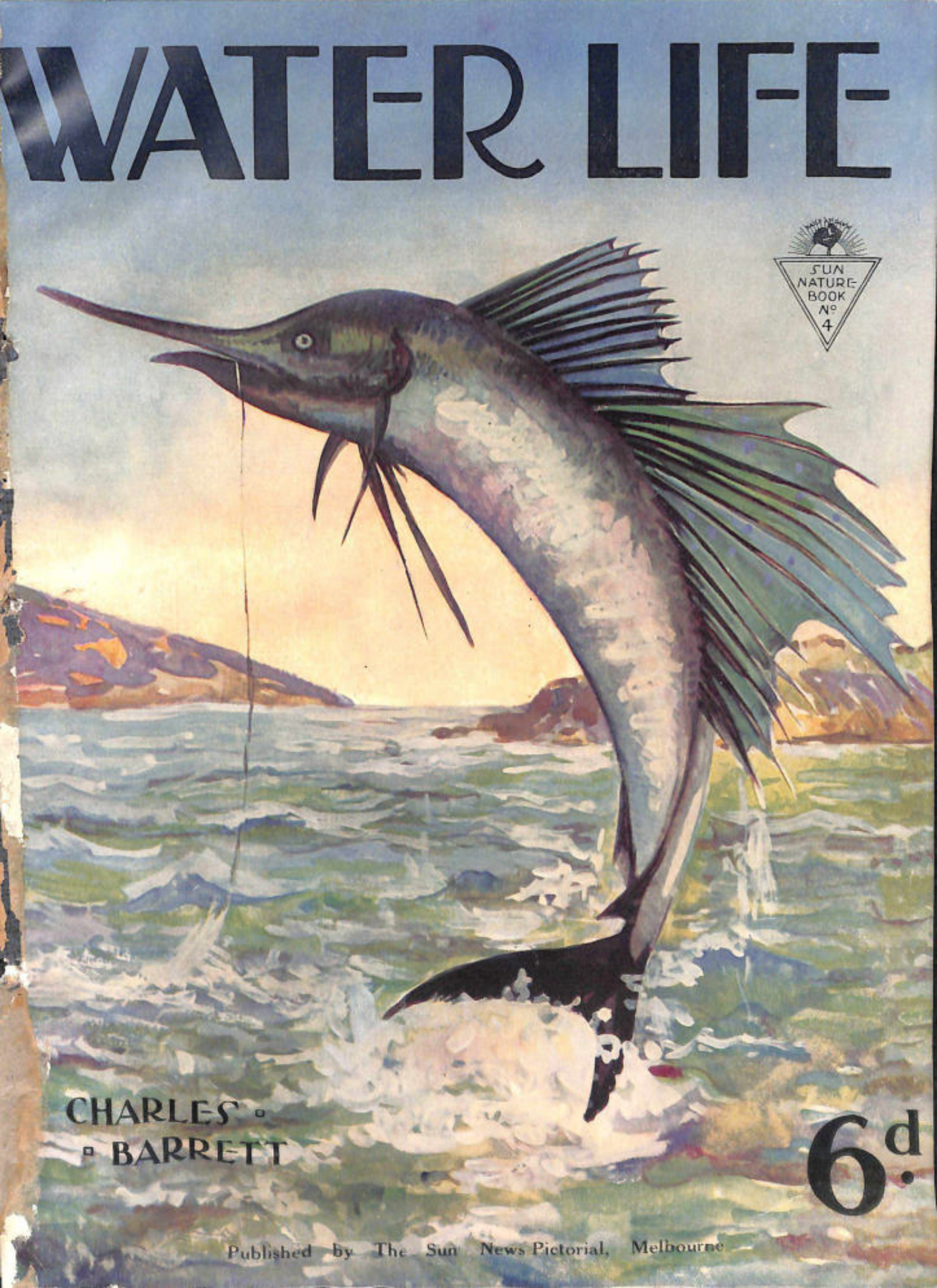
WATER LIFE



CHARLES
BARRETT

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Published by The Sun News Pictorial, Melbourne

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WHITE-TAILED KINGFISHER

In New Guinea and North Queensland the beautiful White-tailed Kingfisher (*Tanysiptera sylvia*) is found. It favors the luxuriant tropical brushes, and migrates to the coastal districts. Usually it associates in pairs. Its trilling call notes are likened to those of the Sacred Kingfisher, and it preys upon small reptiles and the larger insects. It drills a nest-hole in a termites' mound, or a termitarium on the bole of a tree. From three to four eggs (pure white) form the clutch. The picture, from a painting by Neville W. Cayley, is reproduced from *The Emu*, journal of the Royal Australasian Ornithologists' Union.

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ZOOLOGICAL GARDEN ... Melbourne
BOOK NO. 1365

FOREWORD

By The Director of The Australian Museum, Sydney

There are several popular works devoted to Australian mammals and birds, but no publication describing the life of our waters has hitherto appeared. "Water Life" is therefore sure of a warm welcome from the thousands who spend their holidays at the seaside, and from anglers and nature lovers generally. Mr Charles Barrett is an accomplished writer on natural history, and already has to his credit similar works on Australian wildflowers, animals, birds and butterflies. There is no doubt that Australians are now taking a keener interest in the animals of their country, which present many fascinating features to the naturalist and observer. A book such as this is bound to stimulate that interest.

This little work, as one would expect, is diversified in its subject matter, for not only does it include an account of fishes, shells, crustaceans, corals, and other aquatic invertebrates, but also touches on mammals and birds which live by the water. There is, for example, a section on Australian kingfishers, from the big, brown, sombre kookaburra, to the beautiful little azure kingfisher, "a living flash of blue," which recalls Robert Lynd's remark, "Not to have seen a kingfisher leaves the world full of a mysterious beauty."

The author has camped and tramped in most parts of the Commonwealth. His knowledge of "water life" has been gained during several visits to the Great Barrier Reef, cruises on board the Federal Fisheries Investigation vessel Endeavor (she was lost, with all hands, off Macquarie Island in 1914), and other craft; and numerous shorter excursions on the sea and inland waters. The field naturalist, in these pages, has been helped by the scientific specialist. Mr Barrett's collaborators, both members of the Australian Museum staff, are leading authorities on their respective subjects.

—C. ANDERSON.

WATER LIFE

By

CHARLES BARRETT

in collaboration with

Tom Iredale
(Conchologist)

and

Gilbert P. Whitley
(Ichthyologist)

Australian Museum, Sydney.

ACKNOWLEDGMENTS

The illustrations of fishes employed in the text are taken from the works of many authors, both Australian and overseas, so that only a general acknowledgment to them can be made. Many of these figures were reproduced in McCulloch's "Fishes of New South Wales," issued by the Royal Zoological Society, Sydney. The classification employed in that very useful work has also been largely used here. Some of the illustrations of shells, etc., are reproduced, by kind permission, from the "Australian Museum Magazine," and the Museum "Records." Some are from the F.I.S. "Endeavor" Reports on Fisheries; others from McCoy's "Zoology of Victoria." The author's best thanks are due to Dr. C. Anderson for writing the Foreword, and his kindly interest in this book; to Messrs Iredale and Whitley, for their invaluable assistance. The color plates of fishes, the coral pool, river life scene, and the cover design are from paintings made especially for "Water Life" by Miss Ethel A. King. The plate, Australian Shells, is from a painting by Miss Joyce K. Allan.

The Fishes Of Australia

THE fishes of Australia are at least as varied and interesting as those of any other part of the world of similar size. There are more than 2000 known species, and these range from the tiny gobies of the rockpools to huge ocean wanderers like the sunfish, swordfish, and the basking shark.

Our tropical waters are inhabited by gorgeous coral fishes, while the more utilitarian food-fishes prefer the colder seas of the south. We have, living in our harbors, the descendants of ancient families which have died out long ago in most other parts of the world: the Port Jackson shark and nannegai, for instance. Our freshwater fauna is not so varied as the marine, yet includes some interesting types such as the Queensland lungfish, which can breathe air by means of a kind of lung, and the Murray cod, famed for its delicate flavor.

marine, are kept in captivity by fanciers. Anglers have arranged for the introduction of salmon or trout of various kinds into our colder streams. These do well in the south, but in most parts of New South Wales the eggs have to be artificially fertilised and the fry carefully fostered before being distributed.

The introduction of marine species has not been attended with the same success. Harald Dannevig, in 1902, introduced more than 1000 English flatfishes of different species to New South Wales, but they failed to establish themselves.

Fishes do not range uniformly over all seas, but are restricted to definite regions governed by temperature, currents, salinity and other factors. The tropical fishes of the Great Barrier Reef and Northern Australia may occasionally struggle southward to Perth or Sydney, but they do not mix freely



The Grey Nurse Shark

The large ocean sharks are much feared by bathers, as many human beings have been attacked, and maimed, or killed, by these fierce creatures. Several species seem to be responsible for shark tragedies, though precise identification of the species in most cases is wanting. The white pointer (*Carcharodon*), which follows ships, grows to a very large size, and is credited with attacking man in Port Phillip Bay, Victoria. The grey nurse (*Carcharias arenarius*) has hideous jagged teeth, and chases kahawai through the surf-breakers beloved by bathers. The blue pointer (*Isuropsis mako*) often attacks boats in more open water. In our harbors, the scavengering tiger shark and apparently the whaler (*Carcharhinus macrurus*) attack human beings. There are about 80 different species of sharks in Australia, but only a few of them are known to be dangerous to swimmers, and, as they are fish-eaters, it is only on exceptional occasions that humans are attacked. Most of the tragedies have occurred at dusk or on dull days, between December and April (at least in New South Wales), and shark-proof enclosures are common sights on Australian foreshores. It is not always necessary for a shark to turn over to bite, so the best thing to do when one is sighted seems to be to make as much splash as possible when speeding ashore, and, if attacked, to punch the nose (a "nervy" spot) or gouge out the eyes of the shark. The term "nurse" is applied to various sharks, but not on account of their fondness for children! The name is a different derivation from the word nurse in its commonly accepted sense. "Nusse fisshe" were mentioned in a fifteenth century work, but the exact origin of the term has not been discovered. The grey nurse (*Carcharias arenarius*) is the best known species. Fishermen and others commonly call tiger-sharks whalers, and other species "grey nurse."

Australian commercial fisheries are in an embryonic stage of development and require scientific co-ordination and direction, based on research into the life histories and migrations of food fishes. Trawling is carried on successfully in some States, but could be practised more, while our potential herring and sardine fisheries are completely neglected.

Many species of fishes have been introduced into Australia for aquarium or sporting purposes. The goldfish and carp have become established in most of our river systems and seriously affect the balance of nature where the indigenous fishes are concerned. Many ornamental fishes both freshwater and

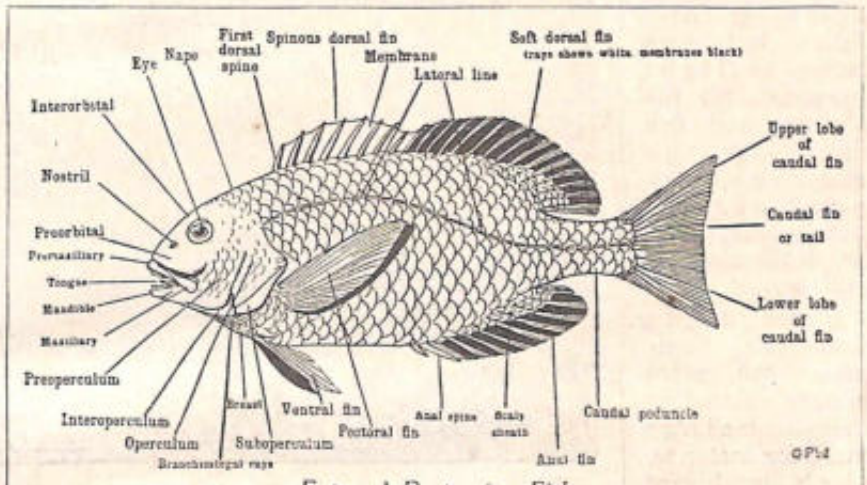
with the south-eastern Australian and New Zealand forms which constitute a quite separate colder water fish-fauna which is capable of further subdivision. Then, again, fishes are found to be typical of certain marine environments: littoral (shore forms) and rockpool species are distinct from open sea species, and the fishes of the mangrove swamps may differ more from those of the ocean bed than would some of those from opposite sides of a continent.

The freshwater fauna is smaller and not so differentiated. In the present state of our knowledge, it can only be said that the freshwater fishes of Australia usually vary considerably and extend their range over immense areas. Here and there,

apparently owing to long isolation, a peculiar form like the Queensland lungfish is preserved, or a long-past connection with the East Indies is suggested by the occurrence of the barramundi (*Scleropages*) in some of our tropical rivers where the common East Indian catfishes and carps have not penetrated.

A true fish may be defined as an animal which lives in water in which it breathes by means of gills; it has a backbone, and, instead of arms and legs, has fins for propelling it through the water. Thus jelly-fishes, star-fishes, and shell-fish are not true fishes because, among other things, they have no backbone, while whales, porpoises and seals, though shaped somewhat like fishes, are mammals, breathing air through lungs, just as we do.

The names of the fins and the principal external structures of fishes may be learned from the accompanying diagram which explains the terms in use for them in ichthyological descriptions, and which are used as sparingly as possible throughout this booklet.



External Parts of a Fish

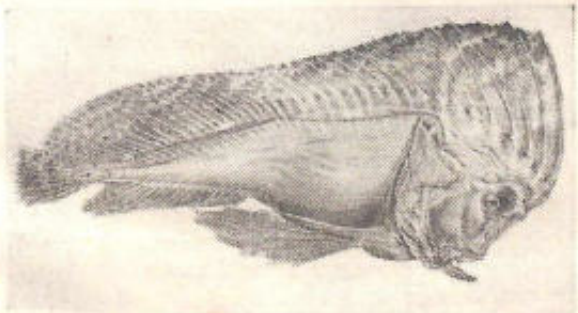
VERNACULAR NAMES

People often complain of the length or apparent pedantry of scientific names and wonder why vernacular or common names cannot be employed in their stead. A scientific name is, however, a formula of international significance which applies solely to the species of animal or plant to which it justly applies, whereas vernacular names are so few in comparison that their very fewness alone causes many different species to be grouped under one name or the same species to be known under different names in places not necessarily remote from one another.

Whether some uniformity will ever be achieved between the different States of the Commonwealth in bestowing common names remains to be seen, but at the present time much confusion is caused by the chaotic vernacular nomenclature employed.

