wales; the annual losses suffered by Australian orchardists through the depredations of insect pests are very large. The aggregate losses inflicted on our country by insects and noxious weeds are possibly as high as £20,000,000 annually, and if even a few of these pests can be removed or controlled it will mean much to the prosperity of the Commonwealth.

Australian governments are fully alive to the menace, and also realise that the remedy is to be sought in extensive experimentation under rigid scientific control. Recently the Federal Government has appointed Dr. R. J. Tillyard, of the Cawthron Institute, Nelson, New Zealand, to direct and co-ordinate the work of defence, and a central research station will be established at Canberra under his supervision. Dr. Tillyard is recognised as one of the highest authorities on pure and applied entomology, and his appointment, at a substantial salary, will be hailed with

general satisfaction. Considerable success has already been attained by a small but zealous band of workers, who for years past have been grappling with the pest problem, but we may now expect an intensification of the campaign, and, let us hope, an increased measure of success.

Of the various forms of animal life which compete with man, insects are the most deadly. It has indeed been said that but for the insectivorous birds, which keep a check on the multiplication of insects, six years would possibly bring our whole system of animal nature to an end. Certain it is that from some points of view the insect is the dominant form of animal life. Fortunately the insect has many enemies, and its most formidable foes are to be found among its own kind. Recognition and utilization of this truth is the best weapon in the armoury of the economic entomologist, for it is by introducing and fostering the parasites of insect pests that the latter can best be controlled. For example, a destructive scale insect, introduced into California with some lemon trees from Australia, was eventually rendered harmless by the importation from Australia of one of its natural enemies, a lady-bug. The student of entomology is often amazed and bewildered by the ramifying

inter-relations exhibited by insects, but only when he has an understanding of the complex web of insect life will man be the winner in the battle for supremacy.

The work of the economic entomologist must be based on accurate determination of the insects with which he has to deal; this task is by no means an easy one. About 600,000 different kinds of insects have already been described, and probably 3,000,000 yet remain to be determined; at the present rate of progress five hundred years will elapse before the last elusive species becomes a member of the Linnean system. The work of identification is rendered more difficult by the fact that many insects are so similar that even an expert finds it almost impossible to classify them correctly unless he is able to compare them with specimens in a reference collection. That is the reason why even in a large and well-staffed Museum it is impossible to name all the insects contained in the collection; it is necessary to adopt the course which for several years has been the

practice in the Australian Museum, namely, to send consignments of unnamed insects to experts on particular groups who have access to type specimens. It is only by co operation of this kind that a reference collection can be built up, so that the systematic work, upon which economic investigations depend, may be accomplished.

As Dr. Tillyard has pointed out, biological control of pests involves a restoration of the balance of Nature where it has been unwittingly disturbed by man. Not seldom the very progressiveness of man has aggravated the evil; improved means of communication help to spread weeds and injurious insects, and agricultural operations sometimes encourage our insect enemies by providing an assured and ample food supply.

Dr. Tillyard and his assistants have a gigantic task in front of them, but we have no doubt that, given a free hand, and adequate financial support, the Canberra research station will abundantly justify its foundation.

Obituary.

Professor Archibald Liversidge, M.A., LL.D., F.R.S., who died in London on 26th September, in his eightieth year, was an elective trustee of the Australian Museum from 1874 to 1907. He was educated at the Royal School of Mines, London, of which he became an Associate in 1870, and in the same year he proceeded to Christ's College, Cambridge, as the holder of an open Scholarship. In his first year at Cambridge he was appointed to a demonstratorship in Chemistry. In 1872 he came to Australia to fill the position of Reader in Geology and Mineralogy in the University of Sydney, and in 1874 he became Professor of Geology and Mineralogy. In 1882 the science school of Sydney University was reorganised, and Liversidge became Professor of Chemistry, a position which he held until 1907, when he became Professor-Emeritus. He then took up his residence in London, where he continued his chemical researches at the Davy-Faraday Laboratory of the Royal Institution.

Professor Liversidge took a prominent part in the scientific life of Australia. He was for

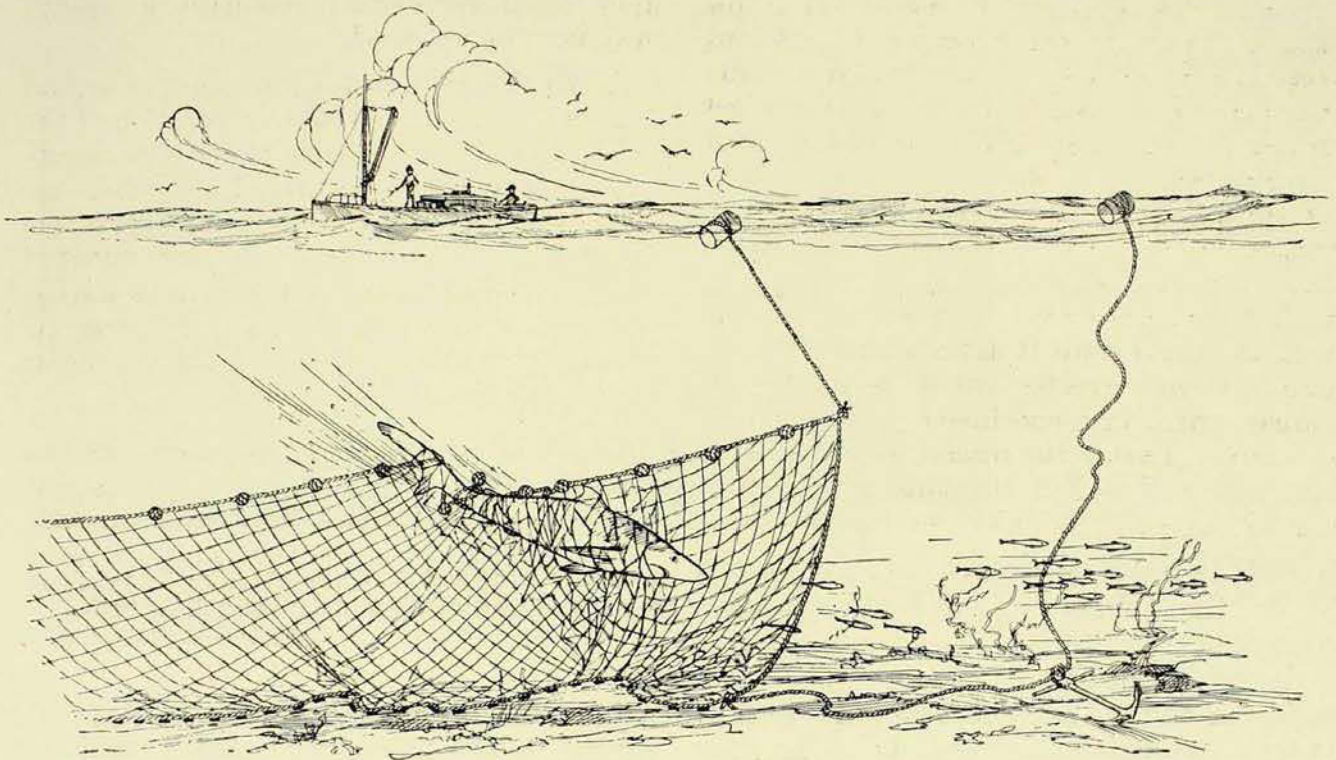
fifty-five years a member of the Royal Society of New South Wales, of which he was twice President, and of which he was for several years one of the Honorary Secretaries. He was largely instrumental in establishing the Australasian Association for the Advancement of Science, of which he was Honorary Secretary from 1888 to 1909.

He took great interest in the affairs of the Museum, particularly the mineralogical collection; most of the foreign minerals in this collection were purchased abroad by him. He was the author of a comprehensive report on technological and industrial museums, and one technical education, and was closely associated with the foundation of the Technological Museum, Sydney.

Professor Liversidge was the author of a work on the minerals of New South Wales, and over a hundred papers mainly on the chemistry of Australian minerals, on the occurrence and properties of gold, and on meteorites.

Catching Sharks for Profit.

By T. C. ROUGHLEY.



Diagrammatic view of the operation of the shark net.

SHARKS—hideous monsters weighing up to a thousand pounds—tiger sharks, whaler sharks, grey nurse sharks, white sharks, man-eaters all of them, are at last being turned to profit.

Most of us on the mention of shark visualise creatures, sleek, silent, and sinister, ever on the alert to grab some unwary bather in its leering mouth of sharp, glistening teeth; or, perhaps, the undignified retreat from the surf on the warning sound of the shark-bell. To the company recently established at Port Stephens, sharks visualise dividends; they are pursued with unrelenting vigour, no mercy is shown them when captured, and quickly they are rent in pieces, each portion to play its allotted role in our commerce. Sharks, instead of roaming at large, unmolested, seeking whom they may devour, are at last being pressed into man's service; their hides are converted into most valuable leather, strong, supple, and good to look upon; their flesh is dried

to feed the hungry millions of the East and Africa; their livers are made to give up their oil, useful for many commercial purposes; and their fins will be turned into soup to tickle the palates of the Chinese gentry.

In the past, the capture of sharks has been left in the hands of a few line fishermen, who, for the mere sport of hooking a hard-fighting, hard-dying fish, of pitting their skill against the brute force of the maddened monsters, have fished for them for the sake of the thrill. Or have they enjoyed more the lust for killing a merciless, crafty, and cruel foe?

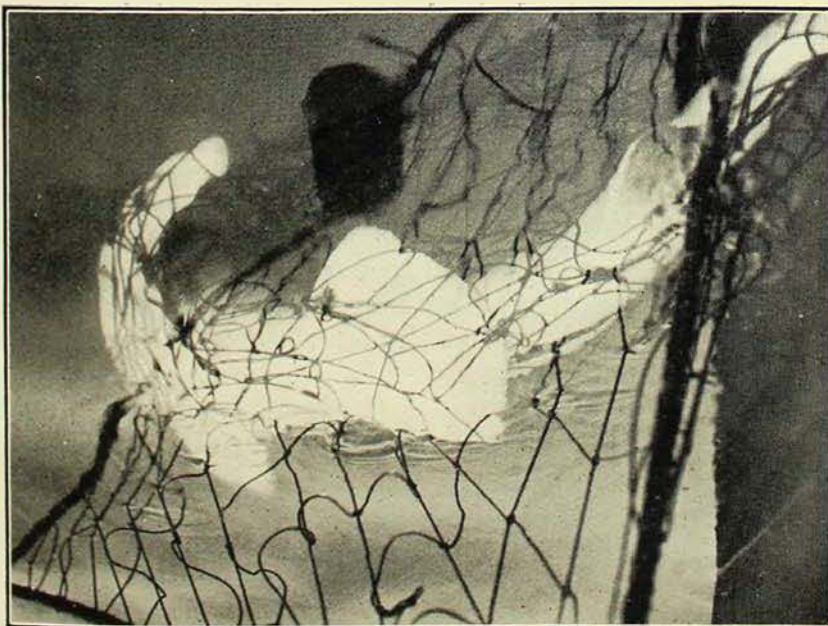
Now, at Port Stephens, the lure of the baited hook no longer enters into the chase, but nets, cunningly constructed and effectively laid to bar their progress, are taking toll of numbers of sharks previously unknown in our fisheries.

BEGINNING THE DAY'S WORK.

The shark fisherman's day begins at half past two in the morning with the "chime"

of a Big Ben; it begins with a few well-chosen, typically Australian invectives against the misguided fool who invented alarm clocks. A hasty snack and a cup of tea, and the boat is headed for the shark grounds outside. The boats, of which two are at present in regular use, are 30 feet long, fitted with 12-horse power Diesel engines, and are solidly constructed to withstand any amount of buffeting. An early start is made in order to be on the fishing grounds in the calm of daylight, and so

avoid the choppy sea which a wind brings in its train, rendering the handling of the nets difficult. In the dim light of the stars, the silence broken only by the regular bark of the exhaust and an occasional grunt of a dolphin,



Grey Nurse shark being hauled to the surface.

[Photo.—T. C. Roughley.]



The sharks when landed are usually alive, and they are killed by heavy blows of a club on the back of the head, or by a revolver bullet through the brain.

[Photo.—T. C. Roughley.]

speculation is rife amongst the crew as to the extent of the morning's catch. Will they bring in more than the other boat?

Half an hour's run from the steep headlands guarding the entrance to the Port, in the faint grey light of dawn, there can suddenly be discerned two floating buoys which serve to indicate the end of a net; somewhere a thousand feet away two more buoys mark the other end; in a line between them the net lies vertically on the bottom. The ground rope is weighted with four ounce leads every three feet; the head line is buoyed by glass floats, five inches in diameter, every eight feet. Nets of twelve, sixteen, and twenty inch mesh, or six, eight, and ten inch squares are used, constructed of forty-two or sixty thread cotton. They are twenty feet deep and may be used in water of that depth or down to 120 feet or more.



Bringing ashore a thirteen-foot Tiger Shark which weighed 1,000 lbs.

[Photo.—T. C. Roughley.]

So far the shallower water has yielded the greater number of sharks.

The fishing grounds are continually changed. If the catch is a poor one, the net is usually taken on board and relaid on another ground, an endeavour being always made to place it across the conjectured track of sharks as they work close to the coast.

From a study of the entanglements of the nets on the sharks, they appear to mesh as follows. The net is laid to lie loosely, thus giving considerable play; a shark swims into it, usually at night, and a mesh is forced over its snout like a noose, which its impetus makes very tight. Alarmed by the trap into which its head has become jammed, it endeavours frantically to free itself from the obstruction, and becomes effectively tangled

by the fins, and frequently in the case of grey nurses, by the teeth also.

WORKING THE NET.