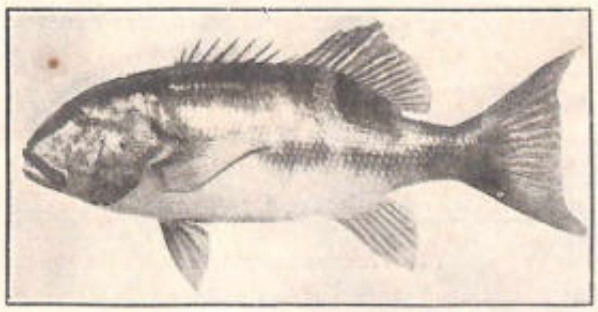
Many of the names of our fishes are derived from those used by English fishermen for species which are only superficially like the Australian forms. These names, misapplied though they may be from a strict point of view, are of great etymological interest and well repay study by philologists, as many of them, anchovy and gurnet for instance, are of great antiquity; others, like albacore, have an Oriental flavor, while many are derived from ancient Greece and Rome.

A few native names of fishes have come down to us from the aborigines and their perpetuation seems desirable. Names like wobbegong, nannegai, morwong, teraglin, tarwhine, and mado are euphonious



The Red Indian Fish

Few of our southern fishes are stranger in appearance than the Red Indian or forehead fish (*Pataecus fronto*), which grows to a length of 9 inches. Its color is red, and in many cases several spots ornament the upper portion of the body. This remarkable species, intermediate in structural character between the red rock cods and the blennies, lives among weedy rocks, and feeds upon small crabs and other crustaceans. It lacks ventral fins, and is a poor swimmer. Sometimes Red Indian fishes are cast up on beaches after a storm.



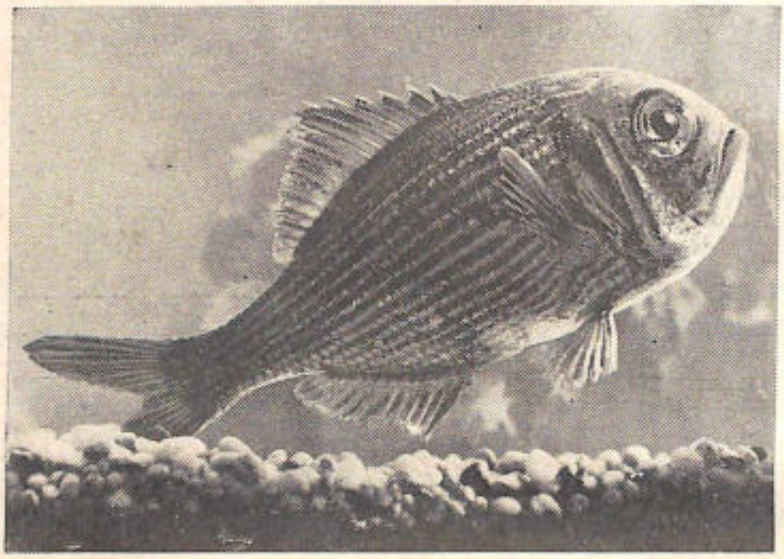
The Chinaman Fish

The Chinaman fish (*Paradicichthys venenatus*) is rather like a large pink snapper or hussar, but is, unfortunately, sometimes poisonous as food, though at other times it may be eaten. The reason for this phenomenon is not explained; but, as the fish is so far only known from the waters of northern Queensland, no alarm need be felt in southern States.

and more applicable to Australian fishes than such prevalent misidentifications as, for instance, bream, whiting and cod. Similarly, it is pleasing to note that New Zealanders utilise the Maori names mako, kahawai, hapuku, warehou and others for their fishes.

The first white settlers in New South Wales invented vernacular names for some of our fishes, but such terms as light horsemen for the snapper and five fingers for the morwong are now obsolete, but others, such as leatherjacket, still persist.

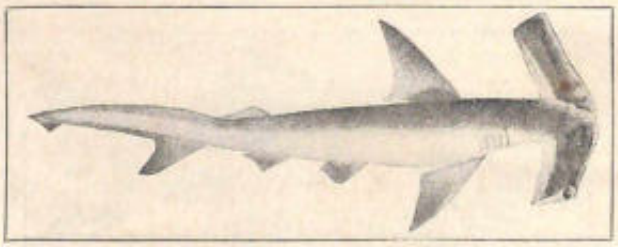
Fishes, being vertebrate animals, are more closely related to human beings than, for instance, such intelligent creatures as octopi, or ants and bees. Yet the attitude of human beings towards the "sea people" is not so kindly as it is towards birds and mammals or the more brilliant butterflies. People regard fish as cold-blooded, stupid, gasping creatures and the endless variety of the forms assumed by fishes, if considered at all, seems more to encourage disinterest in them than to stimulate inquiry on the part of their human superiors. Fishes, after all, are important animals. They inhabit far more of the globe than we do.



The Nannegai

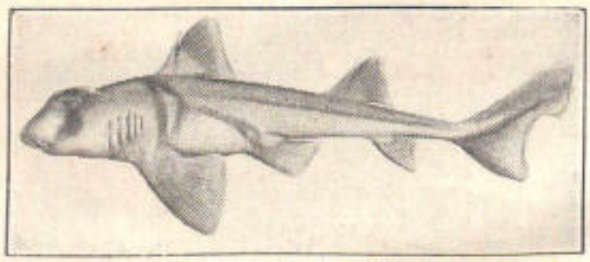
The name nannegai is of aboriginal derivation, originally being mura ngin a gai, corrupted to mother nan a di, and, later, nannegai. This lovely rosy fish, with the large red eyes, lives in deep water off the coast, and is a superb food fish. The scientific name is *Trachichthodes affinis.*

On earth we are celebrating the age of man, which has superseded the age of mammals, but in the sea, which is far more extensive, they are still in the age of fishes. Fishes have adapted themselves for life in depths, pressures, various saline solutions, and light and dark expanses which would do credit to much higher organisms. Their interest to us lies largely in the fact that they are of edible value, but it is hoped that thought of them will conjure up more than fillets or fish and chips, or the mute corpses on the fishmongers' marble slabs, in the minds of those readers who care to study them with any assistance this book may be able to offer.



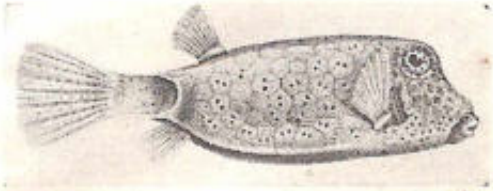
The Hammerhead Shark

The hammerhead shark is almost sufficiently described by its name. There are several Australian species, all referred at present to the genus *Sphyrna*, though some have a kidney or bean-shaped head, and others the more orthodox hammer form, with the eyes at each end of the much-widened head. The purpose of this structure seems to be to act as a cutwater, as the hammer-head shark is said to be a nervous species which swims rapidly away when frightened or hooked; and quickly changes its direction by cleaving with head and tail through the water. Most of our Australian specimens, so far seen, have been of small size, but game fishermen have secured very large ones in New Zealand.



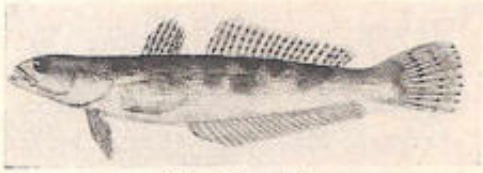
The Port Jackson Shark

The Port Jackson shark (*Heterodontus portusjacksoni*) is a relic of a bygone age, being a living representative of a family of sharks which are found more widely distributed as fossils in the carboniferous rocks. The mouth is small, and the teeth pointed in the front of the jaw and flattened at the back for crushing the hard-shelled marine animals on which this harmless creature feeds. The Port Jackson shark grows to about 4 feet in length, and lays eggs, which are enclosed in a leathery brown shell provided with spiral flanges. The crested Port Jackson shark's eggs have long tendrils at one end also, the more securely to anchor them to the weeds among which they are laid. The scientific name of the crested Port Jackson shark is *Molochophrys galeatus.*



The Box-fish

The box-fish (*Ostracion tuberculatus* and other species) is well armoured with a bony box, often adorned with horns. The colors are bright brown or blue, and adults sometimes develop beautiful tails. Most of the species are commonest in the tropics, but in our southern waters are the brilliant striped or spotted species of the genus *Aracana* and the lens-shaped *Anoplocapros*.

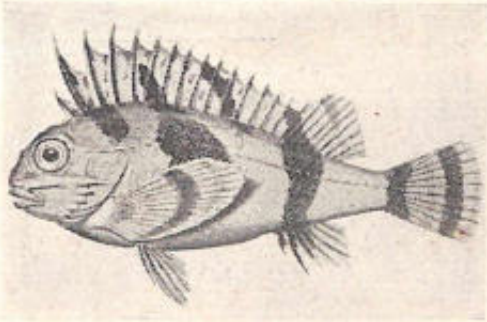


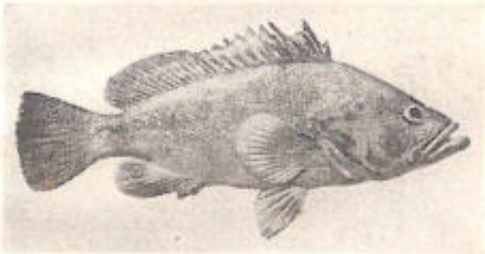
The Congolli

Small specimens of the congolli (*Pseudaphritis urvillii*) are popular among aquarists. This species inhabits the southern States and can live in both fresh and salt water. It grows to well over a foot in length.

The Fortesque

The fortesque (*Centropogon australis*), like the bullrout, can inflict a stinging wound with its spines. It is plentiful in the estuarine eel-grass, and is often painfully felt by net-fishermen.





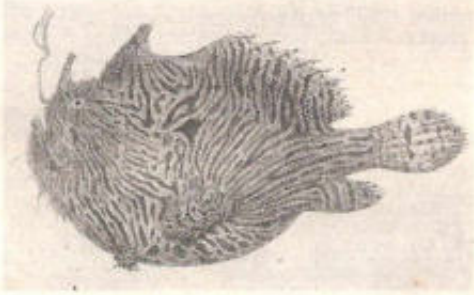
Rock Cod

The term rock cod is applied to dozens of different fishes in Australia, none of them cods in the true sense. The black rock cod (*Epinephelus dameli*) lives among rocks and undergoes remarkable color-changes. The peppermint rock cod, or wirrah (*Acanthistius serratus*) is very tough as food.



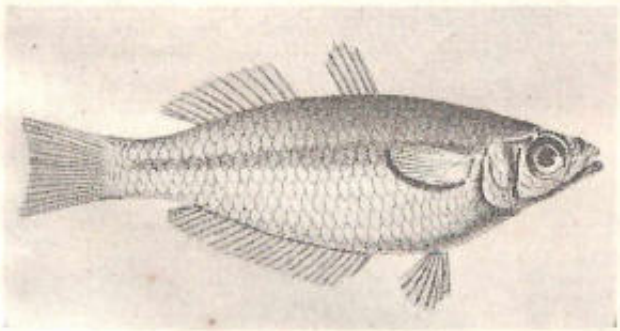
The Angler Fish

The angler fish (*Phrynelox striatus* and species of *Antennarius* generally) carries a little line and bait on the tip of its nose. Waving this to and fro in the water, it attracts curious little fishes and prawns, which it then gulps down whole. In some of the deep sea species, the males are parasitic on the females.



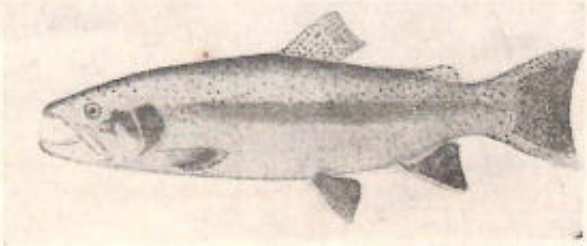
The Stonefish

The stonefish (*Synanceja trachynis*) is the serpent in the coral Eden of the Barrier Reef. Motionless, it lies below rocks or half-buried in mud, where its colors exactly match its surroundings. Touch it, however, and excruciating agony or even death may result from the wounds inflicted by its dorsal spines, each of which has two bags of virulent poison. This hideous fish grows to a length of 2 feet, though average specimens are not much over one foot long.



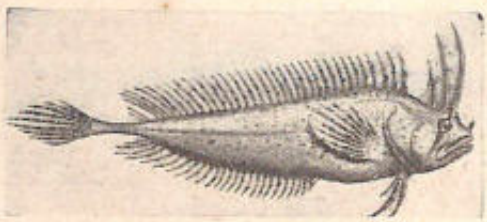
Freshwater Sunfish

In rivers, from Darwin to Sydney and Adelaide, the freshwater sunfish (*Melanotaenia nigrans*) abounds. It is a little, deep-bodied fish, prettily, if quietly, colored and, like the blue eye, a keen eater of mosquito larvae.



Rainbow Trout

Several species or forms of trout (*Salmo*) have been introduced into Australia and thrive well in Tasmania and Victoria, and, to a less extent, in the colder rivers of other States, where they afford good sport to rod fishermen. The best known are the brown trout (*Salmo eriox*) and the rainbow trout (*Salmo irideus*), the latter having a broad red stripe along its sides.



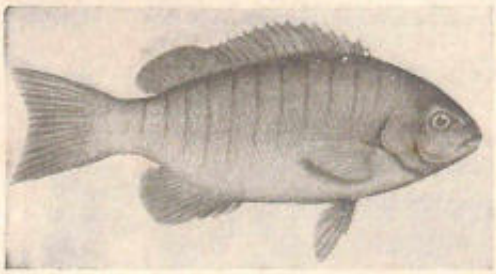
The Blennies

Blennies (family *Blenniidae*) are rather like gobies in form and colors, but have only from one to three ventral rays, so that the ventral fins are finger-like, not forming a sucker. Blennies lay their eggs in empty shells or even tins, and defend them if disturbed by biting at any intruder. Common rockpool forms are the jumping joey (*Lepido blennius haplodactylus*), which climbs out of water to bask in the sun, and the crested weed fish (*Cristiceps aurantiacus*), which greatly resembles a piece of seaweed when alive.



The Jewfish

The Jewfish of eastern Australia (*Sciaena antarctica*) is called mulloway in South Australia and kingfish in Victoria. It is caught off surf beaches or in offshore "pockets" by handlines, and is a fine silverv fish up to six feet long, and excellent as food. The breeding grounds appear to be unknown. The tail fin (caudal) has a convex margin in the jewfish but in its close ally, the teraglin (*Zeluco atelodus*) the margin is concave.

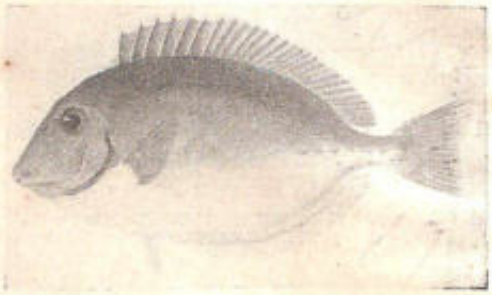


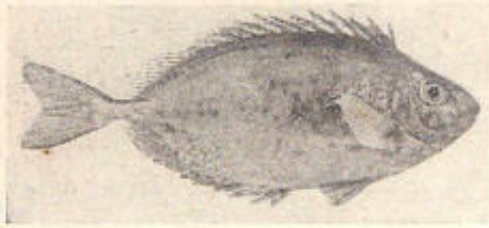
The Ludrick

The blackfish or ludrick (*Girella triglyphus*) takes a green weed bait and is much sought after by rock fishermen. It is greyish in color, with several blackish transverse bands on the body. In the male the teeth are tricuspid, but are usually chisel-shaped in the female. Specimens may grow to a length of 2ft., and a weight of 9lb. Cases of albinism or piebald coloration are sometimes encountered.

The Surgeon Fish

Surgeon fishes (*family Teuthidae*) inhabit our tropical shores. On each side of the tail of these brightly hued fishes there is at least one spine reminiscent of a surgeon's lancet with which these fishes can inflict nasty injuries in self-defence..



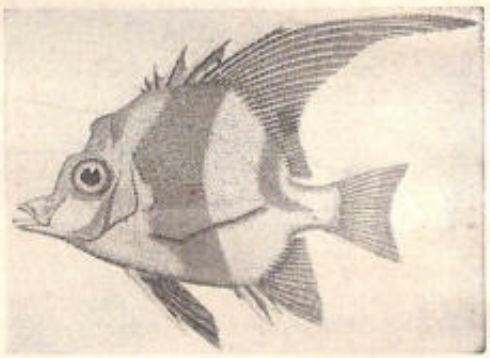


The Spinefoot

The spinefeet (*family Amphacanthidae*) differ in having the ventral fins each possessing three soft rays between two spines, an arrangement unique among fishes. They also have an increased number of anal spines, so they are prickly customers to handle.

The Boar-fish

The trawlers often bring to light various species of boar-fish, so called from their pig-like snouts. The dorsal fin is elevated and preceded by prominent spines, and the large eyes denote a deep sea habitat. A common species on the continental shelf is *Zanclistius elevatus*.



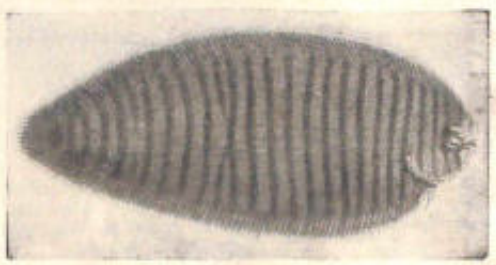


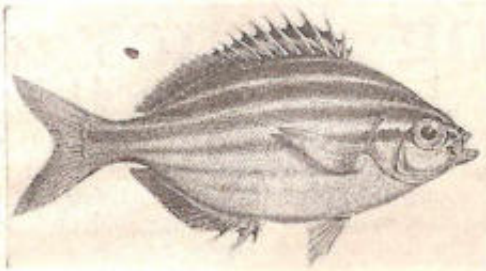
The Magpie Morwong

The bold black and white stripes of the magpie Morwong (*Goniistius gibbosus*) give the fish a striking appearance. It lies motionless for long periods looking rather like a little surprised cockatoo with its crest-like dorsal fin erected over its eyes.

The Sole

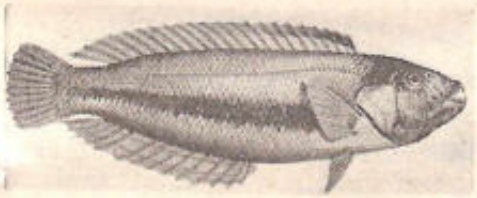
The sole, of which the banded *Synaptura fasciata* is our illustrated representative, differs from the flounder in having the preopercular edge entirely covered over by scales, while the dorsal and anal fins are usually united with the tailfin. All the flatfishes are delicate table fish.





The Mado

The mado (*Atypichthys mado*) is a prettily striped little fish like a "stripey" or "footballer" (*Microcanthus joyceae*) in color, but the latter has a deeper form. Both commonly school around wharves or rocks and are caught on the lines of juvenile anglers using the most primitive apparatus. The mado is shown on the color plate (Figure 9).



The Maori

The maori is a handsome parrot fish (*Ophthalmolepis lineolatus*), which derives its name from the blue lines on its face resembling the tattooing of the old Maoris of New Zealand. It likes to bury itself in the sand, but also engages in more active pursuits, as the following fish story from Taronga Park Aquarium shows: Some maoris were placed in a tank next to another containing old wives. Each morning, the finest specimen of the maoris was found in the tank with the old wives, having leapt the intervening division. As the daily press observed, "Every day the keeper put him back, and every night he leaps the barrier again. The zoo is talking about it and the old wives look even more shy and startled than nature made them."



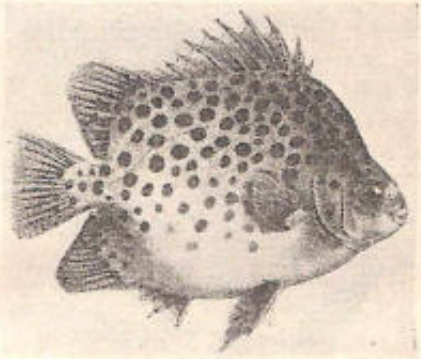
The Gobies

Gobies (family *Gobiidae*) are small, scaly fishes, usually dull-colored yet prettily marked, which may be found in almost any rock-pool. The ventral fins are united to form a sucker for clinging to rocks or weeds. There are many and diverse species from our shores and inlets.

The Goat-fishes

The goat-fishes (fam. *Mullidae*) include numbers of brightly colored shore fishes whose chins are adorned with a pair of feelers or barbels, giving a goatee effect. With these, goat-fishes feel their way over the bottom and appear to find their food also by means of these sensitive appendages.



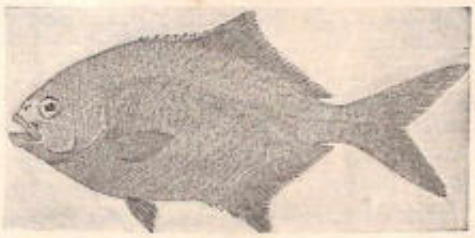


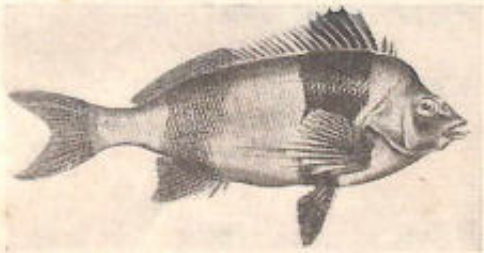
The Butterfish

The term butterfish is applied to many different species in different parts of the Commonwealth, but is here used in the New South Wales sense for the warm water species of *Scatophagus*. These fishes have smooth skin, delicately tinted and spotted or barred with black. They are good eating, but have low tastes when feeding themselves, seeking offal and refuse which would not commend them to the average palate.

The Sweep

The sweep (*Scorpis lineolatus*) grows to a foot in length. It is a blue fish, common in rocky localities off our coasts. It is most easily caught on a piece of sweep bait, a cannibal temptation it finds hard to resist.





The Morwong

The morwong (*Sciaenoides*), called five fingers by the colonists of the First Fleet, is a light yellowish-olive bream-like fish. The lowest pectoral rays are finger-like for grasping rocks. The so-called morwongs of Queensland are quite different fishes of the genus *Plectorhinchus*, of less edible importance. Figured here is the banded morwong (*Goniistius vizonarius*), a well-marked Tasmanian species.

The Mullet

The mullet (*Mugil*) schools in large numbers and migrates over large areas of water when breeding. There are many Australian species inhabiting both fresh and salt water. All are silvery, with glum-looking mouths suitable for browsing over weeds and silt, and all are fine food-fish.



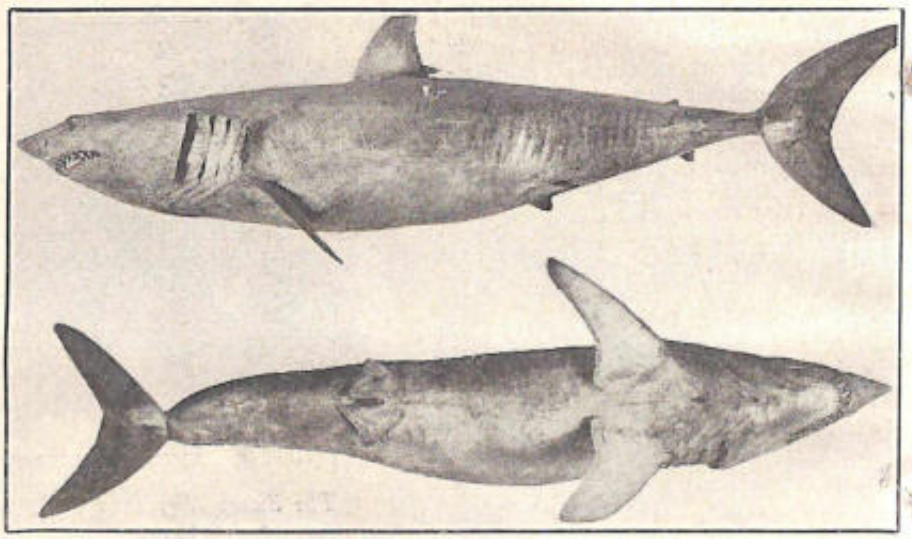
Australian Sporting Fishes

AUSTRALIA could probably be as famous for her sporting fishes as California or New Zealand, but so far anglers have paid little attention to the fact that big game fishes are to be caught in our waters. The blue pointer shark (*Isuropsis mako*) is common at times off our eastern coasts and is identical with that famous fighter, the mako shark of Maoriland. The thresher and hammerhead are also found in Australian waters.

The snapper or redfish (*Chrysophrys guttulatus*) usually averages 5 lb. or 6lb. in the markets, but grows to at least 30lb. A black bream (*Roughleyia australis*) from George's River, New South Wales, weighed 7¼ lb., while the blackfish (*Girella triglyphus*) sometimes reaches a length of 2 feet, and weight of 9lb.

Our "rock-hoppers" catch blackfish (known as ludrick in Victoria) by float-fishing with a green seaweed as bait. The silver drummer (*Segutilum sydneyanum*) takes a brown seaweed.

Most of our potential sporting fishes belong to the mackerel and swordfish tribe. These fishes live in the open ocean and migrate over long distances; so that a preliminary search, especially of our northern waters, would be necessary to determine seasonal occurrences, very little information being at present available. Nevertheless, we have records of the capture of large tunny and kingfish of several species; and swordfish and sailfish of large size have been caught or stranded from time to time. In other countries tunnies and kingfish weighing more than 100lb., and swordfishes up to 1000lb. in weight have been caught, and it is quite possible that similar fishes await the attention of Australian anglers. These fishes take a silvery fish bait, such as a whole garfish or piece of bonito, usually striking at it from one side, and putting up a tremendous fight when hooked. Large herrings appear in our northern waters at times and are related to, but smaller than, the famous tarpon of America.



The Blue Pointer Shark



The Swordfish

The swordfish (*Istiompax australis*), also called black marlin, appears at times off our coasts, but is an established game fish in New Zealand. The sword is round in cross-section, unlike that of the spearfish (*Xiphias estara*), which is flat and bladelike. In the sailfish (*Istiophorus indicus*) the dorsal fin is elevated into a blue-spotted sail, but both the spearfish and sailfish are so far only known from a few specimens in Australia. When game fishing is established here they may be found more commonly than is now allowed. Of course, the sawfish and sawshark, with their toothed blades and five pairs of gilslits, are very different creatures, nearer the sharks and rays.

In Queensland it is common for fishermen trolling from launches with a spinner or other bright lure to catch dozens of Spanish mackerel (*Scomberomorus commerson*) in a day, each specimen perhaps weighing 24lb. or 25lb.; while a kind of trevally, the turrum (*Turrum emburyi*), 16lb. or so in weight, often becomes hooked at the same time. The Queensland groper (*Promicrops lanceolatus*) grows to a length of 7½ feet. In more southern waters the red and blue gropers are caught off rocky reefs.

The kingfish of New South Wales (*Regificola grandis*), or yellowtail of Victoria and haku of New Zealand, is recorded up to 100lb. in weight.

Flathead and whiting, long tom and kahawai (*Arripis*) rock cod, sharks, rays, and groper, the smaller kingfish, tailor, barracouta, kahawai, and

snapper are other sporting fishes.

Jewfish (*Sciaena antarctica*), fished for from the beaches or in deep "pockets," attain a length of at least 6 feet and a weight of over 80lb. Who has seen a young one? Where do these fishes breed and whence come the young? There is much to be discovered about our large fishes, and any local Zane Grey will almost certainly make interesting discoveries. No doubt some readers have heard of greater-sized fishes than those mentioned above, and these would be well worth recording.

The main freshwater sporting fishes are the golden perch or yellow belly, the Murray cod, Macquarie perch, bass and such introduced species as the rainbow and brown trout, which flourish in Victoria and Tasmania.

Murray Cod (*Maccullochella macquariensis*), according to Joseland, readily take a large spoon bait, especially if it has a red tassel. Worms, frogs, meat and grubs are the more usual baits for most of our freshwater fishes. The Australian perch is very partial to a moving insect bait. In Queensland the barramundi (*Scleropages*) takes a spinner or fly; but the Queensland lungfish (*Neoceratodus*) is protected and must not be killed.