Each morning's catch represents the product of twenty-four hours' fishing, the greatest number of sharks caught in one net during this period up to the present time being thirty-two. When working a net, the buoy attached to one end is lifted on to the boat, and the net raised by hauling in the rope connecting the buoy to the extremity of the net. The buoy is then thrown back to the water and the line with floats attached is hauled to the boat until the other end of the net is reached, each portion after examination falling back into the water and regaining its position on the bottom. During this time the boat is hauled from end to end of the net. When a shark is sighted the net is dragged upwards till its head is above the surface of the water; a large hook suspended from the derrick is then thrust into its jaws, and it is dispatched by heavy blows of a club on the back of the head, or by a revolver bullet through the brain. The net is now disentangled and the shark stored in the hold.

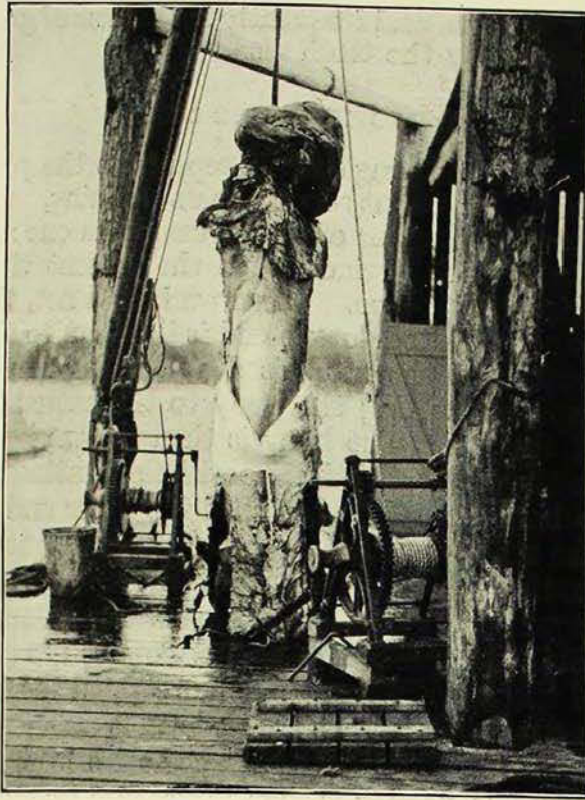
SPECIES OF SHARKS CAPTURED.

The greatest weight of sharks captured in any one week up to the present time is fifteen tons. In the following table the



After the removal of the fins, the skin is cut down the back and behind the gills, preparatory to stripping.

[Photo.—T. C. Roughley.]



Stripping the hide from a 13-foot Tiger Shark. The shark is lowered through a hole in the floor, the skin is secured in clamps, and peels off as the carcass is hauled upwards.

[Photo.—T. C. Roughley.]

commercially valuable sharks are listed in their order of prevalence, with the lengths and weights of the largest sharks of each species captured by the company at Port Stephens :—

Species.	Greatest Length.	Greatest Weight.
	Feet.	lbs.
Whaler (<i>Carcharhinus macrurus</i>) ...	12	650
Grey Nurse (<i>Carcharias arenarius</i>) ...	8	370
Tiger Shark (<i>Galeocerdo arcticus</i>) ...	13	1000
White Shark (<i>Carcharodon carcharias</i>)	11	680

Actually, the most prevalent shark captured is the Port Jackson (*Heterodontus philippi* and *Gyropleurodus galeatus*), but owing to the small size of these species (they attain a maximum length of four or five feet only) they are discarded. Then, too, carpet sharks (*Orectolobus devisi*) and wobbegongs (*O. maculatus*) together have been found almost as prevalent as the grey nurse, but the skin only is at present being retained. The wobbegong attains a length of about five feet, the carpet shark growing a little larger.

REMOVAL OF FINS AND HIDE.

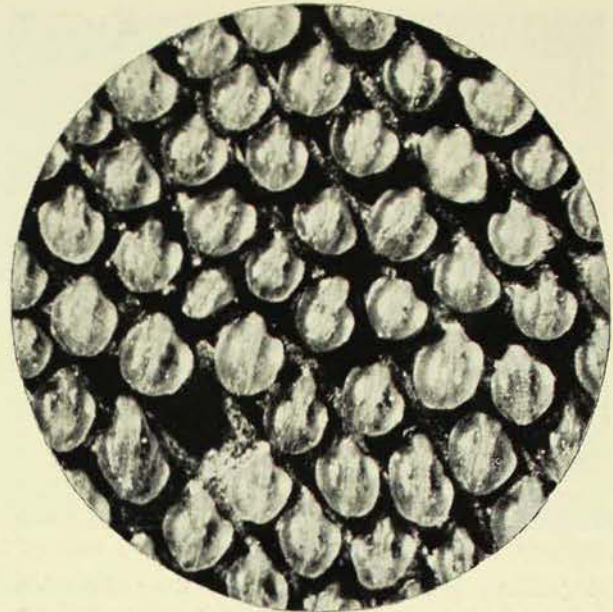
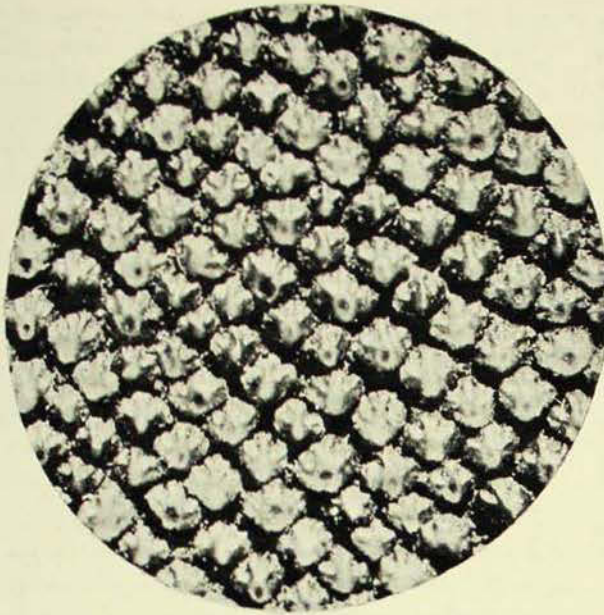
Having stored on board all the sharks yielded by the nets, of which from six to

eight are in regular use, the boats make for the depot at Pindimar, which they reach usually by eleven o'clock. A rope is secured round the tails of the sharks and they are lifted to the dock by means of a derrick worked with a hand winch. The cutting up at once begins. First the fins are removed; these are cut off close to the body, and then dried in the sun, or in patent dehydrators. They are exported to the East for conversion into soup or gelatine. A ton of mixed sharks yields about twenty pounds of dried fin, the loss of weight on drying amounting to approximately sixty per cent.

Next the skin is stripped from the carcass. This is done by chopping off the tail and slitting the hide down the back and round the body behind the gill-openings, at the same time freeing from the flesh a length of about six inches of the skin, thus forming a flap which can be gripped in the clamps. The shark is now lowered by means of a derrick through a hole in the floor, head upwards, the flap of skin behind the head is secured in two clamps, and the carcass



Cutting attached flesh from the shark's hide on a beam-
ing board. The right half still has pieces of flesh attached to it; the left half has been carefully cleaned.
[Photo.—T. C. Roughley]



Left—Denticles (Shagreen) of a Carpet Shark. Right—Denticles (Shagreen) of a Tiger Shark. The shagreen must be removed before the tanned hide can be used for ordinary commercial purposes. Both figures enlarged nine times.

[Photo.—T. C. Roughley.

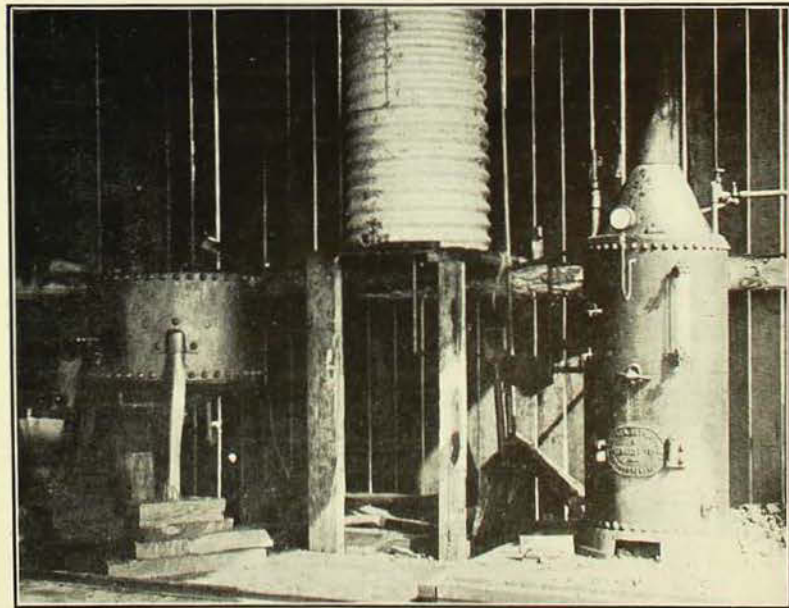
hauled upwards by means of a hand-winch, the skin stripping off as it proceeds. The detached hide is now placed on a beaming board, a curved, upright iron stand, and the adhering flesh trimmed off with a sharp knife. After trimming is complete, the hide is thoroughly washed with salt water and is placed in brine of sixty per cent. concentration for from twenty-four hours to a week, according to convenience, after which it is stored ready for shipment to the tanners.

leather. A ton of shark yields about 90 square feet of leather.

The nature of the shagreen varies considerably; it may be composed of very fine denticles, when it is used by cabinet-makers in the smoothing of wood; or the denticles composing it may be coarse and of different shades, giving to the skin a patterned appearance as in the carpet and wobbegong sharks, the skins of which are being preserved

NATURE AND USES OF SHAGREEN.

Now the skin of the shark is covered with minute, dense, calcified papillae, known individually as denticles and collectively as shagreen, and these must be removed before or during tanning if the leather is required for other than ornamental purposes. They are usually dissolved in a solution of hydrochloric acid and salt. The actual tanning of the hide does not present any special difficulties, and, when properly carried out, the resulting leather is very durable. Its uses are very varied, and it makes an excellent shoe



The plant used for the extraction of the oil from the livers. The livers are placed in the steam-jacketed kettle on the left, the steam being generated in the boiler on the right.

[Photo.—T. C. Roughley.



18 gallons of oil extracted from the liver of a thirteen-foot Tiger Shark.

[Photo.—T. C. Roughley.]

for ornamental uses, such as coverings for caskets, trinket boxes, and toilet sets. They may be dyed very beautiful colours.

FLESH DRIED FOR FOOD.

The flesh of the shark is cut into strips a foot long; these are soaked in brine and then hung in dehydrators to extract the moisture. At a temperature of 130° F. the flesh is thoroughly dehydrated in twenty hours. It is then ready for shipment to the Malay States or Africa, where the demand for dried shark flesh for food is enormous. Of the sharks so far treated the whaler has yielded the best meat, the flesh drying a golden colour. The flesh of the white shark dries a dull reddish brown, and that of the tiger shark is coarse and gristly. A ton of shark yields about 180 lbs. of dehydrated meat.

EXTRACTION OF LIVER OIL.

While the hide is being stripped, the abdominal contents are exposed, the most conspicuous feature being the liver, which varies in size in the different species, but in all species is relatively very large. The liver of a thirteen-foot tiger shark which I saw captured and treated, measured seven feet long and weighed 200lbs. Shark livers are extremely rich in oil, and in some parts of the world sharks are captured for this product alone. The oil is extracted in a steam-jacketed kettle of fifty gallons capacity. The livers are placed in the kettle, steam from a boiler is continually circulated round them, and in a very short time the liver cells

break down and give up their oil. The types of liver oils vary in different species, and the quality is primarily dependent on the freshness of the livers. Stale livers yield the oil much more readily than fresh ones, but it deteriorates very rapidly, becoming darker and of unpleasant odour.

The proportion of oil to the weight of the liver varies very greatly with the species, and also with the age of the same species, the livers of large sharks yielding more oil than those of young ones. Yields computed from a large number of mixed sharks treated, including small ones, show that twenty-eight per cent. of the weight of the liver, or eighteen gallons to a ton of shark, is recovered as oil. The best oil-producer so far treated is the tiger shark. The thirteen-foot tiger shark previously mentioned yielded eighteen gallons of oil, or at the rate of forty gallons to the ton of shark.

USES OF LIVER OIL.

Shark liver oil is used for the currying of leather, the tempering of steel, and in soap-making. If extracted from perfectly fresh livers, it will probably be extensively used for medicinal purposes, for it is very rich in vitamins A and D, on which cod liver oil is principally dependent for its great therapeutic value.

FUTURE PROSPECTS OF THE INDUSTRY.

Until we know more about the habits and movements of sharks on the New South Wales coast, any venture which engages in their capture commercially must be prepared to face certain difficulties. The brief experience of the Port Stephens Company appears to indicate that catches of sharks are likely to be irregular, at least during some periods of the year. Careful consideration must therefore be given, before embarking on such an industry, to the question whether the profits which accrue from an intensive fishery during portion of the year will compensate for intervening slack periods. There may be a period of perhaps a week in which more sharks are caught than can be handled by the staff and plant; this may be followed by a week of poor catches, resulting in idle hands and gear. The sharks appear to migrate in

schools, and a fixed station cannot follow in their tracks.

Of course this company began at a time, during the winter, when it is known that sharks are not nearly so prevalent on our coast as during the warmer months of the year. During summer and autumn large numbers of sharks migrate northward in the wake of schools of Australian salmon (*Arripis trutta*) and sea mullet (*Mugil cephalus*), and at this period the catches should be consistently good.

Solution of such difficulties may be found in the establishment of a depot vessel capable of treating the sharks on board, the catches being supplied by smaller shark boats fishing in its vicinity. Then, should the sharks give out temporarily in one district, the vessel could proceed to other grounds, and, if the catches proved to be good, remain

there until the depletion of the supply necessitated a further change of ground.