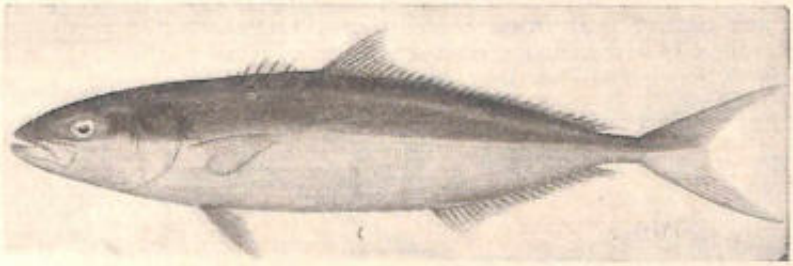
Trout Fisher

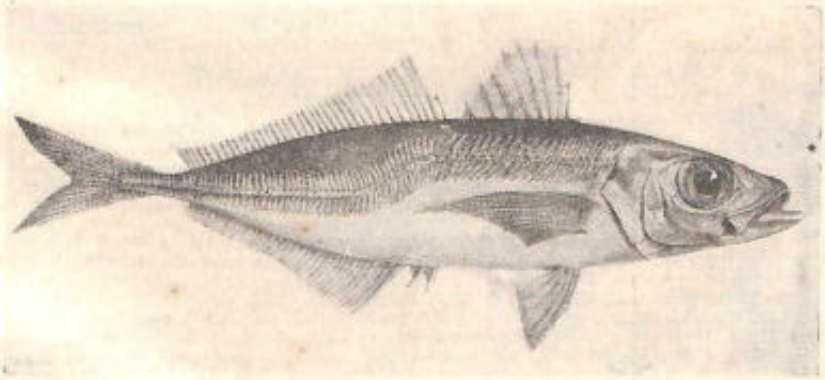
Both the brown and rainbow trout (*Salmo eriox* and *S. irideus*), together with other varieties, have been introduced into the rivers of Tasmania, Victoria, and southern New South Wales. In the Great Lake of Tasmania the brown trout has been recorded up to 25lb., but on the mainland they are smaller than the rainbow trout, which has been caught up to 12lb. in weight. The average fish caught weighs about 1lb.

Particulars of the regulations governing the capture of our fishes may be obtained from the Fisheries Departments of the different States, and local advice can then be sought as to the best baits and methods for the capture of the various species. There is often an angling club in inland districts; and the Government Tourist Bureaus of the capital cities impart information.

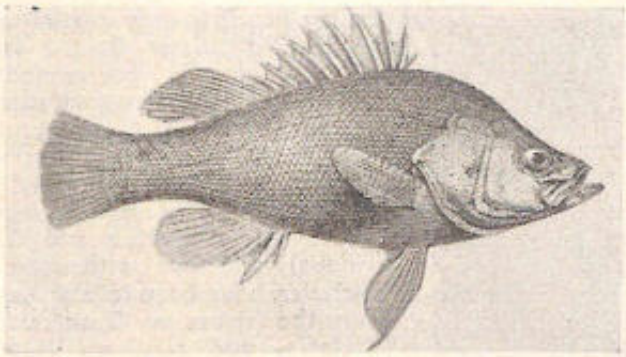
The Kingfish

The kingfish of New South Wales (*Regificola grandis*) or yellowtail of Victoria, is the haku of New Zealand, a fine sporting fish, common in schools, chasing smaller fishes. Unfortunately, the name kingfish is applied loosely to many different species in various parts of the Commonwealth. In Queensland, to the leaping tuna (*Scomberomorus*); in Victoria and Tasmania, to *Sciaena*, the Jewfish of New South Wales. It may also be mentioned that the yellowtail of New South Wales is *Trachurus declivis*, a small fish called horse mackerel elsewhere, while the bonito — like *Sarda*, is called horse mackerel in New South Wales.



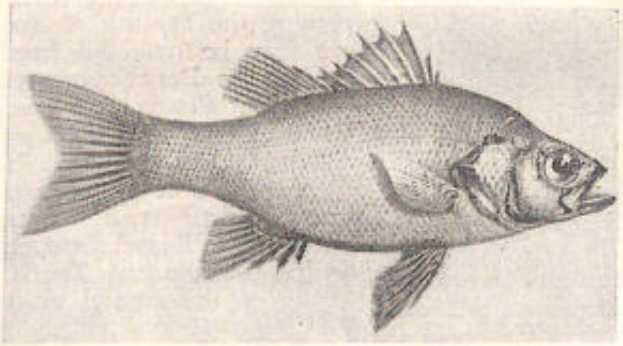


The Yellowtail



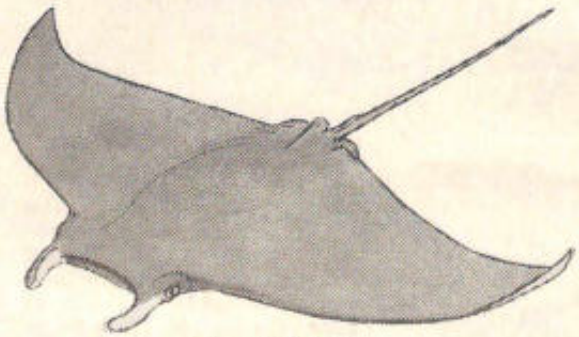
The Golden Perch

Few of our fishes are more beautiful than the golden perch (*Plectroplites ambiguus*), which is common in the Murray and its tributaries, though absent from Victorian rivers that flow south to the sea. The back and head are green, the sides of the body golden-olive, and the lower surface a golden hue, red-tinged. As a table-fish, this species is esteemed nearly as much as the Murray cod. Occasionally, it attains a weight of about 9lbs., but the average is 3lbs. or 4lbs.



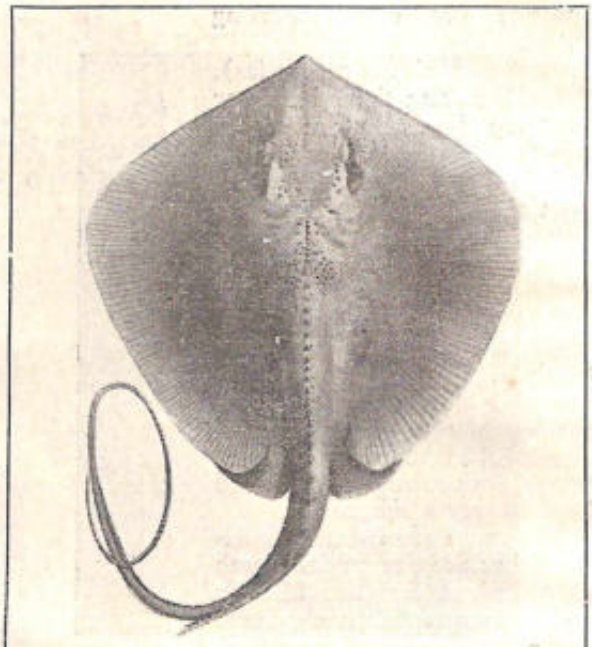
The Australian Perch

The Australian perch or bass (*Percalates colonorum*) is a fine food and sporting fish. After floods it often becomes washed down to estuaries, where resident specimens often differ in form and habits from their fluviatile cousins.



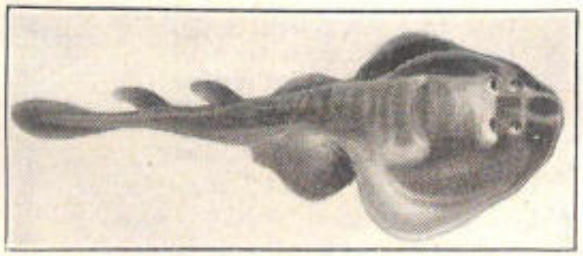
The Devil-fish

The devil-fish (*Daemomanta alfredi*) is the largest of our rays, growing to a width of at least 13 feet, and weighing hundreds of pounds. There is a fin-like structure on each side of the wide mouth for feeding purposes, and the body is diamond-shaped. The tail is whip-like. This huge species of ray is rarely caught, and a good specimen is needed for scientific description. Sometimes the devil-fish may be seen leaping from the sea as it chases a school of fish, and falling back into the water with a thunderous splash.



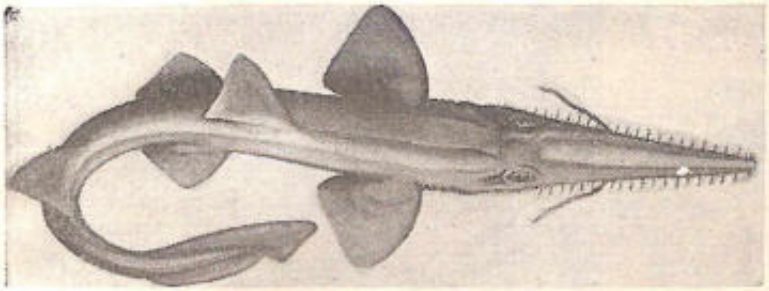
The Stingrays

There are many species of stingrays or, as they are also called, stingarees. They are kite-shaped creatures, and often have one or more serrated spines on the tail which can inflict a dangerous wound. Although there is no venom gland, the slime and foreign matter on these spines usually is sufficient to cause much agony, and even blood poisoning, to a human victim. Stingrays and their relatives, the skates, are excellent as food, and can be recommended for invalids. The skates lay eggs with leathery covers, often with four processes or tendrils, one at each corner. These are known as mermaid's purses or barrows. Most of the stingrays are viviparous. They live on the sand off our beaches, and in deep water, feeding on any small crabs, fishes and other animals they may find there.



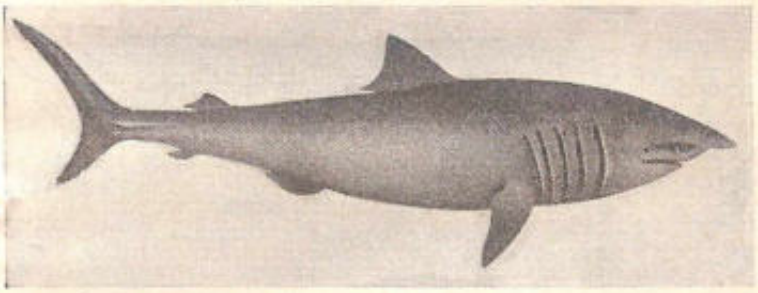
The Numbfish

The numbfish is a member of the ray tribe which leads a lazy life, lying at the bottom of the sea half buried in mud or sand. It can afford to do this because of its power of giving off electric shocks from hexagonal muscle cells in its head and body. Any animal touching the numbfish is immediately paralysed, and, if small enough, doubtless eaten. Any little crabs, worms and fishes which come its way are relished by the numbfish. Cramp fish, numbie, electric ray and torpedo are among the politer names applied to this fish which often bestows shocks upon unsuspecting fishermen when they are handling or standing upon their catches. The numbfish looks rather like a shapeless mass of raw beef in life, though its body is white underneath. There are several species. A long-tailed one, *Narcine tasmaniensis*, is caught by the trawlers, while *Hypnos monopterygium*, with only a stump of a tail, infests our harbors. A rarer form is *Notastrape macneilli*.



The Sawshark

Nature has equipped several different kinds of fishes with a sword or saw-like snout with which the prey is killed. The swordfishes have a long straight bill and strike, or perhaps, sometimes impale, their victims, whereas the sawshark and the sawfish have their weapons toothed, and they slash from side to side with them when attacking their prey. The sawshark, which has two tendrils hanging from the snout, is common off our coasts. Being a true shark, the gill slits are on the sides. In the sawfish (*Pristis*), the gills are below the head, as in the rays, and there are no tendrils on the snout. The sawfish is only an occasional visitor to our temperate waters. The sawshark (*Pristiophorus*) bears living young, in which the teeth of the saw are laid back along the sides of the blade, thereby recalling Nature's provision for the dogfish embryo.



The Basking Shark

The largest Australian shark is the basking shark (*Tetroras maccoyi*, sp. nov.), which grows to a length of probably 40 feet or more, yet is perfectly harmless and docile. It drifts along the ocean currents, lying at the surface and feeding like a whale, on the minute animalculae which it sieves through its long, whalebone-like gillrakers. The Australasian basking shark seems to be restricted in range to the South-West Pacific currents, and specimens are occasionally stranded on the shores of Australia and New Zealand. One, preserved in the Melbourne Aquarium, has been regarded as a new species, *Tetroras maccoyi*, by Whitley and Phillipps, in an unpublished paper. Earlier authors have called it *Selache maxima* or *Cetorhinus maximus*. The very wide gill-slits and flabby head, to say nothing of the enormous size, are sufficient for the recognition of this species.

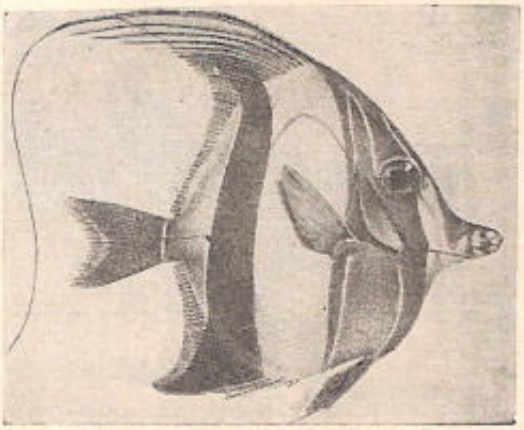


The Grunters

In our freshwater streams and rivers, grunters are familiar perch-like fishes. The noise made by them when caught is responsible for the name. The spangled grunter (*Leiopotherapon unicolor*), is widely distributed, as is also the silver perch (*Terapon bidyanus*), here figured.

The Angel Shark

The angel shark or monk fish (*Squatina australis*) is so called on account of its somewhat ecclesiastical appearance, but it is of interest to us because it is almost intermediate between the sharks and their relatives, the rays. Sharks have rather rounded or spindle-shaped bodies with well developed tails, and, usually, five gillslits on the sides of the head. Rays are flattened, with the gill-slits below the head or body, and usually have long, thin tails. The angel shark has wide pectoral fins like a ray, the gill-slits on the lower part of the sides, and a well developed tail. It lies among rocks as the wobbegong does, and in the autumn produces living young. The common species is grey or brown and rather drab, but the trawlers occasionally catch an ornamented species (*S. tergocellata*) in deep water. An angel shark was figured in the 17th century by an artist accompanying William Dampier to Western Australia (then New Holland).



The Moorish Idol

The Moorish idol (*Zanclus canescens*) is another beautifully colored coral fish. It is allied to the surgeon fishes and has a smooth skin and very long dorsal spine. It feeds on minute creatures in coral waters and grows to a length of seven inches. (Figure 5, color plate.)