The successful establishment of shark fisheries on the Australian coast is of very great economic importance, for not only is a resource being utilized which in the past has been entirely neglected, but sharks are amongst the greatest enemies our food fishes have to contend with. For generations we have been capturing large numbers of fishes for food and have allowed their greatest natural enemies to multiply with freedom. If that agent of destruction can be effectively checked, a greater supply of food fishes must become available to our commerce.

In concluding this brief sketch, I desire to tender my best thanks to Mr. G. R. Turner, Managing Director of Marine Industries, Ltd., Port Stephens, for placing every facility and the whole of the records of the company at my disposal during my investigations.

Notes and News.

Dr. H. L. Warner, of the Rockefeller Foundation, who has been engaged in research work among the aborigines of Northern Australia, has spent some time at the Museum studying the material culture of the Australian natives.

During November, Mr. T. C. Marshall, of the Queensland Museum, Brisbane, worked at the Museum, investigating methods of preparation and display.

Dr. F. X. Schaffer, Director of the Natural History Museum, and Professor of Geology at the University of Vienna, visited the Museum during October and inspected the collections. Arrangements have been made with him for an exchange of fossils and shells.

Mr. H. C. Stotesbury, who has proceeded to New Guinea to make surveys between the upper Fly River and the headwaters of the Sepik on behalf of the Commonwealth

Government and the Anglo-Persian Oil Company, hopes to secure some interesting zoological specimens for the Museum.

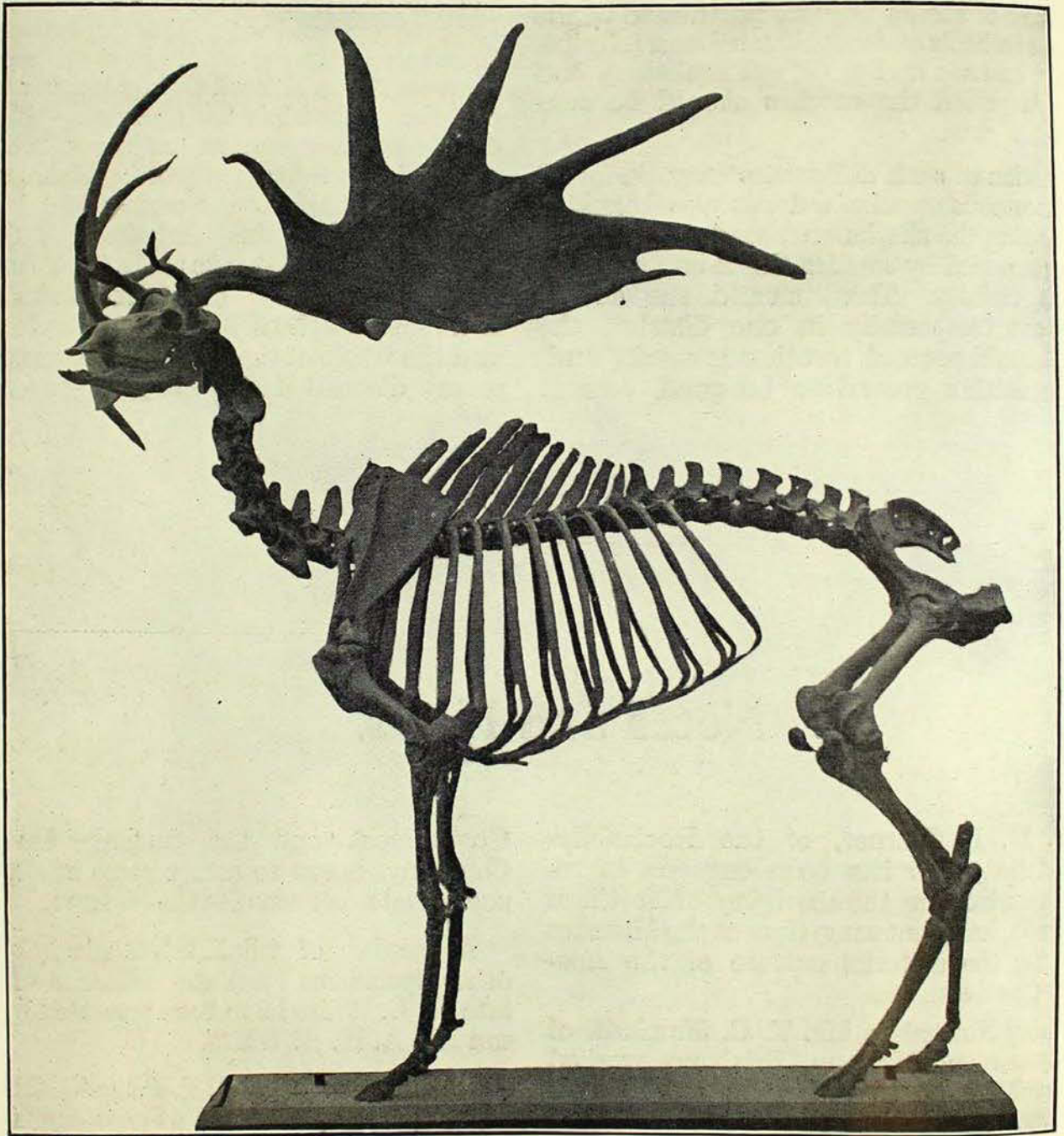
A number of valuable ethnological and other specimens from the collection of the late H. L. White have been presented by his son Mr. A. H. E. White.

From Commander H. T. Bennett, D.S.O., R.A.N., we have received a fine example of a dug-out canoe from Melville Island.

Mr. F. G. C. Tooke, economic entomologist, South Africa, who has been in Australia for the past eighteen months, searching for useful insect parasites, including the natural enemies of the Australian weevil *Gonipterus*, which has been introduced into South Africa and is destroying the eucalyptus trees established there, visited the Museum on his way back to the Union.

The Irish Deer.

BY C. ANDERSON, M.A., D.Sc.



Skeleton of the Irish Deer. This was the largest of the deer family. Its antlers sometimes measured over eleven feet from tip to tip. From a specimen in the Australian Museum.

[Photo.—H. Barnes.]

VISITORS to the Museum have seen and no doubt admired the mounted skeleton of a deer which occupies a case near where the osteological room is entered from the main hall. It will be noticed also that this skeleton contrasts with those

around it in the dark brown colour of its bones, the result of long interment beneath the peaty substance of an Irish bog, for this is a specimen of the celebrated Irish Deer (*Megaceros hibernicus*) a name which means Irish Big Horn.

The Irish Deer was once abundant in Europe, but it became extinct during the glacial epoch, when several large mammals, such as the mammoth, the Woolly Rhinoceros the Cave Bear, and others passed away. Apparently the *Megaceros* lingered on in Ireland long after it had disappeared from the continent and Great Britain.

The first description of this magnificent animal, the largest of the deer family, was written in 1697, when Dr. Molyneux contributed a paper on it to the *Philosophical Transactions of the Royal Society of London*. This author regarded the Irish Deer as identical with the American Moose, which, however, is an entirely distinct animal; the nearest living relative of *Megaceros* is apparently the Fallow Deer.

The Irish Deer surpassed the largest wapiti or elk in size, and particularly in the dimensions of its antlers, which may measure over eleven feet in a straight line from tip to tip and weigh as much as eighty pounds. They are remarkable for the flattened (palmate) expansion into a subtriangular plate, a feature which is slightly developed in the Fallow Deer. In our specimen the spread from tip to tip is nine feet, and the antlers with the skull, which is relatively small, weigh eighty pounds.

In *Megaceros* the antlers spring from a cylindrical prominence on the top of the skull, and the base of each antler is encircled by a ridge or ring of bone called the "burr." Just above this ring there is a descending brow tine, flattened and usually forked. The beam is cylindrical for some distance, then it expands, and from its front edge comes off a branch called the bez tine, and nearly opposite to it is a back tine. Above these tines the antlers expand into the massive palm, which is convex downwards and outwards and sweeps upwards in a graceful curve, terminating in a number of "snags," five in the Australian Museum specimen, though sometimes as many as seven are developed.

In the Irish Deer antlers were present only in the male and, as in its existing relatives, these were shed annually. In the deer family, when the antlers have been recently shed, the bony base becomes invested with soft skin covered with a fine down, whence it is known as the "velvet." By the deposition of bony tissue small knobs commence to grow on the bases. These increase rapidly in size, branch and finally assume the form of the complete antlers, which are at first covered with "velvet." When growth is completed a bony ring, the burr, forms at the base of each antler and, pressing on the blood vessels which supply the velvet, causes them to dry up. The velvet then dies and is removed by friction against trees or other objects. Thus the antlers of deer are so much dead bone, unlike the horns of cattle and other hollow-horned ruminants, which consist of a permanent living bony core covered with a horny integument. After the pairing season the living bone below the burr is absorbed, and the antlers are shed, to be grown again next year. On account of their great size and weight the seasonal renewal of its antlers must have made considerable demands on the vitality and recuperative powers of the Irish Deer.

To support its massive antlers the Irish Deer was provided with a thick, strong neck, as indicated by the large vertebrae, to which powerful muscles were attached. Its limbs too were more massive in proportion than those of any of its relatives, and a full-grown stag might be six feet in height at the withers.

It is evident that *Megaceros* was older than the peat bogs, for it is in the marl underneath the peat that its bones have been found. It is probable, however, that it lived on into the human period, for its remains have been found in association with stone implements. The fact that Caesar and Tacitus make no mention of this remarkable animal indicates that it had become extinct before their time.

Peeps into Sea-bird Home Life.

BY P. A. GILBERT.

BIRDS that frequent the sea are widely diverse in form and habits. Our term sea-birds is a kind of *omnium gatherum*, for it is loosely applied to all forms that depend on the sea for food. It includes the



Young of the Roseate Tern hiding in herbage, Wilson Islet, Capricorn Group, Queensland.

[Photo.—P. A. Gilbert.]

penguin, which passes much of its time under water, the sea-eagle, that soars high in the sky, the frigate-bird, which sweeps to and fro with blustering speed; the silver gull, the petrel, and the tern, which patrol the surface of the emerald waters, or the reef heron, that patiently searches the shallows.

Many sea-birds assemble in small parties or vast communities to breed. These generally select a small cay, islet, or an island of fair dimensions on which to congregate. The waters about these nesting sites are usually teeming with fish and other small animals, which constitute the most suitable food for their myriads of downy young. Moreover, the adult birds are moderately free from serious enemies, the greatest stress and strife being among themselves. Further, the sea-bird system of breeding in close formation in rookeries, or colonies, seems more favourable to the species than the single nesting method, say, of many passerines, which breed in isolated seclusion.

While we are having peeps into the cradle days of sea-birds it will be worth while to compare them with those of passerine or perching birds, and note some of the differences. When the passerine young emerge from their shells they are blind, helpless, and mostly naked. They are nurtured in elaborately constructed nests, to which they are confined until properly fledged. This highly specialised babyhood has prompted students to place the passerines at the top of the tree in bird development. Numerous sea-bird young, however, step into the world arrayed in a garment of down, their eyes are open, and they walk almost as soon as hatched. These primitive traits have induced ornithologists to place them low down in the scale of bird life, as these peculiarities approximate the developmental characters of reptiles, whence birds have seemingly originated. Neverthe-



Young of the White-Capped Noddy in nest. North West Island, Capricorn Group, Queensland.

[Photo.—P. A. Gilbert.]



The Silver Gull. Two newly hatched young and an egg, chipping, North West Island, Capricorn Group, Queensland.

[Photo.—P. A. Gilbert.]

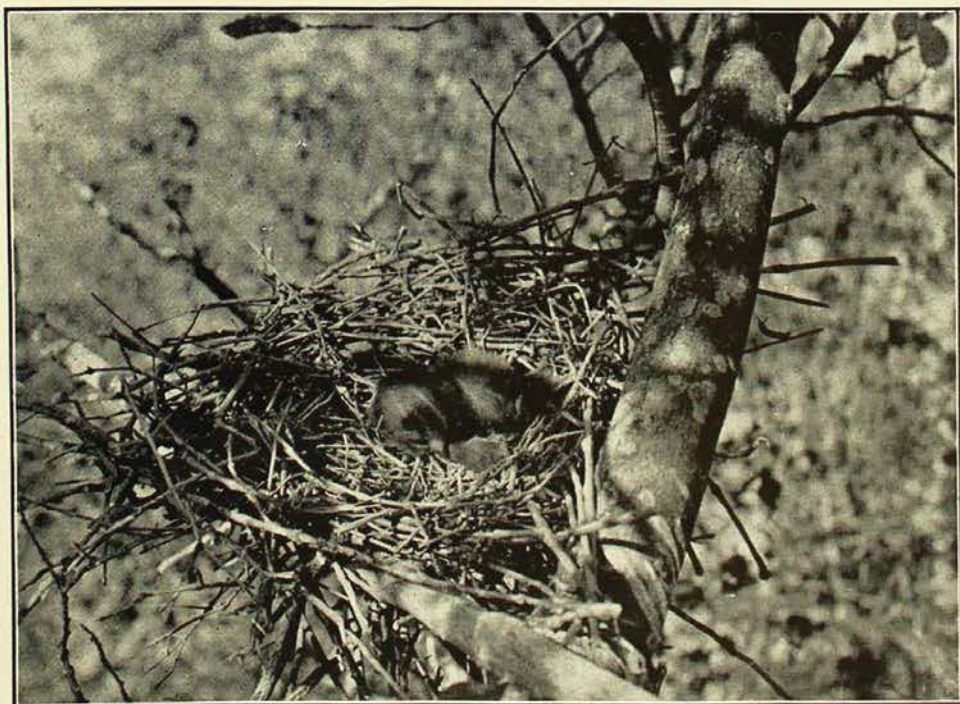
less, it is well not to dogmatise on these points as there is yet a good deal to learn about the descent and relationship of birds.

The Roseate Tern places its nest under a small shrub, near large coral stones, in clumps of creepers on the ground, or on coarse coral gravel in the open. It is merely a depression wherein two heavily blotched eggs are usually laid. The young of the Roseate Tern vary in colour from a spotless creamy white to a dull brown, mottled and streaked with darker markings. The picture of the young Roseate Tern was taken on Wilson Islet, Capricorn Group, Queensland, where a large colony of this species had its most southern breeding haunt, this species being more frequently met with farther north.

The young White-capped Noddy is an intensely charming nestling. This perky ball of fluff had the boldness, when only a day old, to stand up in its nest, open its little bill and peck viciously, at the same time striking with its two small stumpy wing-arms in defence of self and home. The

young, too, have the peculiar habit of disgorging their food when molested. Although clothed in silky down the young Noddy is similar in colour to its parents, the crown of the head being white, while the rest of the body is black. The White-capped Noddy is more advanced in the art of home construction than the Roseate Tern. The nest is usually built in a tree, from a few feet up to thirty or more from the ground; over a hundred nests are sometimes built in the same tree. The structure is roughly composed of leaves, a hollow being made which is just sufficient to prevent the one egg laid from rolling to the ground. The homeland of the baby shown was North-west Islet, Capricorn Group, where an extensive colony of this species occupied nearly every available tree.

Now glance at the two newly hatched Silver Gulls and see how their speckled coats of down match their retreat. Barely a day old, these handsome little fellows were able to walk nimbly, and could see exceptionally well. Soon after they were photographed they crept from their nest into the thick grass for protection. Note the egg being chipped by a belated youngster. The nest of the Silver Gull is placed on the ground near a tussock of grass, under a shrub, or at the foot of a small tree; on North-west



Two grey young Reef Herons. North West Island, Capricorn Group, Queensland.

[Photo.—P. A. Gilbert.]

Islet all these sites were chosen. On the outlying islands near Wollongong they are frequently placed among stones, or in scantily built nests placed on rocks. Three eggs is the usual number deposited for a sitting, sometimes only two, and rarely four, five, or six. The common type is pale green, spotted and blotched with dull grey and brown markings.

The quaintness of young Reef Herons is difficult to surpass. The picture shows two which had just burst their shells. Both were clothed with black down on their backs and white on the abdomen. Their eyes were open and both were able to squeak as soon as hatched. Fifteen minutes after hatching the young opened their mouths in expectation of food. Their nest was a durable structure composed of fig sticks, culms of grass, and lengths of convolvulus vine, and placed in a tree ten feet from the ground. The mother bird was pure white, the father a dark slate colour. Two and three eggs are laid by this species. Another picture shows a bird of a white pair attending



Reef Herons approaching nest with young. North West Island, Capricorn Group, Queensland.

[Photo.—P. A. Gilbert.]

to two white young standing in their nest under cover of foliage. The feet of these young herons were greenish-yellow with black nails. The tree that contained the nest was overgrown with *Cassytha* vines which formed a loose carpet on top and hung about the tree like a thin veil. The young enjoyed the freedom which this growth afforded, running over the carpet with the greatest ease. Here they usually watched for the coming of their parents. Instantly the parent bird alighted on the stick near the nest the agile young slid into the nest to receive their meal.

Through the courtesy of Mr. E. A. Briggs, M.Sc., Zoology Department, the University a fine film, taken by himself, and illustrating the making and use of fishing nets by the natives of New Guinea, was shown on October 27. On November 10th, by permission of Mr. R. T. Littlejohns, his wonderfully successful series of pictures of the lyre bird, taken in the gullies of the Dandenong ranges, was screened at a Museum lecture. Under the auspices of the Ornithological Section of the Royal Zoological Society of New South Wales, a "film night" was held in the lecture hall, on Thursday, December 8. On this occasion, in addition to Mr. Littlejohn's

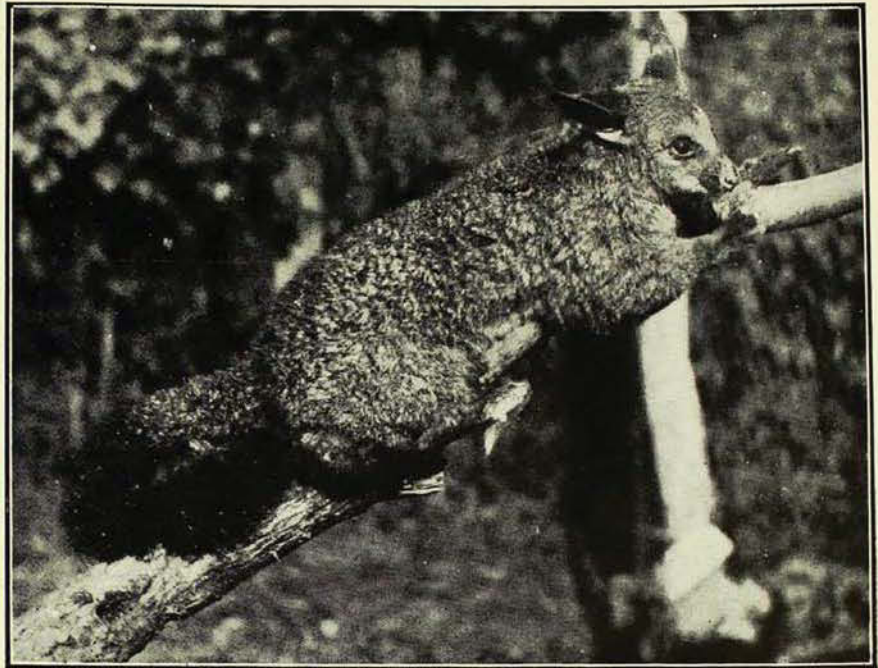
pictures, a number of views by Mr. J. S. P. Ramsay, showing a female lyre bird at its nest in French's Forest, was screened. More of Mr. Ramsay's excellent cinematograph work was shown at the same time, illustrating the home life of the platypus. This film, taken on the Namoi River, near Manilla, was made in co-operation with Mr. Harry Burrell, and shows the burrow, the nest, eggs and young, as well as the adult platypus, both on land and in the water. The evening's entertainment also included two interesting films of the bird and fish life of Lord Howe Island, taken by the late Allan R. McCulloch, of the Museum Staff.

Some Dwellers of the Bush.

By H. C. BARRY.

WAHROONGA, a suburb of Sydney and situated on the outskirts of Kuringai Chase, has retained much of its sylvan charm despite the advance of settlement. Stretches of untouched bushland extend to the coast, picturesque gullies debouch into Cowan Creek and other branches of the Hawkesbury River, and on the ridges, by way of variation, one finds heath lands. In the treatment of their home surroundings many of the residents, in retaining bush trees, have preserved the native beauty. Thus placed it is little wonder that the district has become a favoured sanctuary for our bush creatures.

These observations are confined to our native furred animals, or mammals. Yet the district is rich in bird life, for I have listed over one hundred species in the past six or seven years.

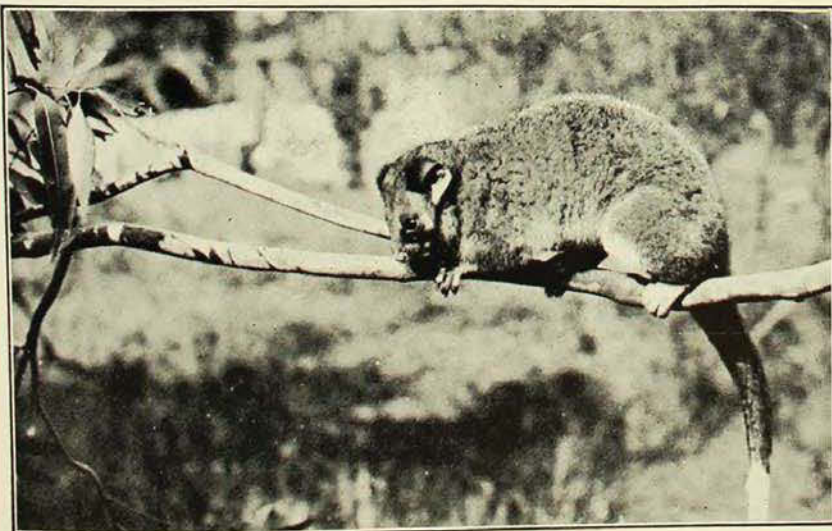


The Common Grey Opossum (*Trichosurus vulpecula*).

[Photo.—H. C. Barry.]

OPOSSUMS.

One of the commonest of our wild marsupials, and possibly the best known is the common Grey Opossum (*Trichosurus vulpecula*), and it is not unusual when coming home in the evening to see one or two sitting on a fence post. Many houses have them living under their roofs. Generally the first notice the occupant receives is in the still small hours when all is quiet save for the heavy footfall as they leap the ceiling joists, a notice which causes consternation in the household. They are easily caught in box traps, set at the foot of gums where a number of scratches on the trunk indicates that it is a favoured resort. Being nocturnal they do not make attractive pets; moreover they are protected, though occasion-



The Ring-tailed Opossum (*Pseudochirus laniginosus*).

[Photo.—H. C. Barry.]



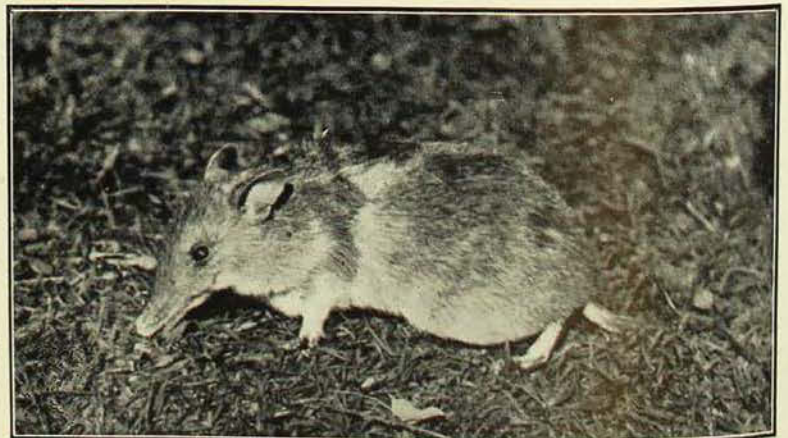
The Pigmy Flying Opossum (*Acrobates pygmaeus*).
[Photo—H. C. Barry.]

ally an open season is declared in particular districts. Apart from the illegality of trapping, there is a moral aspect. Our fauna is unique, it is the most interesting in the world, and it is our duty to assist in preserving it. It is far better to study our animals in the wild than in captivity. I remember catching a mother and a large young one in two separate traps set at the foot of a tree. When liberated the young one jumped on to his mother's back and she cantered away with her passenger to the nearest telegraph post. In the bush they make their homes in hollow trees, and these may be detected by the worn appearance of the trunk. They seem to feed not infrequently upon the ground, but are ever ready to scramble up the nearest tree at the first sign of danger. In climbing they go forward with a series of jumps, keeping the two paws wide apart, and in

this respect they are not nearly so agile as the pretty little Ring-tailed Opossum (*Pseudochirus laniginosus*).

Ring-tails were formerly very common here and were occasionally seen about residences during the evenings. Nowadays they are rarely observed close to the town, and have to be looked for along the creeks, or amongst the saplings further out. They are readily distinguished from the Greys by their smaller and lighter forms and the white tips to their long tails. They build large bark and stick nests, with a side entrance, about the size of a round football. They are timid and extremely nimble, swinging by their tails from branch to branch, a means also adopted when feeding amongst the twigs. Often I have found new nests unoccupied, whilst very old ones housed a mother and her young. Apparently they build several so as to deceive the spoiler, like the Babblers, a bird so familiar in our inland towns. Usually two

young are born in the winter months, and, like all marsupials, these are very immature and it is some months before they are coated with fur and assume a resemblance to their parents. They live in the nest with their mother until almost full grown, going out with her at night to feed among the leaves close by, and sleeping and drowsing during the day.



The Long-nosed Bandicoot (*Perameles nasuta*).
[Photo—H. C. Barry.]

" FLYING " MARSUPIALS.

The large Flying Phalanger (*Petauroides volans*) is usually found away from settlement. Its fur is soft and silky and the colours range from creamy white to grey or black; in the Australian Museum may be seen a number of examples showing this range. Between the fore and hind-limbs there is a fold of skin which serves as a parachute and enables the creatures to glide, or, to use an aeronautical term, volplane. Thus, to an extent, their name is misleading. Then there are the smaller Flying Phalangers (*Petaurus sciureus* and *P. breviceps*). These are grey and white in colour. The large variety I met recently whilst camping on the coast; their loud screams make sleep difficult, and one night one landed with a "flop" on the butt of a tree a couple of yards away from the tent.

The Pigmy Flying Opossum, or Feather-tailed Mouse (*Acrobates pygmaeus*), the smallest of the marsupial gliders, is a dainty little creature about the size of a mouse. Like the Flying Phalangers, it has a loose fold of skin extending from the fore to the hind-limbs which enables it to glide, and a long feather-like tail assists it in steering in its long gliding leaps. It constructs its nest in a hole in the trunk of a tree at a distance ranging from two to fifty feet from the ground. These nests are often made of gum leaves, with a cunningly arranged curtain of leaves which can be pulled together after the small occupants enter. Their food, so far as is known, consists mainly of insects. Upon one occasion I found one sitting on the stump of a tree that had been recently felled; possibly it contained the hollow in which it had its nest.

BANDICOOTS.