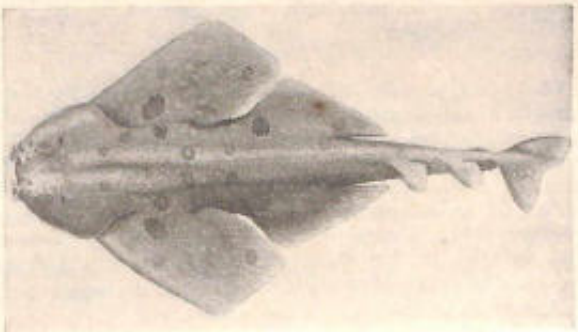
Red Rock Cod

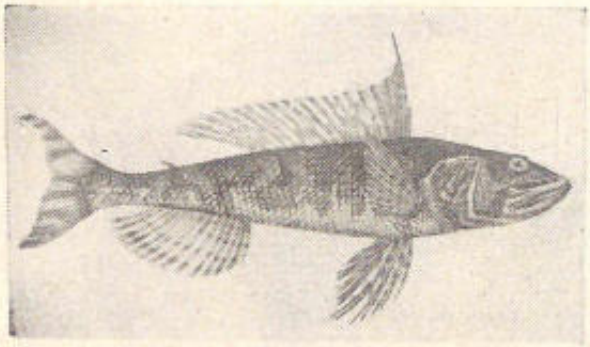
The red rock cod (*Ruboralga jacksoniensis*) loves to lie still among weedy rocks, which it closely resembles, even tags of skin simulating small seaweeds. It is one of the mail-cheeked fishes, otherwise somewhat perch-like, but is no relative of the true cod.



The Kelp Fish

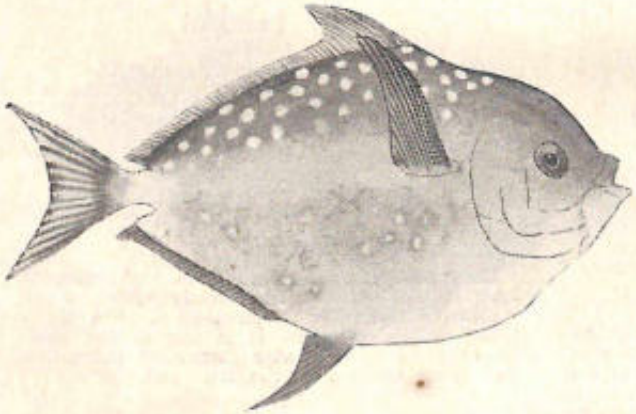
The kelp fish (*Chiroremus aboriginalis*) has fairly large scales and a pointed snout, and takes a cungevoi bait. It lives among weed-covered rocks in our temperate waters.





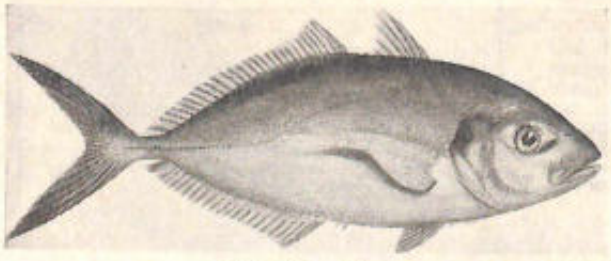
The Sergeant Baker

The Sergeant Baker (*Latropiscis milesii*) was named after some early colonial military man. It is a beautiful purplish-red colored fish of fine flavor, and grows to a length of 24 inches. There are red blotches on the back and sides, and pearly white ones beneath, while pink fins are crimson spotted. In the male, the front dorsal spines are lengthened. This gaily colored species, though common in the eastern States, is not often on sale at the fish shops.



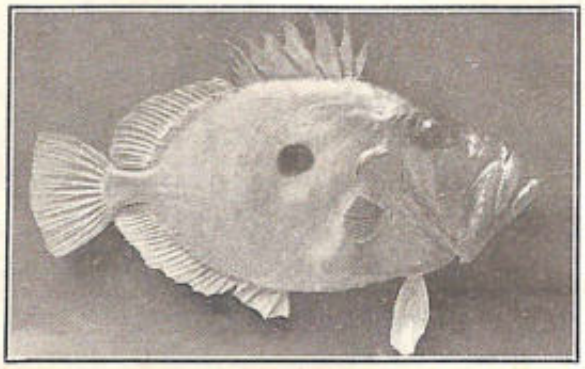
The Moon Fish

The opah or moon fish (*Lampris regius*) is a large silvery species with deep belly and pink fins. It is very rare, but sometimes drifts around the seas between Tasmania and New Zealand.



The Trevally

The white trevally of New South Wales (*Usacaranx nobilis*) is called silver trevally in Tasmania, and silver bream in Victoria. Allied species are called yellowtail in New Zealand and skipjack in Western Australia. The name trevally, or cavalli, means a horse (Lat. *caballus*), and is applied to several groups of fishes having a "horsey" expression; this supposed equine resemblance is, however, more marked in the little pony fishes (family Leiognathidae) of Northern Australia, and reaches its climax in the sea horses (*Hippocampus*).



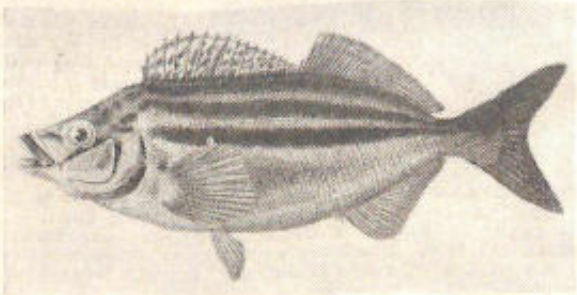
The John Dory

John Dory (*Zeus australis*) is a fine food fish. It is thin and tall when viewed head on, so that it can approach its prey with ease and then shoot forth its very protractile mouth. Tradition says that the dark mark on each side of this fish is the thumb and finger-print of the disciple who caught the fish which rendered the tribute money, as told in the New Testament; but the John Dory is a marine species not likely to be present in the situation credited.



Queensland Lungfish

The Queensland lungfish (*Neoceratodus forsteri*) is a rather sluggish fish, up to about 5 feet in length, which lives among weeds and submerged tree-trunks near the banks of the Burnett and Mary Rivers, Queensland. It is of particular interest because, though it usually breathes through gills in the orthodox fish-like manner, it can also rise to the surface and inhale air into its peculiar lung, often making a grunting noise as it does so. This faculty must be very useful; when the water becomes foul, the lungfish outlives the other native fishes of the river. The lungfish cannot travel on land, for its flipper-like fins are incapable of supporting its heavy body, and the fish, despite its lung, soon dies when taken from the water. It feeds chiefly on vegetable matter, though worms and shrimps are also taken. The species is protected by law, and anglers must return any they catch to the water. The eggs are not unlike those of frogs, and the baby lungfish is rather like a tadpole. The frog tadpole grows its hind-legs first and its fore-legs afterwards, but the young lungfish reverses this procedure; the forelimbs or pectoral fins are the first to appear, and the hind limbs or ventral fins are developed when the fish is four or five months old. In eight months, the lungfish is about 2½ inches in length; it may live for well over 20 years.



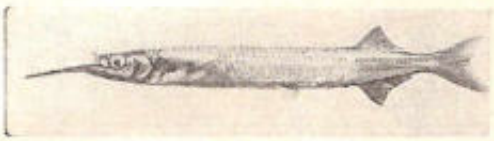
The Tasmanian Trumpeter

The trumpeters (species of *Latris* and *Latridopsis*) are excellent food fishes, commonly sold in the fish shops of Tasmania and New Zealand. These fishes, however, do not venture far beyond the southern colder waters. Illustrated is the Tasmanian trumpeter (*Latris lineata*), which attains to a large size—weight up to about 60lb.



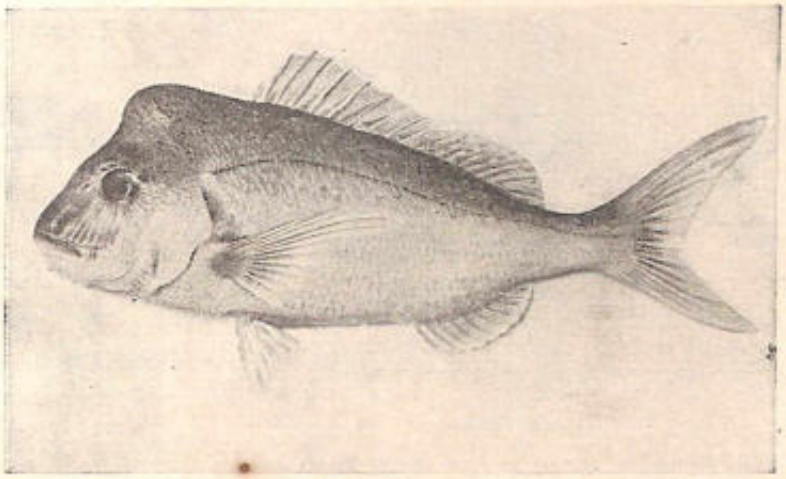
Peron's Leatherjacket

This yellowish-brown fish with dark brown markings, grows to just over a foot in length. The male has the "toothbrush" group of spines on the sides of the tail. Peron's leatherjacket (*Cantherines peronii*) has been taken at Warrnambool, and elsewhere in Victorian waters.



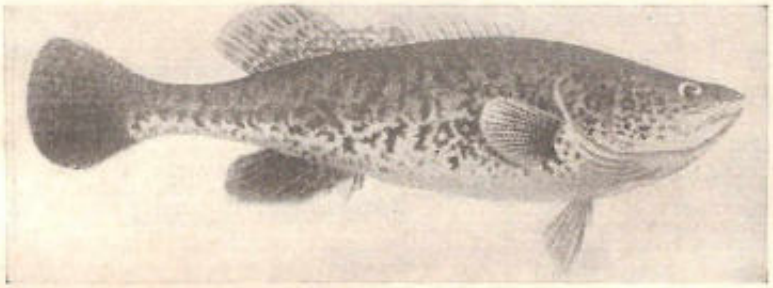
Garfishes

Garfishes or guardfishes, balloo or bullahoo of the aborigines, are also called beakies (*Reporhamphus*). They are netted in large numbers in estuaries and off beaches at times, and are tasty morsels, though very bony. They swim at the surface at night, often cleaving the water with their tails to make a swishing sound. The upper jaw of a guardfish is triangular, and the lower one lengthened into a prominent beak.



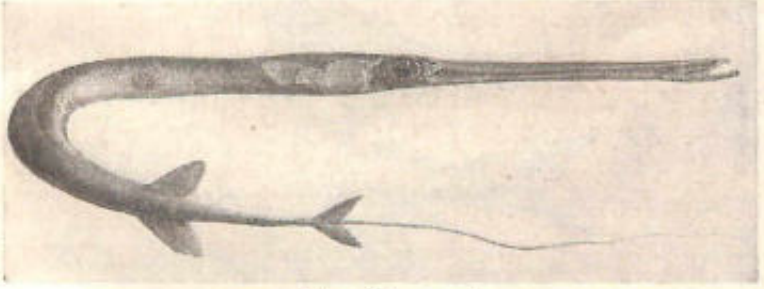
The Snapper

The snapper (*Chrysophrys guttulatus*) is the food fish, par excellence, in Australia. It is known by various names. The young are called cockney, then, up to one pound weight, red bream, and later, squire or redfish. After reaching 3 lb. or 4 lb. weight, the school snapper leaves estuaries for open water, and the average market specimens weigh five or six pounds. When adult, the snapper (Figure 13, color plate) develops bony knobs on the skull which give a remarkable "Old Man" appearance to large specimens, which may attain a weight of over 50 lbs. Snapper is often needlessly spelt schnapper. To the aborigines it was known as wollomai, recalled by Cape Wollomai, in Victoria. Many houses and estates are thus named also, but more likely because, on one occasion, a horse named Wollomai won the Melbourne Cup.



The Murray Cod

The pride of the Murray-Darling system is the Murray cod (*Maccullochella macquariensis*), whose cool greenish colors and fine flavor are delightful to eye and palate respectively. Fisheries officials have a difficult job to curtail poaching and illegal netting of this fish, which reaches a length of 5 feet, and may weigh over 100 lb. More than one cod weighing 150 lbs. has been recorded. The average weight of fish that come to the market is under 20 lbs.



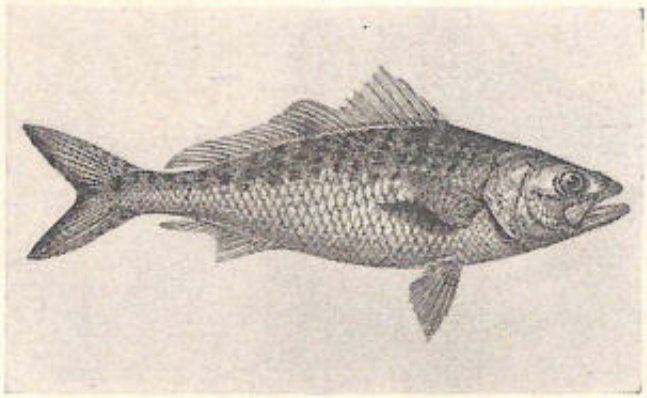
The Flutemouth

The flutemouth (*Fistularia immaculata*) has a long snout reminiscent of the churchwarden pipe of a bygone generation, so that in White's "Voyage to New South Wales" (1790), it is figured as the tobacco pipe fish. These fishes grow to a large size, and have a filament at the end of the tail which can be lashed in various directions.



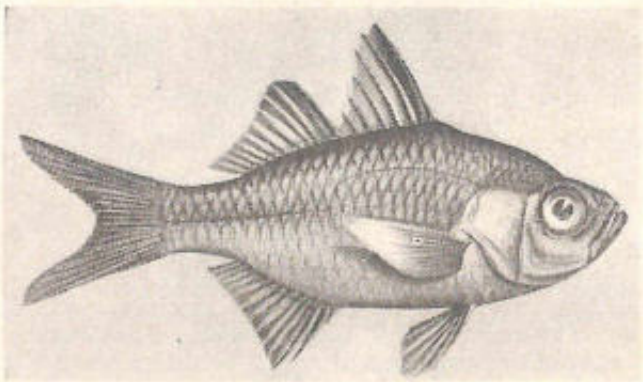
The Seahorse

The seahorse (*Hippocampus abdominalis*), shown in the color plate (Figure 12) is popular in aquaria on account of its sedate bearing and quaintly horse-like appearance. The female lays her eggs on the abdomen of the male, who then carries them in a pouch until they hatch. These fishes live among weeds in our harbors, but a small deep sea species (*Farlapiscis breviceps*) has been chosen for illustration in the text.