The Long-nosed Bandicoot, which is very common, is rarely seen by the ordinary observer. In many gardens, and other thickly covered places, their little scratchings may be seen. When startled they generally make for a hollow log, often partially buried.

Like other bandicoots, their food, in the main, consists of roots and tubers, though they are by no means averse to grain. Their fur is coarse and bristly, hence it is in no demand. This species has a very long pointed snout and long ears, unlike the Short-nosed Bandicoot (*Isodon obesulus*), which is found along the coast and has a greater geographical range, though I have not seen it in this district. Bandicoots are nervous and timid animals, yet, owing to their secluded ways, they seem to be holding their own despite advancing settlement.

OTHER MARSUPIALS.

In the rock-shelters, weathered in the sandstone, along the sides of the gullies the Yellow-footed Pouched Mice (*Phascogale flavipes*) make their homes, and their foot-marks may be seen in the soft sand. The nest is a domed structure composed almost entirely of gum leaves and usually well hidden in some crevice. They are nocturnal and, therefore, the only way to see them is to find some nest in occupation. Their food consists mainly of insects.

The Scrub Wallaby (*Macropus ualabatus*) is found in Kuringai Chase, where one also hears of the Brush-tailed Rock Wallaby (*Petrogale penicillata*) being seen. Both are scarce, and, despite protective laws, shooters, foxes and hounds leave little chance of survival, and make the remaining few extremely timid. Native Bears were also common here years ago, but now, as in most places in New South Wales, they are rarely seen.

Only once have I heard of an Echidna, or Spiny Ant-eater, being found at Wahroonga. Probably the ground is too stony for them to burrow in, yet there may be more in the huge expanse of Kuringai Chase, for their silent and unobtrusive ways do not bring them under notice. Other representatives of our wonderful native fauna in all likelihood may dwell here also, but I have restricted myself to those creatures which have come under my own observation.

Amber.

BY EUGEN NEUMANN, M.D.

FEW substances have been longer in use for ornamental purposes than amber.

Carved amber objects have been found amongst the relics of the earliest peoples, such as the Swiss lake-dwellers and the Ancient Egyptians. The Phoenicians are credited with having brought it from the shores of the Baltic to the Mediterranean, and amber beads were found in the royal tombs of Mycene and in Etruscan ruins. That it was well known to the Greeks is



Amber, with impression or mould of insect. From a specimen in the Australian Museum.

[Photo.—G. C. Clutton.]

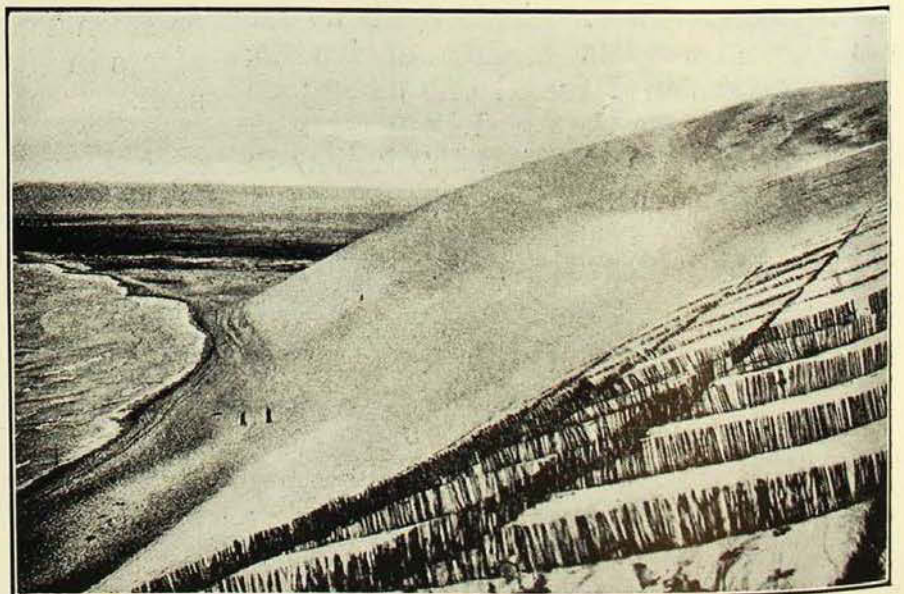
proved by their use of the word *elektron*, meaning amber, from which our word electricity is derived. It was one of the lures which led the Romans to invade the Gallic territory west and north of the Mediterranean, and the Roman writer Pliny says that "it had been so highly valued as an object of luxury that a very diminutive human effigy made of amber had been known to sell at a higher price than living men, even in stout and vigorous health."

An elaborate Grecian myth accounts for the origin of amber in this wise. Phaethon, son of Helios, the sun-god, attempted to

drive the chariot of his father, but he lost control of his steeds, and, approaching too near to the earth, set it on fire. Jupiter then struck down Phaethon with a thunderbolt and he fell dead into the Eridanus. His sisters, the Heliades, who had harnessed the horses, were changed into poplars, and their tears into amber.

In Homer's *Odyssey* Penelope received the gift of an amber necklace from one of her admirers, and the lively Roman poet Martial compares the fragrance of amber to the fragrance of a kiss. Of more modern poets both Milton and Shakespere make mention of amber.

Considering the wonderful colour scheme which golden or yellow amber presents, the hues varying with the direction and intensity of the sun's rays, and that it is easily shaped into rounded or faceted beads for brooches, necklaces, bracelets, earrings, or pins, a combination of clear and cloudy amber, or of amber with silver and gold, proving very effective for trinkets, one would imagine that it would have made a permanently



The Kurische Nehrung, with a gigantic dune; in the foreground "breaks" have been constructed to retard the advance of the encroaching sand.

strong appeal to the fair sex, and would not be so very subject to the moods of fashion. Besides, there was never the stigma of bad luck attached to it, as sometimes to pearls or opal till the "lucky black opal" came to the fore. Yet only in the manufacture of pipes, cigar and cigarette holders, often in combination with meerschaum, or as mouthpieces for chibouques or nargilehs,

to the palaeontologist as a conserving medium.

Amber is readily inflammable and burns with a bright flame and balsamic smell; the German name *bernstein* (from *brennen*, to burn), is derived from this quality. The specific gravity is a little higher than that of water, in which therefore it will sink. It is just too hard to be scratched by a finger nail, but it may be readily cut with a knife. It polishes well, and with wear it assumes a darker colour, which is rather prized, and, unlike the pearl, it does not lose its lustre.

It is well known, of course, that when amber is rubbed with cloth it becomes charged with negative electricity and will attract paper, wood, and other material. Its chemical composition is variable, as is usual with amorphous substances; it consists of succinic acid, a volatile oil, and several resins soluble in alcohol, the insoluble residue resembling bitumen.



An old cemetery on the Kurische Nehrung which has been overwhelmed by blown sand and again laid bare by a storm.

oriental tobacco pipes in which the smoke is passed through water, has amber always held its own.

It derives its name from the Arabic *ambar* or *anbar*. The French call it *ambre*, and the phrase, "fin comme l'ambre," means "as sharp as a needle," or a "shrewd fellow."

ORIGIN AND PROPERTIES.

Amber, an exudation from long extinct coniferous trees, is a brittle, resinous, amorphous substance, usually in the shape of drops or globular masses of yellow, brown, or reddish colour, transparent or cloudy, the latter sometimes more highly in favour. The biggest nugget ever found weighs about twenty-one pounds, and is preserved in the Natural History Museum in Berlin. Amber betrays its origin as resin by the impressions or moulds of insects, leaves, and blossoms, which were enveloped by the exudation before it hardened. Thus we learn something regarding the primeval fauna and flora, and, like the Siberian ice, with its enclosed carcasses of mammoths, amber is important

THE HOME OF AMBER.

The Baltic seaboard, from Danzig to Memel, has always been the principal source of amber. Here where now roll the waves, there stood in the older Tertiary period, namely the Oligocene, big pine forests. The chief amber-producing trees seem to have been *Pinus strobooides* and *Pinus succinifer*, which were much more resinous than their modern relatives. Amber is also encountered in the brown-coal strata and the Post Tertiary diluvium. After storms small pieces are frequently thrown ashore, entangled in sea weed, and are sometimes found on the coasts of Norway, Sweden and Denmark, and even on the south coasts of England.

From the earliest historical times pieces of amber have been cast up on the north Prussian coastline, and their collection and sale is a very ancient industry. At the beginning of this century two bridges were excavated in swampy ground a little eastward of the river Vistula, not far from the

coast. These are attributed to the Romans of the first century A.D. and seem to indicate the former existence of an ancient amber trade road. They are both very solidly constructed, the longer having a thickness of nearly thirty-nine inches in the centre, and consisting of six layers of oaken planks.

The coast of Samland, a squarish peninsula with two lagoons, the "Frisches Haff" and "Kurisches Haff," produces a material distinguished by its golden colour and translucency. The strips of land separating the lagoons from the sea are called "Nehrung" and the Kurische Nehrung, adjoining the republic of Lithuania, is of special ethnological and ornithological interest. Here, too, the elk, the same animal which in America is called the moose, may occasionally be seen, and the strange phenomenon of "Wanderduenen" (shifting sand dunes) may be observed.

SHIFTING SANDS.

These are formed by the westerly winds, which destroy the weaker vegetation by the constant impact of sand grains. The loose sand is then carried onwards, burying forests and villages in its path. These sand dunes accumulate up to heights of about 400 feet, and advance inland at a rate of twenty feet per year. If not blocked in its progress the sand falls into the Haff, the steep, towering dunes sometimes leaving room for only a very small path on the edge of the lagoon. Buried villages are again uncovered as the dunes progress eastward, and old cemeteries are laid bare, as at the "Pestkirchhof" Nidden, where plague raged in 1708 after the lapse of two centuries, and at Pillkopen, where crosses now buried were still visible in 1897. To prevent further inroads of the dreaded sand a great and expensive afforestation scheme has been carried out close to the shores of the sea and lagoon, the village of Pillkopen having thus been saved from burial.

The solitude, bleakness, and desolation of the *Wanderduenen* is awe-inspiring, and the colour effects are marvellous, Humboldt comparing them to those observed in the landscape of the Nile.

It was the Kurische Nehrung that Queen Louise of Prussia had to cross, during the severe winter of 1806, on her flight to Memel, after her country's defeat by Napoleon.

WINNING OF AMBER.

The right to the exploitation of amber is a monopoly of the Prussian Government, which used to lease it for a period of years. Sometime after the middle of last century a solicitor in a little town of East Prussia was approached by a rather shabby individual, who informed him that he was applying for the license, and offered, if his application were successful, to take him into partnership for the payment of a comparatively small amount. The professional man, however, promptly turned him out, but lived to regret this, for the applicant, joined by a skipper (bought out by him later) secured the lease, and became a very wealthy man, gradually increasing his annual rent to the Government from a few hundred pounds to some hundreds of thousands.

Amber was first obtained almost exclusively by dredging, a whole flotilla of steam dredges working near the coast of Samland and in the Kurisches Haff, but the lessee later acquired extensive territory close to the shore, and shafts were sunk as in ordinary mining operations, the "blue earth" being particularly rich. The mine is situated at Palmicken and in close proximity is Kraxteppelin, once a poor fishing village, which developed into a considerable township accommodating some thousands of amber miners.

In 1899 the Government redeemed the lease by payment of £500,000, acquiring all property and workings, and took the whole concern into its own management. People were now allowed to gather small pieces of amber cast ashore by storms, a privilege hitherto denied them, but these had to be delivered to the authorities at the current market price. At Königsberg, the capital of the province and the seat of a university, the Government established works where amber was assorted into nearly two hundred grades and prepared for further treatment. Chips were fused under high pressure into compact pieces in the "ambroid" or "Pressbernstein" factory, or used in the production of a great variety of varnishes, with succinic acid and oil as by-products. The University Museum contains about two thousand specimens of amber with various animal and vegetable remains embedded, besides a collection of models illustrating the occurrence of amber and its contained fossils, and of resins resembling amber.

One Hundred Years!

THE year just closed marked the centenary of The Australian Museum, and to commemorate the event a bronze tablet was unveiled on December 19th by the Hon. T. R. Bavin, K.C., M.L.A., Premier, before a

Mr. Bavin, in his speech, referred to the important part played by the Museum in the State's life and said that the obligation of the State towards the institution was not being adequately met. This responsibility was



Bronze Tablet commemorating The Australian Museum's Centenary.

[Photo—Courtesy of Sydney Daily Telegraph Pictorial.]

gathering including representatives of scientific bodies and a number of prominent citizens.