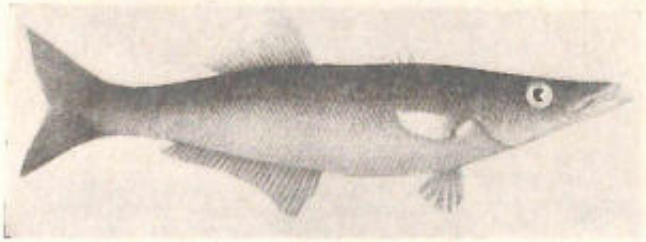
The Kahawai

A fish called sea salmon in New South Wales and roughy in Victoria, and known to science as *Arripis trutta*, would be better termed by the Maori name, kahawai, as it is not a true salmon and the roughy of some Australian States is still another unlike fish. Kahawai appear in thousands in New Zealand, where they are used as bait for larger fishes. They migrate northward along Australian coasts in summertime, where they are chased by sharks and dolphins. The flesh is good as food, but the kahawai is usually neglected for better fish which abound in its season. The young have been called newfish. Like blackfish, kahawai should be kept alive as long as possible or cleaned immediately after capture, as otherwise the viscera decompose and render the fish unfit for human consumption.



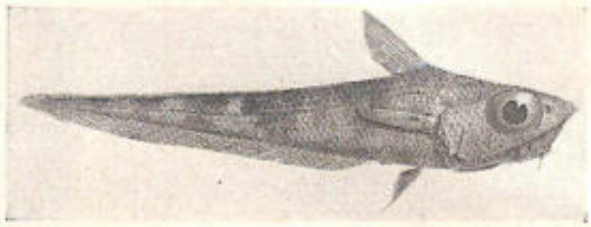
Chanda Perches

The chanda perches (family Ambassidae) are found in salt and freshwater. They stick their spines through the meshes of nets, so are unpopular with net fishermen, but the freshwater species, like the Victorian *Blandowskiella* and the *Ambassis* and *Priopis* of New South Wales and Queensland, are more in demand as aquarium fishes.



Long-finned Sea Pike

The sea pike (*Sphyraena obtusata*) is a fierce though diminutive relative of the famous barracuda (not barracouta) of the West Indies. The long-finned sea pike (*Dinolestes lewini*) is related to the soldier fishes (family Apogonidae).



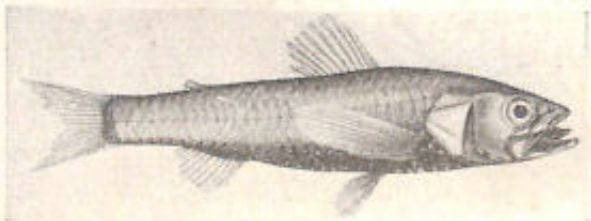
The Rat-tail Fish

The rat-tail or grenadier (*Coelorhinchus fasciatus*) is a relative of the true cod family of the Old World. It is repulsive-looking, and lives in water at least 100 fathoms deep, but is destined to be one of Australia's foremost food-fishes when our fisheries are more fully exploited.



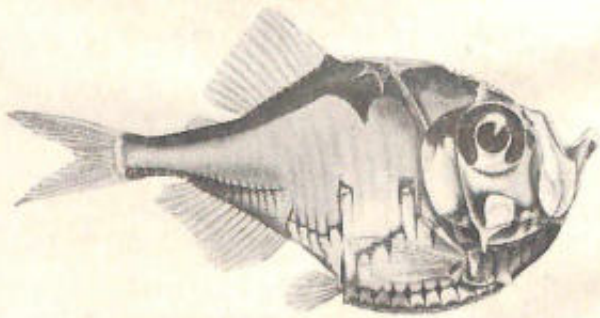
The Lancelet

The lancelet is an almost transparent creature, only an inch or two in length, which lives in sand in shallow water. It is the lowest form of fish life, as it has no jaws, no gill-slits, no limb-like fins, and only the most rudimentary backbone. The body is pointed at both ends, and has a series of V-shaped muscle bands running along each side. The mouth is surrounded by a ring of feeding tentacles, and there is usually a somewhat arrow-shaped tail fin. These primitive little creatures burrow rapidly in the sand or swim freely in the water. There are seven species in Australia, the one illustrated being the Southern lancelet (*Paramphioxus bassanus*).



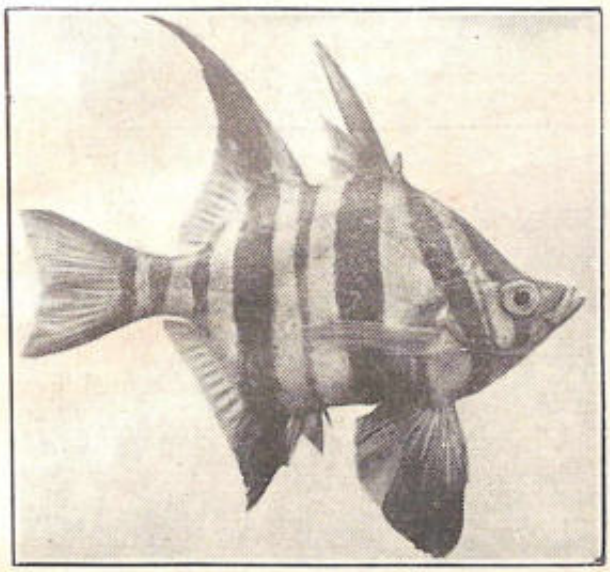
Lantern Fishes

The lantern fishes (family *Myctophidae*) are inhabitants of very deep water off our coasts, where their surroundings are pitch dark and cold. They have rows of luminous spots on the scales, which are in orderly array in each species, and these, shining in the dark or switched off according to the will of the fish, act as a guide to keep the school together or perhaps as aids to feeding or signals of danger.



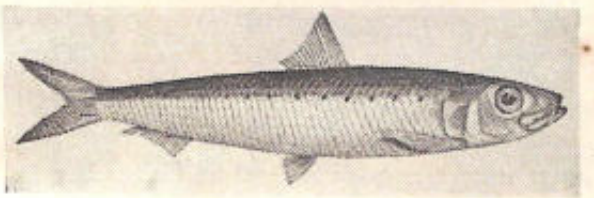
The Hatchet Fish

The deep-bodied hatchet fish (*Polyipnus tridentifer*), here figured, comes from the Great Australian Bight.



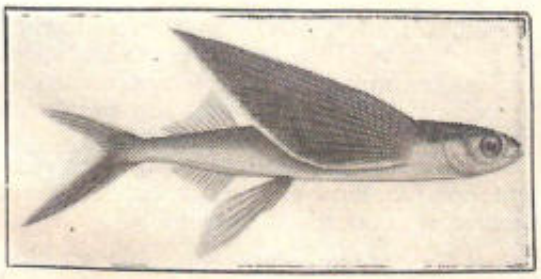
Old Wife

The old wife (*Enoplosus armatus*) is a graceful little fish, common in our harbors, which swims in schools, looking like a fleet of neat little schooners, with the fins sets like sails. The yellow and brown bands are very striking, and the length attained is about nine inches. This species was originally described in 1790. (See also color plate, Fig. 10.)



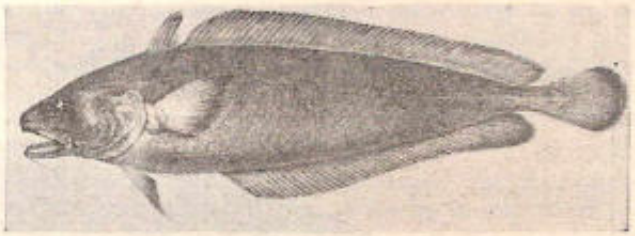
Australian Pilchard

The Australian pilchard (*Sardinia neopilchardus*) occurs at times in such multitudes that the little blue (above) and silvery fishes may be taken literally by the bucketful in shallow water. They are chased by larger fishes, millions being captured; others are suffocated in the mad, fleeing shoals, and drift to the shore. Tons of dead pilchards have been carted away from one sea-beach.



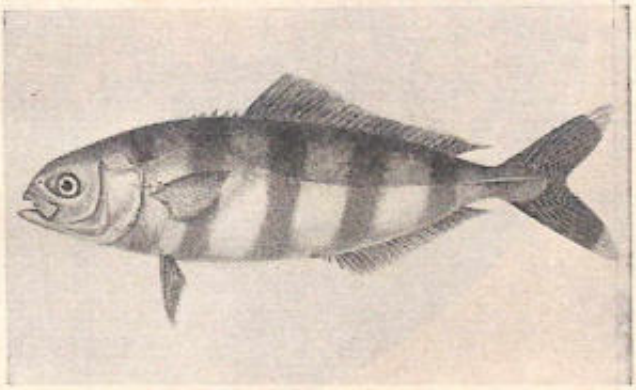
The Flying Fish

Ocean voyagers admire the flight of flying fishes (*Exocoetus, Exonautes,* and *Cypsilurus*) as they thrust themselves from the water by their tails and glide over the waves, sustained by the wind. They are attracted by lights and often leap aboard ships. Some have two "wings," formed by the pectoral fins; others have the ventral fins also enlarged. The young are brown-banded, and often have quaint tufts of skin below the chin, giving them a "bearded baby" appearance.



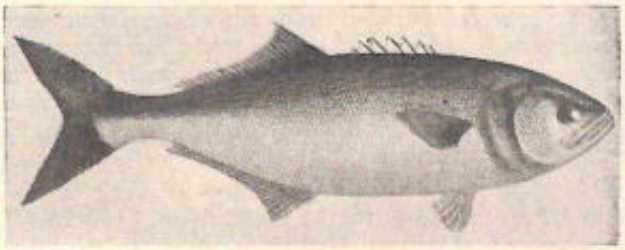
The Ling or Beardie

The ling or beardie (*Lotella callarias*) lives near rocky reefs and grows to 20 inches in length. An excellent food-fish, it is one of the few Australian representatives of the true cod family (*Gadidae*), so famous in the Northern Hemisphere. These all have a barbel hanging from the chin for feeling along the bottom of the sea.



The Pilot Fish

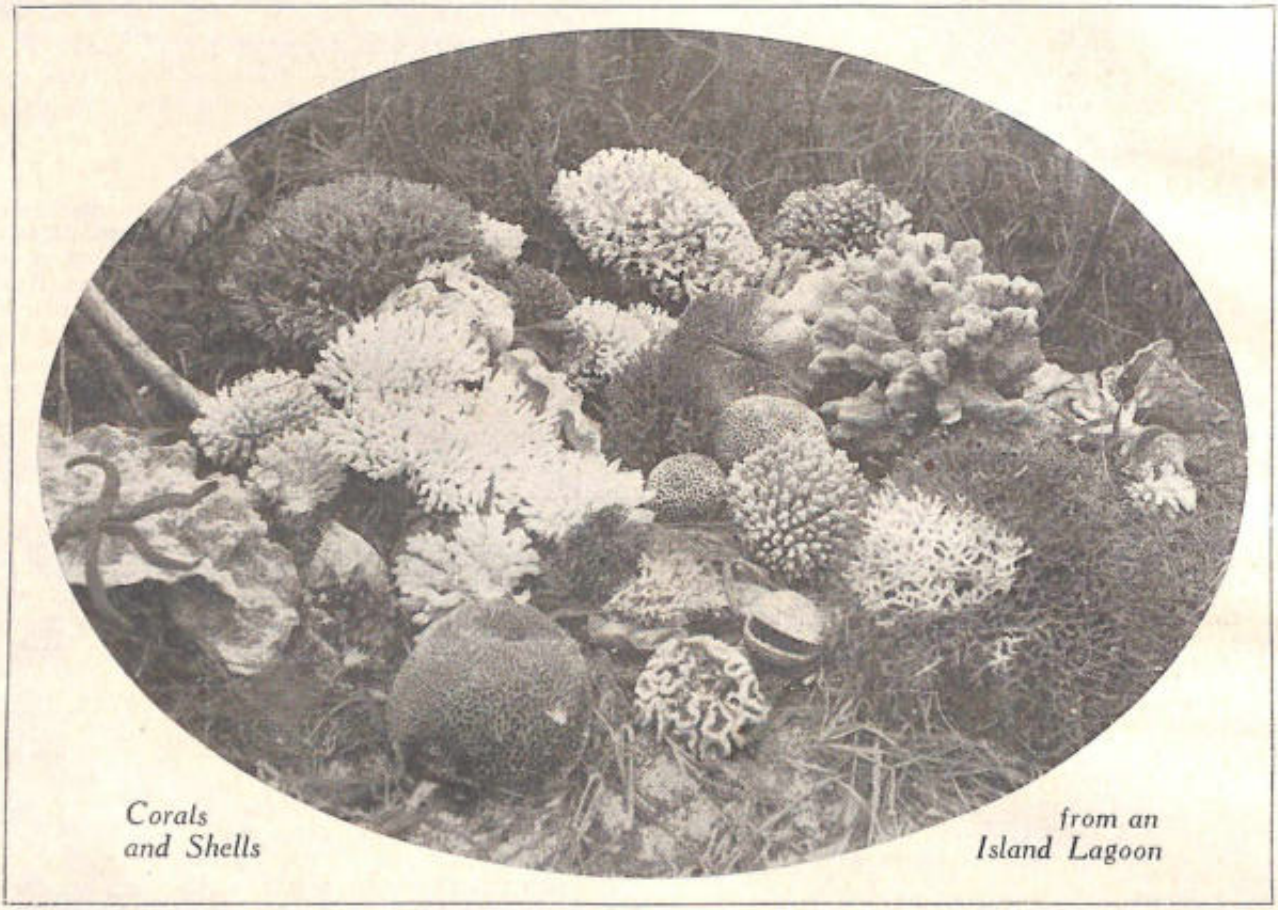
The pilot fish (*Naucrates angeli*) is the camp-follower of the shark, notwithstanding popular legend which credits it with all sorts of pathfinding and food-testing services. It is a bright blue-banded fish. It feeds on any scraps left by the shark, which does not harm it, and should not be confused with the very different sucker-fish. The name *Naucrates angeli* applies to the Australian species, but the illustration represents the Indian Ocean species, *N. indicus*.



The Tailor

The tailor (*Pomatomus pedica*) derives its name from its habit of cutting nets or lines with its sharp teeth, as a tailor shears through cloth. It is called skipjack in South Australia, Tasmania and Victoria, but this must not be confused with the skipjack of other States, which may be the billfish (*Scomberesox*) or a kind of trevally. The tailor is reported to grow to over 3 feet in length, with a weight of more than 18lb. It was known to the Queensland aborigines as pombah.

The Coral Pool



Corals and Shells from an Island Lagoon

Wonders of the Great Barrier Reef

Here an attempt has been made to illustrate a little of the life so abundant in the coral pools on the reefs off the Queensland coast.