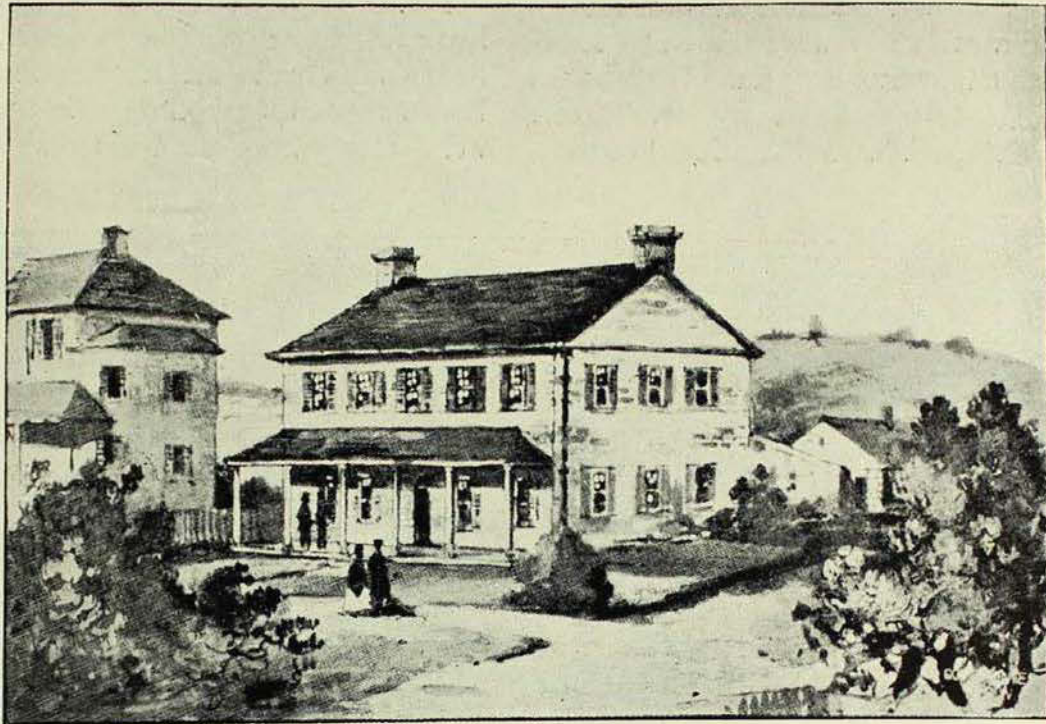
Mr. Bavin was presented with a war boomerang, suitably inscribed, and Mrs. Bavin was given a basket of flowers. In making the presentation, Sir Charles Rosenthal, K.C.B., C.M.G., President of the Board of Trustees, deplored the lack of funds which prevented the Institution's expansion, and the consequent congestion, to which reference has been made so many times in this MAGAZINE. Preliminary plans have been prepared for extensions to the William Street facade, and it was hoped that the Government would make available a sum of £30,000, spread over a period of, say, three years.

realised, and the Government would do its best in the new financial year, to meet that obligation. In the hundred years just passed, the State had made a wonderful progress, a development in which the Australian Museum had taken a prominent part. Perhaps the Museum was regarded as a haven of shelter to which they could send children on wet Saturdays and holidays, yet though it would afford them an excellent educational entertainment, it did far more than that, for a Museum was a fortress of scientific and cultural knowledge.

Associated with its history were the names of all men who had taken the lead in the scientific development of the State. Its trained and competent staff was always

ready to answer questions and make investigations helpful to the economic life of the community, and performed an invaluable service in the combating of disease. It served to inspire and encourage those who

Survey Trip with H.M.A.S. 'Geranium.' The picture showed a phase of the navy's work little known to the public. The officers and crew were shown at work along the coral reefs and amongst the aborigines of Melville



The Residence of Chief Justice Forbes, in which the Museum was housed from 1836 to 1840.

[After Bladen—*Public Library of New South Wales, Historical Notes*, 1906.]

were trying to raise the standard of scientific knowledge throughout the State. It deserved the support of the Government, and of such members of the public as could afford to help. He would strongly urge upon the public that it should realise the benefit that this institution was conferring upon the State, and endeavour to meet its claims. In conclusion, Mr. Bavin congratulated the trustees and staff on the very competent and efficient service they were performing.

A vote of thanks to the Premier was moved by Dr. Anderson (Director) and supported by a former President Dr. T. Storie Dixon.

In the evening a large audience witnessed the screening of the film taken by Commander H. T. Bennett, D.S.O., R.A.N., "On a

Island in the Gulf of Carpentaria. Other things shown by the film were the bird-life on the various islands visited, the shooting of crocodiles in the rivers of North Australia. Commander Bennett described the scenes and incidents in a racy and entertaining manner.

Though 1827 has been accepted as the year of the Museum's birth, since Earl Bathurst in a despatch to Governor Darling approved the expenditure of not more than £200 annually to assist in the development of a "Publick Museum," there is evidence that a Museum was in existence in Sydney prior to 1825. The Australian Museum has had many homes, its collections having migrated from point to point till they were domiciled where they now repose in 1849.

The Late W. E. J. Paradise and The Australian Museum.

BY G. P. WHITLEY.

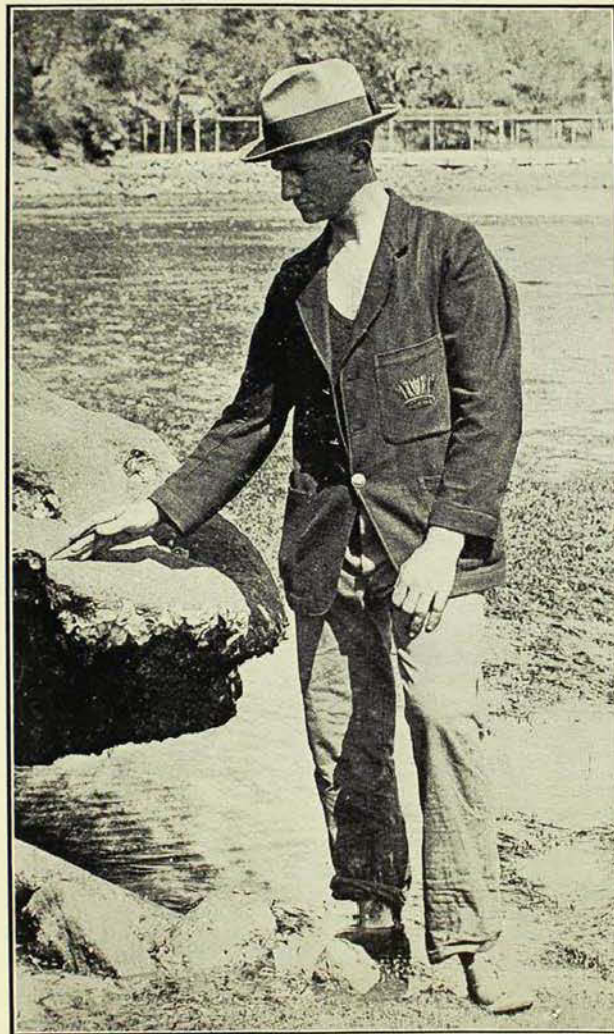
For man also knoweth not his time: as the fishes that are taken in an evil net, and as the birds that are caught in the snare; so are the sons of men snared in an evil time, when it falleth suddenly upon them.—*Ecclesiastes*.

AMONG the victims of the terrible tragedy which occurred in Sydney Harbour on November 3rd, 1927, when the steamer *Tahiti* struck and sank the ferry *Greycliffe*, was Surgeon Lieutenant-Commander W. E. J. Paradise, M.B., Ch.M., R.A.N., an Honorary Correspondent of The Australian Museum. This enthusiastic naturalist had for several years been associated with Museum officers in their scientific work and had been regarded by them almost as one of the staff. His unassuming disposition and steadfast friendship endeared him to them all, whilst his capability and willingness to perform zoological work was widely recognised.

William Edward John Paradise was born in Sydney in 1897. After a promising school career, during which he distinguished himself in sport and showed a strong liking for nature study, Paradise studied medicine at the University of Sydney and graduated in 1920. Next year, he entered the Royal Australian Navy as a Surgeon-Lieutenant, and was attached to H.M.A.S. *Geranium* in 1923 and 1924, when, under Commander H. T. Bennett, D.S.O., R.A.N., she carried out survey work in Queensland and the Northern Territory.

There he was able to indulge to the full his bent for natural history and made large collections of marine animals for The Australian Museum. Most of his collections yet remain to be classified, and the research work thereby involved will probably take several years. Nevertheless, some groups of animals have already been dealt with in recent publications of the Queensland and Australian Museums and the Royal Zoological Society of New South Wales, and a fine sea snake was described in the *Proceedings of the Zoological Society of London*, 1926. Dr. Paradise, with characteristic versatility, himself contributed several papers on medical and zoological subjects, a list of which appears in the current number of the *Australian Zoologist*.

Dr. Paradise was an active member of the Great Barrier Reef Investigation Committee and wrote an important paper on the coral reefs of the Outer Barrier. In recognition of his valuable work, he was promoted to the rank of Surgeon Lieutenant-Commander in August, 1926. In that year, too, he made a hydrographic survey of the mud-flats of Gunnamatta Bay, Port Hacking, a rich collecting ground for marine invertebrates. This work,



The Late W. E. J. Paradise.

[Photo—A. Musgrave

which forms a basis for the future study of the ecology of that interesting locality, was carried out in collaboration with Australian Museum zoologists, who then found Dr. Paradise not only a charming camp companion, but an excellent cook as well. The accompanying picture shows him in working attire, pointing to a rock which served as a survey base at Gunnamatta on that occasion.

Dr. Paradise was President of the Microscopical Society of New South Wales, and a Councillor of the Royal Zoological Society, of whose Marine Zoological Section he was first Secretary and later Vice-President.

Just before his death, Dr. Paradise had been working out the life histories of the commoner fishes of Port Jackson. He was always ready to accommodate students of

marine life in his little boat for a collecting trip on the harbour, when he would dredge or net specimens for them, and go to any trouble to fulfil their wants.

A baby son and widow, to whom heartfelt sympathies are extended, are left to mourn the loss of Surgeon Lieutenant-Commander Paradise, whilst his many friends in naval and scientific circles sadly miss the company of one who was plainly on the threshold of an unusually brilliant career.

His remains were interred with full Naval honours and in the presence of his scientific friends, in South Head Cemetery, overlooking the harbour whose natural history he had studied so assiduously and in whose placid waters he had met his most untimely fate.

The session of lectures conducted during the year just closed, and to which reference has been made from time to time, has been a successful one. There were seventeen evening lectures and these were attended by approximately 4,500. These figures would have been exceeded had our theatre been larger for it was necessary to repeat a number of the lectures. We have previously mentioned the inadequate accommodation of this theatre—which was constructed at a time when Sydney's population was much smaller, and consequently audiences also—and its hampering effect upon an important phase of our work. Other than this series there have been lectures to the inmates of the New South Wales Deaf, Dumb, and Blind Institution. These are necessarily delivered to limited classes, since each member has to handle the object discussed and learn its form by gliding the hands over it. In all, eight lectures were delivered to 116.

In addition to these there have been lectures to pupils of the State schools, the Sydney High School, to inmates of the New South Wales Deaf, Dumb and Blind Institution and to others, the total attendance to all Museum lectures amounting to 10,600.

On September 29th the President of the Board of Trustees, Sir Charles Rosenthal, K.C.B., C.M.G., lectured upon his journey through the Mediterranean countries and the Balkans. Amongst other places the lecturer discoursed upon the Trentino country, the Asiago Plateau, Roumanian oilfields, and Gallipoli, and described the characteristics of the people who inhabit these regions.

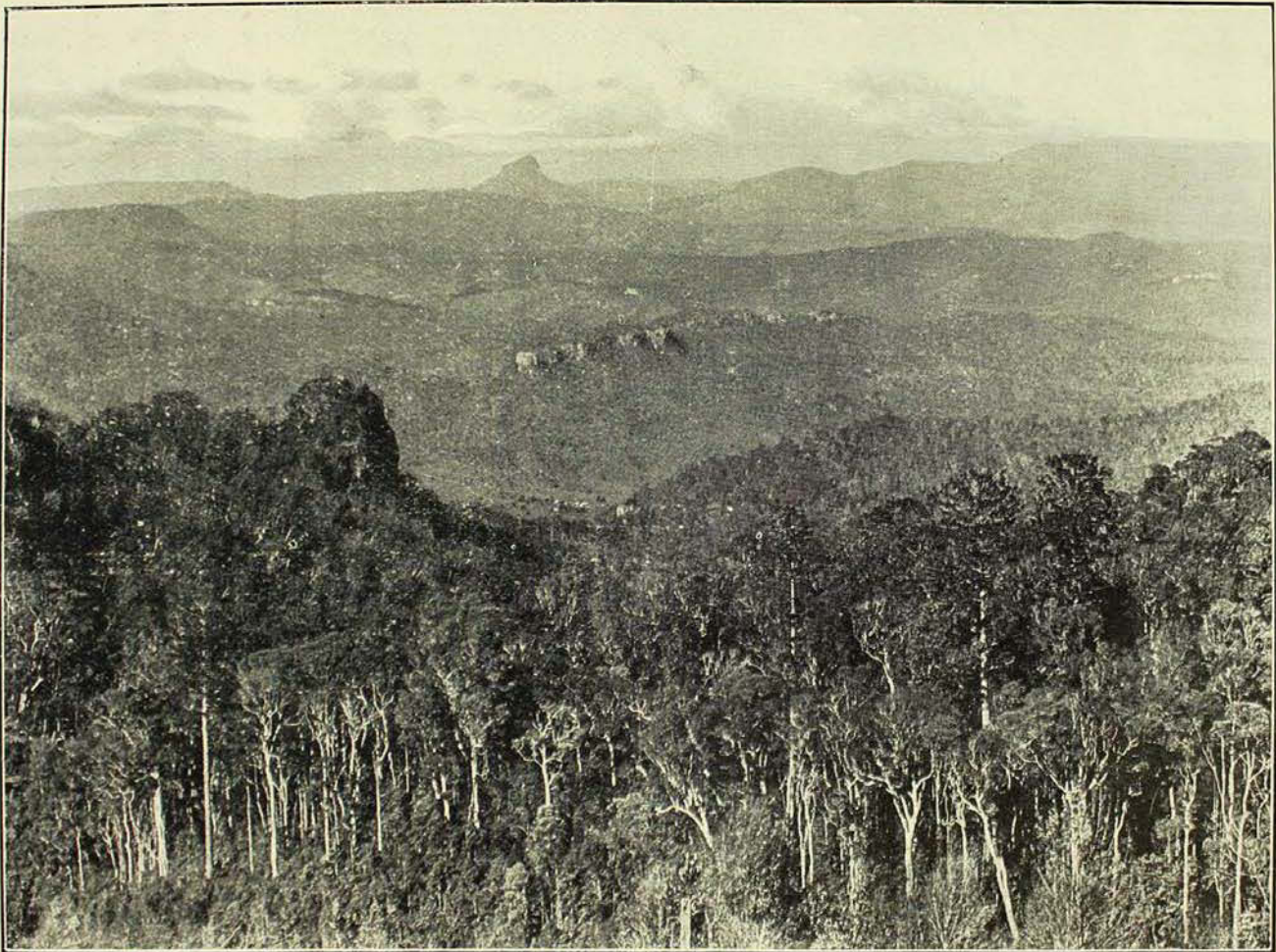
At the Hobart conference of the Australasian Association for the Advancement of Science, to be held during January, The Australian Museum will be represented by Dr. G. A. Waterhouse, B.E., F.E.S., a Trustee, and Dr. Chas. Anderson, M.A., Director.