While coral of various kinds may be seen at each side, the middle of the plate is taken up by swimming fishes, the blue and green fishes, which are gregarious in habit, being at the top. These lovely little flashing gems have been called demoiselles, a very appropriate name. Most of them have been simply called coral fish; a few (such as that figured at the right top of the plate) being known as beaked coral fish on account of the notable snout with which crevices in the coral are "explored."

The gaudy spotted object, a little below on the left, is a tropical relative of the common leatherjacket of our southern shores. The little striped demoiselles, on the right, have been called humbugs on account of their resemblance in looks if not in flavor to the humbug sweetmeat. The remaining and largest fish illustrated flaunts a curious elongated spine from its dorsal fin and has been called the banner fish; it is not distantly allied to the beaked coral fish.

The brilliantly-colored "lobster," in the righthand bottom corner of the plate, is one of the chief delights of the visitor to the reef, its very extended antennae or feelers always being a source of wonder. Although generally called a lobster, it has no nippers and is, therefore, a crayfish and should be called the coral crayfish. As a matter of fact, most Australian lobsters are crayfish, and commonly, when a real lobster is found, it is called a crayfish.

In the opposite corner is another most striking object, a handsome crab with fingerprints of blood marked on its back. The central sea star is one of the very first animals to be noted, even by the most unobservant; the deep blue strongly contrasting with the creature's surroundings, however varied in coloration the adjacent coral may be.

High up on the lefthand side of the picture will be seen projecting the poisonous spines of a needle urchin, a somewhat gregarious animal, inoffensive

in itself, but greatly feared on account of the sharpness and brittleness of its spines, whose wound causes great agony. The two curious worm-like colored objects just above the crab are the animals of the lesser giant clam, which is very numerous in the coral blocks on most reefs.

Now to the corals, the most important features in every coral pool. Their number is legion, as they vary in form and coloration, so that the exact differences between the kinds has not yet been calculated. The uppermost in the plate, as in real life, are the stag corals; these are the most hardy and can stand more exposure to the sun than can any other species. Many colors may be here seen, though the stag corals seem to favor green more than any others, their form being branches, more or less thick, and always very brittle. The pure white skeleton seen in houses as coral is covered in nature with a minute, jelly-like animal which lives by poisoning its prey, and in consequence cuts from living coral are also poisonous.

The round globe-like object on the lefthand side of the picture is brain coral, so called because its curious reticulate surface is reminiscent of the convolutions of the brain. This is the most solid of all corals. On the opposite side are three forms without much apparent distinction: to the casual observer they are simply corals. The beautiful little branched form of a pink color may be called the pink humbug coral, as the little humbugs take refuge in it and can be caught by lifting the coral out of the water. The two curious flat subcircular objects at the bottom are well known as mushroom corals.

The inhabitants of the seashores can be easily grouped according to the different kinds of shore as sandy beaches, rocky points or muddy estuaries. Even the rocky points inside Australian harbors show varied forms of marine life to those exposed to the ocean surf. The beaches, now so popular to surfers, have lost most of their natural marine animals due to the multitudes of people wandering to and fro and bathing in the shallow water.

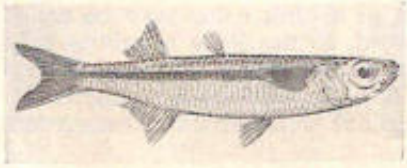
Before surfing became so popular many animals, such as pipis, sandworms, and sand bubbler crabs were common on most beaches, but now they are uncommon, except in places where they are more or less unmolested. Yet today many small forms of shells are still washed up among the feet of the surfers, but rarely living forms.

The rocky points show limpets of various kinds, large and small; winkles also many kinds, some whelks, many loricates, crabs, the under surfaces of stones in pools left by the tide being covered with animal life, ranging from sea stars and sea squirts down to minute molluscs and sea-mats.



Captain Cook's First Coral Island

On Low Isles, off the coast of North Queensland, the Great Barrier Reef Expedition had its headquarters. In the photograph, the huts of the Expedition are seen, with the lighthouse rising from the midst of the few trees (one is a coconut), on this sand cay, which probably was the first Australian coral island seen by Captain James Cook. In the journal kept during that wonderful voyage of 1770, along the east coast of Australia, Captain Cook records that on June 10, the Endeavor passed a "small low island, which lay about 2 Leagues from the main." The scientists who spent a year (1927-28) on the Great Barrier Reef, studied minutely the Low Isles reef and lagoon, and their animal and plant life. They discovered new kinds of marine creatures, secrets of coral life, and, generally reaped a rich harvest of facts and specimens.



The Hardyheads

There are many species of hardyheads (*Atherina, Craterocephalus,* and *Pranesus spp.*) in our rivers and harbors, where they swim in schools. They are small, silver-sided fishes, with large eyes and hard scales.



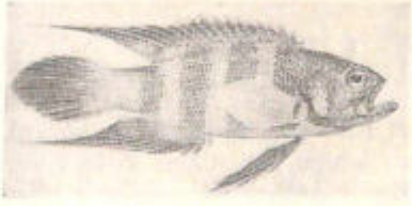
The Dragonets

The dragonets of the genus *Callionymus* are beautifully colored fishes, superficially rather like flatheads, but with the gill-opening pore-like and a prominent preopercular spine on each side of the head. When caught, they have a stale but pungent odor, so that they are often called stinkfish. Many kinds live in deep water.



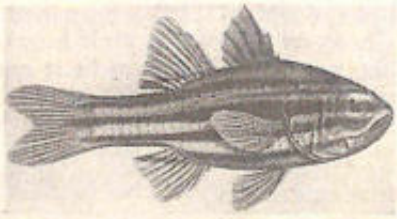
The Goldfish

The goldfish (*Carassius auratus*) has long been a favorite aquarium fish and has been introduced into our rivers and largely displaced the native fishes. The serrated dorsal spine is characteristic, but all sorts of shapes and varieties have been bred in captivity.



The Roundhead

The roundhead (*Paraplesiops bleekeri*) is a gaily colored fish, common in some places around rocky reefs, and sometimes cast up on beaches after storms.



Soldier Fish

The soldier fish (*Lovamia fasciata*) is gaily striped in yellow and black, reminiscent of the military uniforms of a past generation. Battalions of these little fishes swim in coral pools, around wharves, or in any sheltered waters, and the eggs are carried in the mouth of the parent fish until hatched.

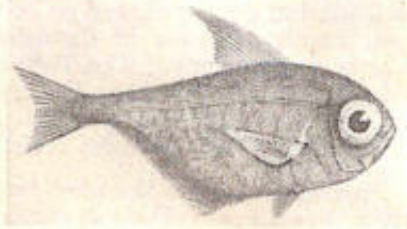


Egg of the crested Port Jackson shark.



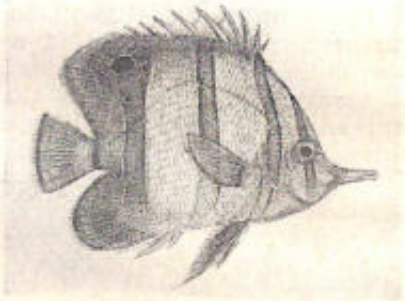
The Bullrout

The bullrout (*Notesthes robusta*) ascends rivers from the sea and can be kept in aquaria, when it feeds readily on earthworms. The dorsal spines can cause a very painful wound if the fish is handled or trodden upon.



The Bullseye

The bullseye of New South Wales (*Pempheris compressa*) is different from the fishes known by that name in other States. It is a rough-scaled fish which is often washed ashore on ocean beaches after storms, and belongs to the family *Pempheridae.* An allied Western Australian species, *P. klunzingeri,* is figured here. The red bullseye (*Priacanthus macracanthus*) and the rare deep sea *P. velabundus*) are again different from *Pempheris.*



Coral Fishes

In the coral lagoons of Queensland and Northern Australia fishes run riot with their colors, and the coral fishes, or butterfly fishes especially. These fishes, of the genus *Chaetodon,* have plate-shaped bodies and slender snouts with bristle-like teeth for feeding on the coral. The general color is yellowish, ornamented with bold patterns of black and other colors. In the beaked coral fish (*Chelmon rostratus*), the snout is very prominent. A specimen from Port Darwin is figured in the coral pool plate in its natural colors.



The Smiler

The smiler (*Merogymnus jacksoniensis*) has a round head with a large mouth shaped in a perpetual grin. It buries itself tail first in sand and hides there until its food passes nearby. There are several Australian species, all found in temperate or tropical waters and all brightly patterned.



THE CORAL POOL

1. Blue Demoiselles (*Iredaleichthys hedleyi*) and Green Demoiselles (*Hoplochromus caeruleus*). 2. Beaked Coral Fish (*Chelmon rostratus*). 3. Needle Urchin (*Centrechinus setosus*). 4. Orange-spotted Leatherjacket (*Oxymonacanthus longirostris*). 5. Staghorn Coral (*Acropora hebes*). 6. Brain Coral (*Symphyllium sp.*) 7. Humbugs (*Tetradrachmum arnanum*) and Pink Humbug Coral (*Seriatopora hystrix*). 8. Banner Fish (*Heniochus macrolepidotus*). 9. Clam (*Tridacna fossor*). 10. Rosy Coral (*Pocillopora sp.*) 11. Blue Starfish (*Linckia laevigata*). 12. Barometer Crab (*Carpilius maculatus*). 13. Coral Crayfish (*Palinurus versicolor*). 14. Mushroom Coral (*Fungia danai*).



1. RED INDIAN (*Pataecus [sonti]*)
2. COMB FISH (*Cremnovissa picta*)
3. GURNARD (*Cuvieperca volucris*)
4. MACAW FISH (*Xiphocheilus [ziczac]*)
5. MOORISH IDOL (*Zanclus [cornutus]*)
6. BUTTERFLY COD (*Pterois volitans*)
7. HORSESHOE LEATHERJACKET (*Monacanthus [hippocrepis]*)
8. RAZOR FISH (*Aeoliscus strigatus*)

AUSTRALI



AN FISHES

9. MADO (*Atypichthys mado*).
10. LEAFY SEA DRAGON (*Phyllopteryx foliatus*)
11. SEA HORSE (*Hippocampus abdominalis*)
12. SNAPPER (*Chrysophrys guttulatus*)
13. OLD WIFE (*Enoplosus armatus*).
14. ANEMONE FISH (*Actinicola percula*)
15. GIANT SEA ANEMONE



1. RED INDIAN (*Pataecus fronto*).
2. COMB FISH (*Ctenoactis pictus*).
3. GURNARD (*Cuerupaces volucer*).
4. MACAW FISH (*Xiphocheilus fasciatus*).
5. MOORISH IDOL (*Zanclus canescens*).
6. BUTTERFLY COD (*Pterois volitans*).
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AUSTRALI



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AUSTRALIAN SHELLS

1. Turban. 2. Cowry. 3. Trocas. 4. Violet Snail. 5. Auger Shell. 6. Fig Shell. 7. Spiny Woodcock. 8. Painted Volute. 9. Precious Wentletrap. 10. Cone. 11. Sea Ear. 12. Tellen. 13. Harp Shell.

Shells Illustrated in Color

The Turban Shell

The name turban was given to a shell which, perhaps, recalled the coiling of a turban. The best example of the group is the Australian one (Figure 1). It grows to a large size, is of a flattened turban shape, and has a beautiful and peculiar operculum, the shelly or horny piece which fits in the aperture of shells of many kinds. In this case it is a strong shelly piece which closes the mouth of the shell against its enemies. A number of the group supplies the "cat's eye," so well known from its beautiful coloring. The shell itself is smooth and brightly colored.

The Cowries

The cowries have always shared favoritism with the cones, as they are even more splendidly colored, and their form is very different. The species named, *Arestorides argus* (Figure 2) is rather an elegant form, as in this group the shape varies from somewhat plump ovals to rather slender ones. The commonest large cowry is called the tiger, and is plump and thickly spotted, but one of the most interesting is the wonder cowry of the cold southern Australian seas. This cowry differs from nearly all others in having a depressed spire and rather a long, crooked tail, and is famed on account of the high price, £30, which was paid for the first one found. At the present time it is comparatively valueless, as the trawls are bringing up numbers. But a beautiful white form is still one of the handsomest members of this group. The young cowries are shaped very unlike the adult. The adult sits on its eggs. The money cowry is famed on account of its usage as money.

Trocas

Trocas is the name now used commercially for a large conical shell (*Trochus niloticus*), from which pearl buttons are made. The word "Trochus" is a Latin one given to this group some 150 years ago, and all the members, large or small, have pearly shells covered with a colored outer surface which is easily removed by a weak acid. Their little ones may be seen cleaned and made into necklaces, as in Southern Tasmania, while on the Japanese workboxes they are commonly used. These are related to the turban shells, but are easily separated by having a horny, not shelly, operculum, and generally being more conical. Among the commonest shore shells of Southern Australia is a conical one, which resembling Trocas, has a shelly operculum of a pink or bluish stone. (Figure 3).

The Violet Snail

Floating on the surface of the sea are many very beautiful violet snails, some half a dozen very different kinds being known from Australian waters. In the days of the old sailing ships these snails were seen and caught easily when the ship became more or less becalmed. Today steamers travel too fast for those on board to even see Niobe snails while moving, but after stormy winds the shells may be cast up on our beaches in large numbers. The shell floats upside down, and the animal is provided with a curious float of bubbles which also serves as a raft to which the eggs are attached. (Figure 4).

Auger Shells

The name given to the beautiful and elegant shells of which a fair specimen is illustrated (Figure 5) suggested itself to the old collectors two centuries ago. These elongate shells seem to be unwieldy, and probably are so, as the tips show wear from trailing over the sand. The augers bury themselves as the sand recedes, and are then easily overlooked, but sometimes are betrayed by the tracks left by the trailing spire. Many kinds with different coloration are known, some larger than the present one, but the majority smaller.

Fig Shells

There are only a few species of fig shells, but they are very delicate and beautiful, and also comparatively uncommon. The spire is almost flat, and the mouth open; from the mouth a huge, highly-colored animal is extended. The shell is minutely reticulated, and bears a few square spots of bronze red. The species figured is *Ficus margaretae*. (Figure 6).

The Spiny Woodcock

The Ancient Romans and Greeks used a wonderful purple dye for the costumes of their rulers, and it has since been called Imperial purple. This delightful color was taken from a rather humble shell with no outside appearance of harboring such a wonder. Similar shells are common in our seas, but owing to the abundance of aniline dyes are not used at all. Some of these shells are, however, far from humble. The species, *Murex tenuispina*, pictured in the color plate (Figure 7), shows the central figure of a shell of elegant shape furnished abundantly with long slender spines.