In the Macpherson Range.

BY A. MUSGRAVE, F.E.S.

IN the south-eastern corner of Queensland, and forming a great natural barrier between that State and New South Wales, there extends as an eastern off-shoot of the

coverly of the range. They state that "A range distant scarcely ten miles, and stretching from E. by N. to S.E., of elevated bold appearance, was named Macpherson's Range, in



View from near the O'Reillys' home looking towards New South Wales border. Mount Lindesay's peak and Mount Barney's rugged slopes are seen on the horizon, while Castle Rock at the end of Hunter's Lookout is seen on the left, and giant hoop pines on the right. [Photo—A. Musgrave.]

the Great Dividing Range the rugged mountain system of the Macpherson Range.

To that "Prince of Australian Explorers," Allan Cunningham, we owe the discovery of the Macpherson Range, for, on the 3rd August, 1828, he, Captain Logan, and Mr. Frazer stood on the side of Mt. Lindesay and looked at a range some ten miles distant. Some old manuscripts preserved in the Australian Museum record in Allan Cunningham's handwriting his account of the dis-

compliment to Major Macpherson of His M. 39th Regt., while the southern extreme, a very bluff head and a round hummock, were called respectively 'Coke' and 'Burrough.'

The Macpherson Range at its eastern extremity runs out into low spurs, but about three miles from the sea it commences to ascend until it reaches a height of 4,000 feet, forming "a series of peaks and dome-shaped mountains" which slope abruptly towards New South Wales, and give off on



The steep and narrow path leading down into the Valley of Stockyard Creek.

[Photo—A. Musgrave.]

the Queensland side a number of long, narrow spurs, which are usually dignified with the names of plateaux, such as the Lamington Plateau and Robert's Plateau. These constitute the Queensland National Park. It will be seen that but few streams flow from the range into New South Wales, though the Tweed and the Richmond Rivers rise in the Macphersons.

On the Queensland side of the Range at its eastern end, rise Currumbin and Tallebudgera Creeks, and the Nerang and Coomera Rivers, which all flow straight to the sea. Towards the western and south-western end of the Range, Canungra, Stockyard, Moran's, Waterfall, and Running Creeks alternate with the spurs given off from the Range, and flow into the Albert River. In addition to these streams are the Right and Left branches of the Albert.

The spurs and the mountains of the Lamington and Robert's Plateaux include 47,000 acres of densely wooded country, and the guide-book, *The National Park of Queensland* states, "There is one vast unbroken jungle from the head of Currumbin to the source of the Richmond River near Mount Lindesay."

Last midsummer, Mr. P. A. Gilbert and I left Brisbane for the O'Reillys' farm at

Robert's Plateau in the Queensland National Park. We left Brisbane about 8.30 a.m. and arrived at Beaudesert in time for lunch, and were then driven out to Stockyard Creek by car, a distance of from nineteen to twenty miles. Here we were met by Mr. Bernard O'Reilly with pack and saddle horses. But I will digress for a moment to say a word about our hosts, the O'Reillys. Originally residents of New South Wales, they came to Robert's Plateau 13 years ago. The

Plateau had been subdivided into selections, and the O'Reillys, who had lived in the Blue Mountains, were quick to realise the potentialities of the place, and took the first four holdings. The other holdings were then withdrawn, and the Queensland National Park came into existence. Thus the O'Reillys were left literally in the air, 3,100 feet to be exact, with no road and with dense jungle all around them and eighteen miles from the nearest town of Kerry. The magnificent views now obtainable from the ridge on which their home is placed, would not be visible were it not for their energy in clearing away the scrub. We had every opportunity of judging the results of their industry as our horses trudged up the mountain side. The path, which is wide enough only for a single horse, has been built entirely by the O'Reillys. It winds up the side of a spur dividing the valley of Stockyard Creek from the Horseshoe Bluff Gorge, and in places is very steep. As it nears the summit the ridge narrows to a razor-back and the path clings to the side of Stockyard Creek. Though the descent into the valley is not sheer, it is very abrupt, and the sides of the mountain are covered with grass so that nothing could



"Lignum vitae," *Vitex lignum-Vitae*, an inhabitant of the rain forest of the Macpherson Range.

[Photo.—A. Musgrave.]

save one if one's horse stumbled over the side. In the past, cattle have been lost over the edge, owing to frightened animals turning suddenly and jostling one another into the valley. The valley of Stockyard Creek is one of the most beautifully wooded I have ever seen. The dominant tree is the Brisbane or Brush Box (*Tristania conferta*), which grows to a great height and is the largest tree in the Park according to Mr. Tom O'Reilly, the next in size being the Giant Nettle (*Laportea gigas*). Stockyard Creek flows into the Albert River, into which most of the creeks hereabout flow.

At the top of the ridge the track enters the first of the O'Reilly selections, where the forest has been cut down and the land cleared for cattle to graze. Then it passes through magnificent brush, typical rain-forest country, until it comes out again into a wide open space cleared of all timber except for a

magnificent specimen of a Hoop Pine, the "Lonesome Pine," as it is termed.

SOME RAIN-FOREST PLANTS.

On the road along which we passed to the O'Reillys house, I later photographed some rain-forest trees which are typical of the Park and its moist conditions.

Some of these trees are characterised by the possession of channelled or fluted barrels, and a good example is afforded by the "lignum-vitae," a tall tree which grows in the North Coast district of New South Wales and the Coast district near Brisbane. It takes its vernacular name from its specific Latin name, which was given it by Allan Cunningham, who named it *Vitex lignum-vitae*. The wood is stated to be hard and tough and suitable for cabinet work.

In a recent paper, Mr. W. D. Francis, Assistant Government Botanist of Queensland, states that, "one of the most impressive features of luxuriant rain-forests is the wide buttresses or plank buttresses which radiate from the bases of the stems of certain species of trees. These buttressed trees abound in dense rain-forests in tropical and sub-tropical parts of the world. The Queensland buttressed trees, with the exception of *Ceriops candolleana*, a mangrove, are rain-forest species and all of the Queensland buttressed species, with one exception belong



A Booyong, or Crow's Foot Elm; *Tarrietia argyrodendron* var. *trifoliata*, whose buttressed roots typify the rain-forest condition under which it lives.

[Photo.—A. Musgrave.]



The O'Reillys' home, built of scrub timbers, commands fine views over the Macpherson Range.

[Photo.—A. Musgrave.]

to genera which are represented in the Indo-Malayan region. The buttresses are not confined to any single natural order of plants, but occur in species and genera of natural orders which are often widely separated from one another."

Beside the road grew a splendid example of a Booyong, or Crow's Foot Elm (*Tarrietia argyrodendron* var. *trifoliata*), which Mr. Francis points out, "is one of the most common and most widely distributed of all the Queensland buttressed trees, as it abounds in rain-forests in Northern and Southern parts of the State."

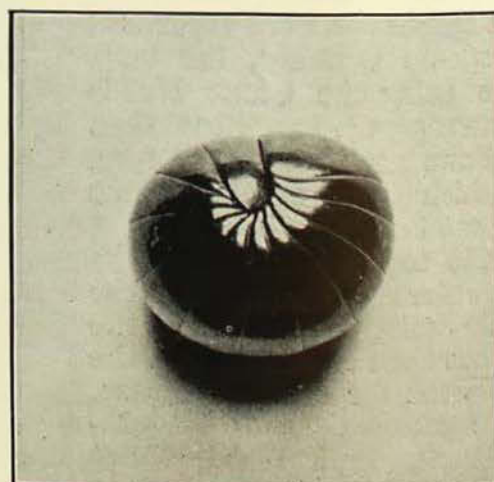
In our excursions into the scrubs we frequently came across the limbs of trees thickly encased with such well-known ferns as Stag's Horn and Hare's Foot. These parasite-laden limbs usually crash to the ground after heavy rain, the absorption of so much moisture by the ferns placing too severe a strain on the branch. Perhaps the commonest of these parasitic plants at Robert's Plateau is the Bird's Nest Fern (*Asplenium nidus*), which occurs in numbers on the trunks of trees and even on hanging vines. Some of them cling to the side of a tree trunk, while others completely envelop the stem. The Bird's Nest Fern has a wide range from tropical Asia to the Pacific islands, and occurs in the coastal district and the Dividing Range of Queensland and New South Wales. In view of the great wealth of the vegetation, it is only fitting that the range should have

been discovered by a botanist. The luxuriance of the plant life is undoubtedly due to the great rainfall and the decomposition of the volcanic rock called andesite. In the vicinity of the house are granite-like outcrops of these andesite boulders.

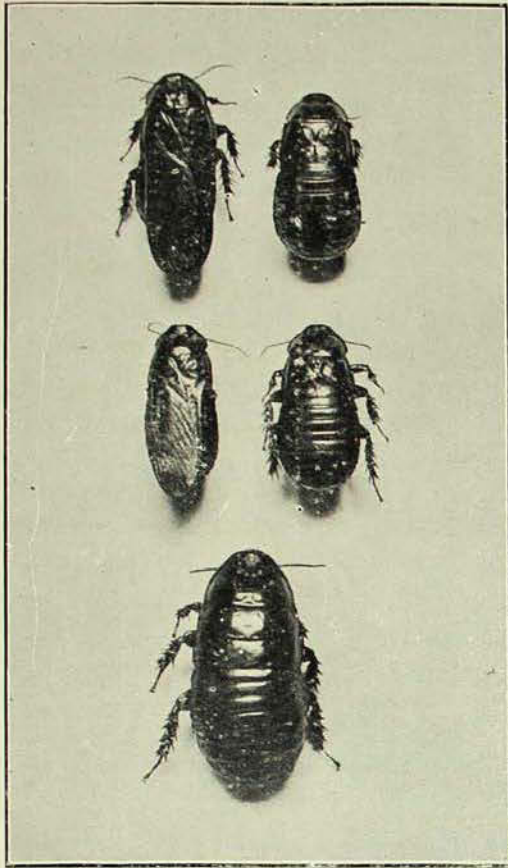
RAIN.

When we arrived in Queensland, the State was in the throes of a fierce drought, and as we crossed the famous Darling Downs, which, by the way, were discovered by Allan Cunningham the year preceding his discovery of the Macpherson Range, we noticed that the country was parched and dry, and numerous whirlwinds of dust were to be seen on each side of the line. As the

train drew into Ipswich station the drought broke, and we arrived in Brisbane after passing through rain-squalls. Next day the rain-clouds held their burden until we were safely ensconced in the O'Reillys cottage, and then the rain descended in earnest and the week which followed was one of the most miserable we have experienced. We were marooned thus for a week, and when we could stand the enforced idleness no longer and went out for a walk, we would return with sopping clothes and sodden boots. Each day we read the rain-gauge, and carefully recorded the number of points from the day's dismal downpours.



Pill millipede *Cyliosomella*, from Robert's Plateau.
[Photo.—A. Musgrave.]



Brush Cockroaches *Panesthia laevicollis* top, *P. australis* middle, *P. tryoni* bottom, from the Macpherson Range.

[Photo.—A. Musgrave.]

In 1925, 92 inches of rain fell at Robert's Plateau, and up to 17th December, 1927, only 42.39 inches had fallen for the year, so that the rain had a deficit to make up before the year ended. We considered that it did everything in its power to regain its former status, for during our visit from the 14th to the 26th December, over 13 inches fell, and during the week we were imprisoned over 12 inches were recorded. We had no reason to doubt that we were living in the midst of a rain-forest.

At the O'Reilly's we met Mr. Rowland Illidge, the veteran Queensland naturalist. His three sons were camped about a mile away in one of the O'Reillys' old huts, and they later joined us in excursions. We were very fortunate in having Mr. Illidge as a companion during the wet weather, for he kept us entertained with stories of the Park, which he has visited on many occasions, and he was a mine of information as to its bird-life and entomology.

The O'Reillys' home is built entirely of native woods from the neighbouring scrubs, and in order that it should withstand the

buffetings of the southerly gales, anti-cyclone posts, with their bases sunk four feet into the ground, are placed in the corner of every room.

From this haven of refuge we made our excursions into the jungle to observe the birds, and to collect insects. Despite the fact that the rain forced us to remain indoors for the greater part of our stay, I was able to bring away about 500 insects for the Museum collection. Among the insects noted in the Park was the Bird's Wing Butterfly (*Troides priamus* subsp. *richmondus*), a species occurring also at Tambourine Mountain, and about which I have written in my article on Tambourine Mountain in the AUSTRALIAN MUSEUM MAGAZINE for July-September, 1926.

In bright sunny weather numbers of small Scarabaeid beetles were to be seen flying about; they seemed to be attracted by anything of a whitish nature, and they occurred in hundreds on top of a stump, the decaying whitish wood proving an irresistible lure for them, while the wool of sheep grazing near the house, contained many examples which had become entangled. During the noon-day heat, when a fierce glare radiated from the corrugated iron roof, they kept up an incessant tattoo on the shining iron, which recalled to us the only too-familiar sound of rain-drops. This beetle has been determined by Mr. A. M. Lea as *Cheiragra vittata*.

COLLECTING IN THE RAIN.

Between showers we sometimes ventured forth to collect in the dripping jungle near the house. The majority of insects are not visible, but in the scrub numbers of beetles, chiefly weevils of the genus *Poropterus*, come from under bark and logs and wander over the surface of the tree-trunks. Their dark colouration harmonizes as a rule with their surroundings, but some are fairly conspicuous.

Under decaying logs we encountered the quaint pill-millipedes. These measure about an inch and a half in length and have hard, round, dorsal plates and head and tail plates. When disturbed they roll themselves into a ball presenting the hard, shining plates which serve effectively to protect them. They remain thus for some time, when they may be observed to unroll slowly and then creep away. Millipedes may be at once distinguished from the centipedes by the fact



Standing on Hunter's Lookout a magnificent view is obtained of the densely wooded valley of the left branch of the Albert River, and the Mountains of the New South Wales border.

[Photo—A. Musgrave.]

that they have two pairs of legs to each segment, whereas centipedes possess only a single pair to each segment. Millipedes are quite harmless, except for a fluid which some of the species secrete, and they are sluggish in their movements and feed on vegetable matter. Centipedes are active and predaceous and are capable of inflicting a poisonous bite.

Under the wet rotting logs in the scrub in company with the pill-millipedes, were many specimens of cockroaches of the genus *Panesthia*, which was represented by three species, *P. laevicollis*, *P. australis*, and *P. tryoni*. This last-named species was quite new to the Museum collection, and was described as recently as 1918 by Dr. Eland Shaw from specimens taken at the Lamington Plateau by Mr. Henry Tryon, former Government Entomologist of Queensland. This species is wingless. The winged forms, *P. laevicollis* and *P. australis*, are interesting for the fact that they overlap

in their range in the New England district, for the former species occurs in Queensland and the northern parts of New South Wales, and the latter in Victoria and northern New South Wales. They resemble one another very closely. Some of the specimens we collected had fully developed wings, while others had only vestiges of the wings remaining. This state of winglessness is due to their habit of eating one another's wings, as Dr. Shaw has pointed out.¹ This wingless condition enables them to move about with greater ease under decaying bark and in the holes in decayed logs in which they live.

HOOP PINES.

Crowning the ridges on the C. inbabel and Canungra Creek side, are forests of the Hoop pine, *Araucaria cunninghamii*, which dominate the surrounding trees and add a spice

¹ Shaw, *Vict. Nat.*, xxxi, 7, 1914; and *Proc. Linn. Soc. N.S. Wales*, L., 3, p. 208, 1925.



Moran's Falls, 300 feet high, by means of which the waters of Moran's Creek leave Robert's Plateau on their way to join the Albert River.

[Photo.—A. Musgrave.]

of variety to the scenery. The average height of the Hoop pine is said to be 150 feet, so it is singularly appropriate that such a giant among the trees of the Park should bear for its specific name that of its discoverer. During his first overland journey in 1827, during June of that year, Allan Cunningham wrote: "Dense brushy forests, clothing the bases of the lateral ridges, immediately overhanging our encampment, were productive of a number of curious plants not before known, and it was in these shades I first clearly and satisfactorily recognised the Pine (*Araucaria*) which I had formerly observed in greater numbers in the dark brushes of the Brisbane River." The Hoop pine is one of our most useful trees; it has been the butter box producer for New South Wales in the past, and has been put to other

purposes. It extends into New South Wales as far south as the Bellenger River.

The big "Lonesome Pine" near the O'Reillys' was measured by Mr. Gilbert, and the trunk was found to be 3 feet 8 inches in diameter, and 10 feet 11 inches in circumference. Its branches were laden with many epiphytic plants.

GENERAL TOPOGRAPHY.

A week after our arrival at Robert's Plateau we awoke one morning to find the sun shining on the distant mountains. From the verandah we could see Mount Lindesay, 4,000 feet, Mount Barney, 4,300 feet, Mount Huntley, 4,200 feet, Spicer's Peak and Mount Maroon away in the distance, while nearer Hunter's Lookout, Castle Rock, and the spurs given off from Razor-back Mountain and Widgee Mountain showed plainly in the rays of the morning sun.

On the northern side of the ridge on which the house is placed, the ground slopes away to Canungra Creek and we looked over a perfect maze of mountains and ravines towards Tambourine Mountain, Mount Witheren and the distant Pacific.

In the valley between Hunter's Lookout and the spur on which the house stands, flows Moran's Creek, which rises in the Ranges not far away. The scrub has been permitted to stand in the creek bed and here we saw trees festooned with vines and laden with orchids and ferns. Moran's Creek leaves the plateau by falling 300 feet into Moran's Gorge and it ultimately junctions with the Albert River; the Creek was in flood when I secured the photograph, owing to the week's constant rain, and the falls looked magnificent as a result.

The first day after the week's almost continuous downpour, Mr. Tom O'Reilly led a party consisting of the three Illidge boys, Mr. Gilbert and myself to the mountains of the New South Wales border. The views into New South Wales from the peaks of the



Among the mists on the road to Mount Bithongabel. Mr. Tom O'Reilly resting on his brush hook looks at the Old Man's Beard Moss hanging from the trees.

[Photo—A. Musgrave.]

Macpherson Range provide some of the most wonderful scenery in Australia.

The road led through dense forest country at the head of Moran's Creek and the left branch of the Albert River, and passed through one of the O'Reilly selections. In a hut on this selection, Mr. S. Jackson, the well-known bird collector for the late H. L. White, of "Belltrees," Scone, lived while studying the bird life of the Queensland National Park. Mr. Jackson named the hut "The Ark," because it rained for forty days and forty nights while he was camped in it. It is about six miles from the O'Reillys' house to the border, and the track has been cleared by the O'Reillys, though we frequently came across windfallen trees and a track had to be made around them to permit the horses to get past.

At 3,500 feet we came to the beech forests; the trees here were "bearded with moss," and massive and venerable in appearance. As we neared Mount Bithongabel we turned off to the left, and eventually arrived at Mount Wanungera, 4,000 feet in height. Here we emerged from a wonderful grove of beeches to gaze down into the Valley of the Tweed.

On a second visit to the border we were rewarded with glorious views from Mount Bithongabel and could even see the waves of the Pacific breaking in the distance. The Macpherson Range here is S-shaped and sends out spurs so that a perfect maze of mountains is the result, all densely wooded, no matter how sheer their sides may be. On our left lay Mount Merino, on our right was Mount Cominan, 3,100 feet, Mount Durigan, 3,550 feet, Mount Throakban, 3,670 feet, which sends out a spur to Widgee Mountain, and Mount Worendo, 3,640 feet, connected by a ridge with Razor-back Mountain. Ahead of us in New South Wales lay Mount Warning. The right branch of the Albert River rises near Mount Durigan, and the source of the left branch of the Albert is near Mounts Bithongabel and Cominan.

THE ANTARCTIC BEECH.

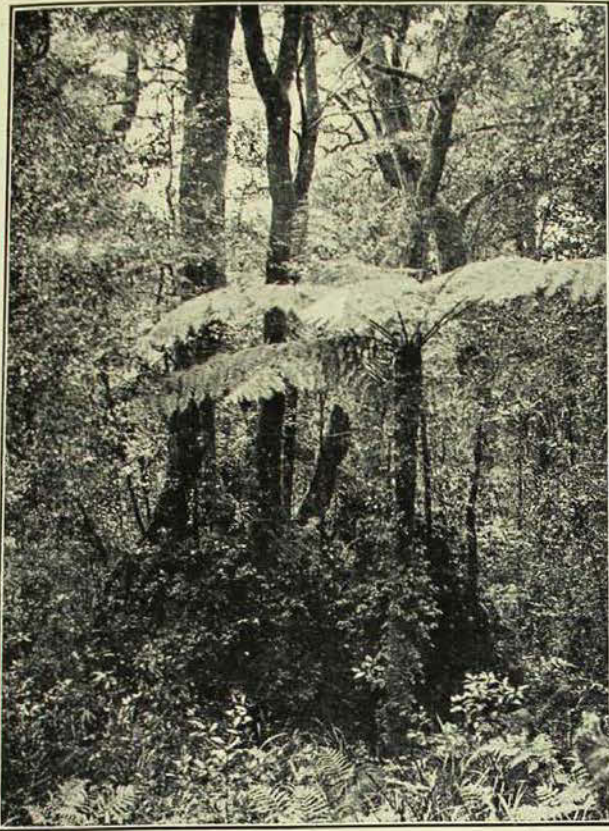
The most interesting tree in the Queensland National Park, is the Antarctic Beech as they call it, but which in New South Wales is known as the Negro Head, *Nothofagus moorei*.

This tree occurs only above an altitude of 3,500 feet, and in New South Wales is found at Barrington Tops, the Dorrigo, and other elevated spots in the North Coast district.

In some of the trees at Robert's Plateau, the girth at the butt was from 30 to 40 feet, but their innermost parts were usually decayed and eaten away, giving rise to dark, mysterious cavities filled with rotting debris. These trees are reputed to be of tremendous age, 3,000 years is one estimate, and though these figures may be exaggerated, the trees certainly impress one as being of great antiquity. They are the veterans of countless storms, their limbs weighed down with Beech Orchids, *Dendrobium falcorostrum*, and their trunks covered with mosses and ferns.

One which I photographed at Mt. Wanungera had its base large and solid, the trunk being quite slender in proportion to the basal part. According to Mr. O'Reilly, this condition indicated that the ground was formerly higher than it is now, but the earth has been washed away leaving the roots exposed. This feature is quite common among the beeches and some of the roots are from twelve to fifteen feet from the ground.

The dark-green foliage of the beeches was not seen to advantage in the dense forest,



The Antarctic Beech Trees *Nothofagus moorei* are extremely old and their bases and limbs are bearded with moss and ferns. The earth has been washed away from their roots, leaving them exposed.

[Photo—A. Musgrave.]

but once out at the clearing at Mt. Wanungera or Mt. Bithongabel, one was able to get some idea of the graceful appearance of the tree and the extent of its foliage. The leaves of the beeches were attacked by a small metallic green Scarabaeid beetle, *Diphucephala richmondia*, hardly a single leaf occurring which was not damaged to some extent by the beetle.

THE QUEENSLAND WARATAH.

On the slopes of the mountains of the New South Wales border, we saw growing the beautiful Queensland Waratah (*Embothrium wickhami* var. *pinnata*), a plant which occurs in New South Wales in the Dorrigo, and which is known also as the Red Silky Oak. It is placed in a different genus to that of the New South Wales waratah, and grows to be quite a tall tree. The flowers grow in bunches, and, being scarlet in colour, make quite a beautiful sight against the dark foliage of the beeches. The plant was first described from specimens taken at Bellenden Ker in north Queensland. It was then found growing in the Dorrigo, N. S. Wales,

and has since been noted from the Macpherson Range.

THE RUFIOUS SCRUB BIRD.

The dense jungle near the Border is the home of two rare and interesting birds, the Rufous Scrub Bird and the Olive Whistler, which possess respectively the brightest and the most mournful notes of all the birds frequenting these damp moss-clad forests.

The Rufous Scrub Bird is about the size of a robin, and occurs only in mountainous country where the jungle is densest. My first meeting with it had been at Blue Gum Knob in the Upper Chichester Valley, near Dungog, some years ago, where through the zeal of my friend Mr. J. S. P. Ramsay, son of Dr. E. P. Ramsay, who first described the bird, I was able to have a few momentary glimpses of this avian rarity. The bird frequenting the Queensland National Park was considered by the late Mr. H. L. White to constitute a new sub-species, and he gave it the name of *Atrichornis rufescens* sub-sp. *jacksoni*, in honour of the collector Mr. Sid. W. Jackson.

To get even a glimpse of this tiny bird is a distinct achievement, and few ornithologists



The Queensland Waratah *Embothrium wickhami* var. *pinnata*, which grows among the beech trees on the slopes of the Macpherson Range at an altitude of 4000 feet.

[Photo—A. Musgrave.]

have set eyes on it. Hopping always under the leaves of low-growing plants and by the sides of logs, it never exposes itself unnecessarily for an instant. Its movements are very mouse-like, as Mr. A. H. Chisholm and Mr. S. W. Jackson, who have studied it here, have pointed out.

On the road to the border we had the good fortune to hear and see the Scrub Bird, and Mr. Gilbert, who is a keen ornithologist, was able to make its acquaintance for the first time.

The notes of the Scrub Bird are very loud, out of all proportion to the size of the bird, and the scrubs resound when the bird gives forth its ringing, deafening call of "Chip, Chip, Chip, Chip."

THE OLIVE WHISTLER.

Among the beech forests we also heard the mournful notes of the Olive Whistler, *Pachycephala olivacea*. This bird occurs in Tasmania as well as the eastern Australian States, but the form occurring in the Macpherson Ranges is regarded as a subspecies, *macphersonianus*. In *The Emu* for

April, 1921, Mr. Jackson gives an interesting account of his field experiences with these birds. Of its song he says: "The bird had a variety of notes. One very sweet one was a slow, soft, and long-drawn-out call resembling 'P-e-e-p - p-o-o-o-o.' These notes were rendered slowly, and the 'P-e-e-p' was rather high pitched, while the 'P-o-o-o-o' was a low note . ." Unlike Mr. Jackson we were not privileged to see the bird, but its sad and weary cries of "Pee-po" haunted us as we rode among the rotting trunks of the beeches on the way to the border.

* * * *

Such then are some of the wonders of the Macpherson Range awaiting those who care to venture in quest of them. This wonderful National Park, which fortunately is so far distant from any large town that its natural beauties are untarnished, stands as a monument to those far-seeing people who were responsible for its reservation. To the late Hon. H. M. Collins, and to Mr. Romeo Lahey is due the credit for the preservation for posterity of this unique piece of Australia.