The Painted Volute

When the trawlers began operations in Australian waters they brought in the shells that were caught in the net, and, of course, all these were uncommon or new. The depth, 70-80 fathoms, had only been reached previously on few occasions, by a small dredge. The present species had been described from a dead shell washed up on a beach, and had been regarded as a monstrosity rather than a distinct kind. The trawl, however, has revealed the fact that it is a different kind and, moreover, that it is sometimes beautifully colored, as in the shell named *Ericusa kenyoniana*, shown (Figure 8). The pleats on the inner lip of the mouth are consistently double at the upper end; at first this was also thought to be due to an accident. These shells are called volutes, and Australia has more beautiful kinds than any other place in the world.

The Precious Wentletrap

One hundred years ago began a great boom in shell-collecting, an amusement then of long-standing fame. Fifty years before, Captain Cook's naturalists had brought back to Europe from the Pacific Ocean many curious shells, including the precious wentletrap (*Scala scalaris*), chosen for illustration (Figure 9), and great competition had developed many collectors. Then the opening up of Australia led to more discoveries, and shells went up in value until extraordinary prices were paid.

The Cones

Half a dozen groups of shells have always held the field in the favor of collectors for the last 300 years, and at the head of all are the cones. Their form is neat and attractive, but the variety of coloring is almost bewildering, patterns succeeding, each exceeding its predecessor. Marbled cones contrast with unicolor, even pure virginal white, while tracery of golden threads enhance others. The shell illustrated (Figure 10) belongs to the series known as admiral cones. The names selected by the early collectors show their appreciation which culminates in the far-famed "Glory of the Sea," the most valuable of all shells, and of which only about a dozen specimens exist in collections. All around the coast of Australia many kinds occur, large and small, and included among these are the only poisonous shell-fish known; poisonous by biting, not poisonous when eaten.

The Sea Ear

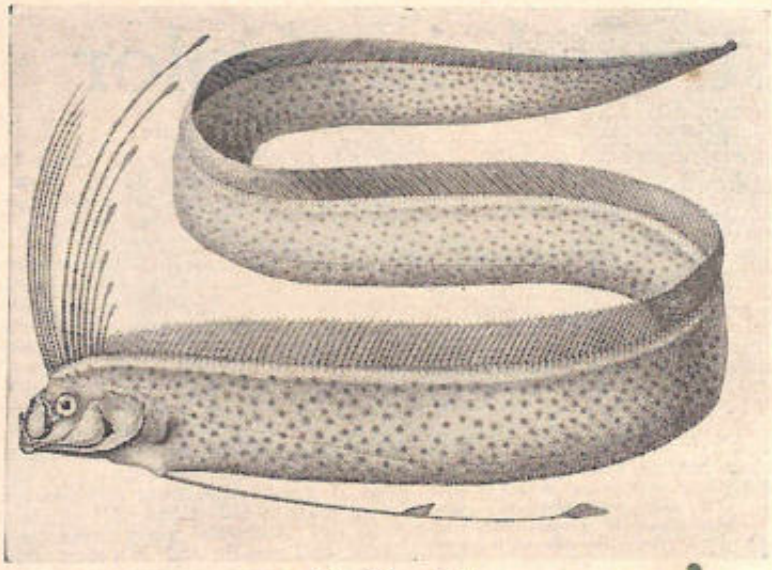
A beautiful shell has been long known as the ass's ear, and it really recalls that organ in shape, though its coloring is very different. It is a member of a group fairly common in our waters, and sometimes called muttonfish. But today no one would compare the taste with that of mutton, and the molluscs are not now eaten by white people. The shells stick to rocks and have a series of holes along the upper edge. The ass's ear, *Haliotis asinina* (Figure 11) shows an elegant and active animal living on the coral reefs, but much larger and broader ones live in the south. These latter are well known through the bright iridescence of their interior, which is due to the action of light on the particles which compose the inside layer.

Tellen Shells

Many beautiful bivalves are classed in this group. They have elegant shapes; sometimes one valve is more rounded than the other, and sometimes with discrepant sculpture. In addition, they possess modest, but attractive coloration, the kind shown (Figure 12) being smooth, with the other valve flatter than the one illustrated. They are somewhat active animals, burrowing in the sand, and having long tubes for feeding. Most of the burrowing bivalves have long tubes, but this is not universal, as was once believed.

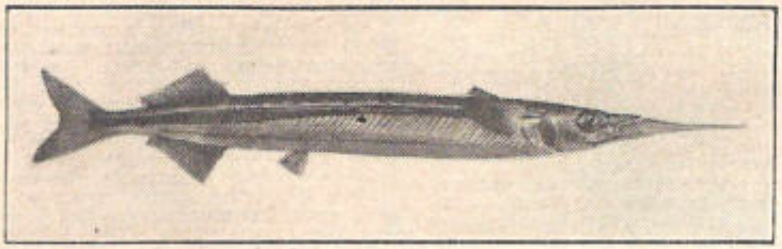
The Harp Shells

A small restricted group of rather brilliantly-colored and curiously-shaped shells is represented in the color plate (Figure 13). Harp shells have always and justifiably so, been favorites with collectors, as they combine beauty of color with delightful form, the quaint marbling of color between the ribs contrasting well with the erect unicolored lamella. The resemblance to a harp was seen many years ago when that musical instrument was more in vogue than at the present time. The open mouth of the shell shows that it housed a large animal which more or less enveloped the shell and coated it with the bright enamel which is so pleasing.



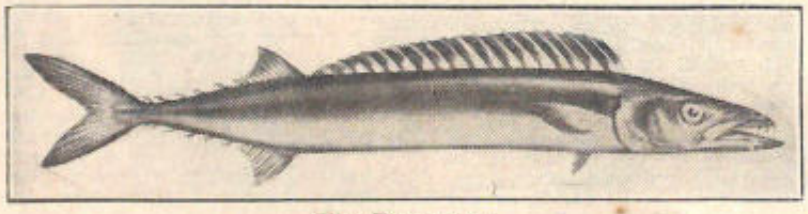
The Oar Fish

This is one of the ribbon-fishes, which attain a length of up to 20 feet, while the thickness of the body may be only one inch. The oar fish (*Regalecus glesne*), also called "king of the herrings," has long ventral fins—the "oars." The other name was given in the belief that these fishes swim with shoals of herrings. The ribbon-fishes have beautiful silvery bodies, while the fins are of a roseate hue.



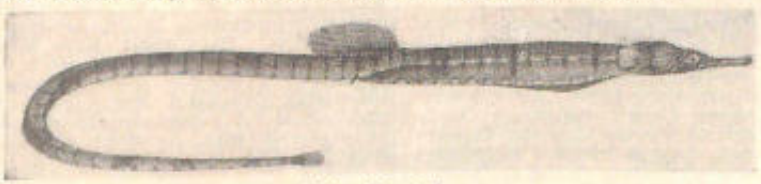
The Sea Garfish

The sea garfish (*Hyporhamphus intermedius*), familiar in the fishshops and at the breakfast table, is a beautiful little fish (length to about 18 inches). Bright green on the upper surface, below it is silvery-green, while each side of the body is ornamented with a silver stripe. The sea garfish is distinguished from the freshwater or river garfish by its blackish colored pectoral fins, slimmer body, and longer, movable upper jaw.



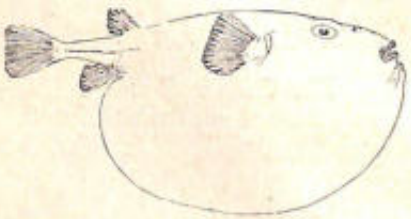
The Barracouta

The barracouta or 'couta (*Thyrsites atun*) is a long, grey, mackerel-like fish with vicious fangs. It is caught in open waters on a barbless hook in great numbers, and is a splendid food fish, reaching a length of four feet. A smaller species (*Rexea solandri*) is taken by the trawlers.



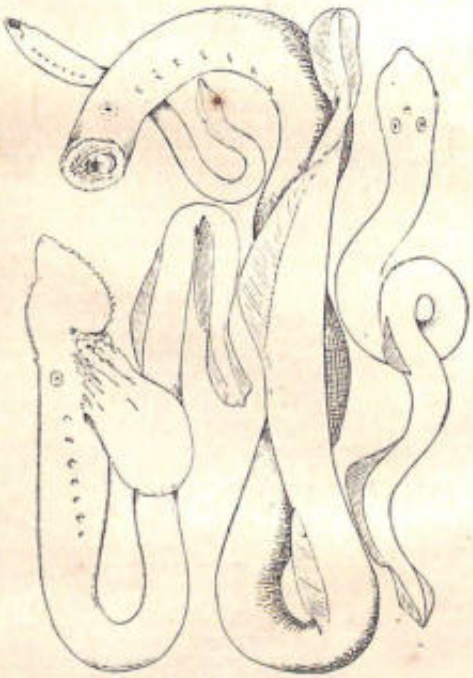
The Pipefishes

Pipefishes are long, thin fishes with pipe-like snouts. There are many species, all grouped in the family *Syngnathidae*. They are found mostly among sea-grass, which they very much resemble in form and color. A well-marked species is the tiger pipefish (*Syngnathus tigris*), here figured.



Toado and Balloon Fish

The toado or puffer fish (fam. *Tetraodontidae*) is often tormented by children until it swells up its body into a ball by taking in air and water. The flesh is poisonous as food and the skin often spiny. Common in shallow water offshore are species of the genera *Ovoides* and *Lagocephalus*. The one illustrated here is the rare balloon fish (*Liosaccus aerobaticus*), found in the open sea. Note the enormous distension of the belly.



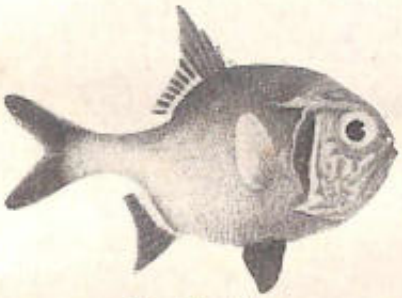
The Lampreys

Lampreys are hideous, eel-like fishes, which can easily be distinguished from eels by the sucking-disc, provided with teeth, which surrounds the mouth in place of jaws. There are seven gill-slits on each side, and a single nostril situated right on the top of the head. Lampreys rasp away the flesh of living fishes with their horny teeth, and do considerable damage. They are found in both salt and fresh water, but the Australian species evidently breed in rivers, which they ascend in great numbers at times. Probably a nest of stones is built on the river-bed, as in European and American species, but little is known of the habits of our lampreys, and any observations on them would be of great scientific value. The young are eyeless and toothless, but the adults of one species, *Geotria australis*, sometimes develop a huge bag at the throat, the use of which is not known. The flesh is excellent, but when eaten to excess may lead to trouble, the deaths of King Henry I., and, later, Pope, being attributed to surfeits of these delicacies.



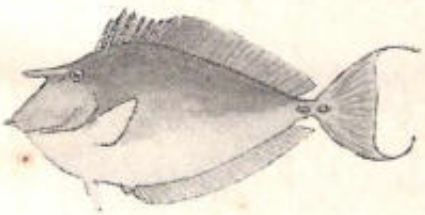
The Black Bream

The black bream of New South Wales (*Roughleyia australis*) ranks next in popularity to the snapper, and is caught mostly by handlining, at night. Usually weighing 2lb. or 3lb., the record specimen, from the George's River, New South Wales, weighed 7¼lb., and measured 21¾ in. The fish called black bream in Tasmania is the blackfish of New South Wales or ludrick or black perch of Victoria.



The Roughy

The roughy (*Trachichthys australis*) has the body covered with rasp-like scales. It is a prettily marked, brownish, little fish, sometimes cast ashore after storms. Other fish, such as Kahawai, are called roughy in our Southern States.



The Unicorn Fish

The unicorn fish (*Harpurus unicornis*) is a kind of surgeon fish with a long nose-like snout which it uses for grubbing among stones and coral, keeping the spine-armed tail held overhead as a protection against enemies.



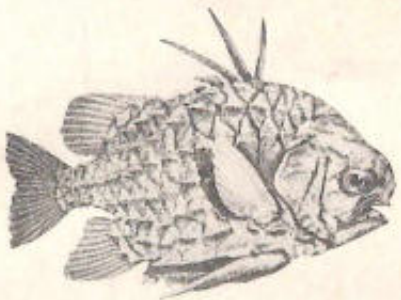
The English Perch

The English perch (*Perca fluviatilis*) is established in some of our cold rivers. It may be recognised by the sail-like spinous dorsal fin, which is often red, and the dark bands crossing the sides of the body.



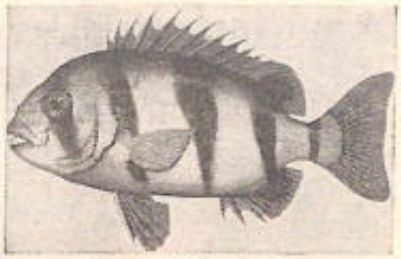
Leafy Sea Dragon

The leafy sea dragon (*Phyllopteryx foliatus*), which grows to a length of 16 inches, is found only in Australian seas. Specimens often are found cast up on ocean beaches. The leafy sea dragon is nearly related to the seahorses, but is larger and more brilliantly colored. Its haunts, apparently, are among weed-covered rocks below low tide level, and it feeds upon worms, minute crustaceans, etc. The ruby-colored eggs of this curious fish are carried by the male, fastened to a soft area of skin beneath the tail; there they are hatched. No fewer than 120 eggs have been found on one male fish.



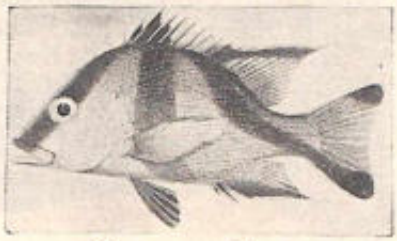
The Mail Fish

The mail fish (*Cleidopus gloriamaris*) is like a knight in armor; its scales are rather like the rind of a pineapple, and the fins very spiny. There is a luminous patch on each side of the mouth, wherefore this deep sea species is also called the port and starboard light fish.



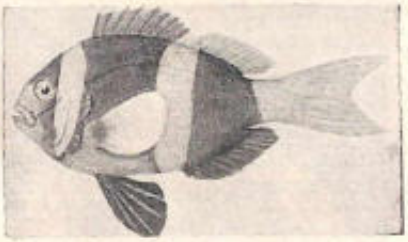
The Knifejaw

The knifejaw (*Oplegnathus conwaii*) has the teeth fused together to form a beak like that of many of the parrot fishes. It is found on the continental shelf of south and south-western Australia and Tasmania, and grows to a length of sixteen inches.



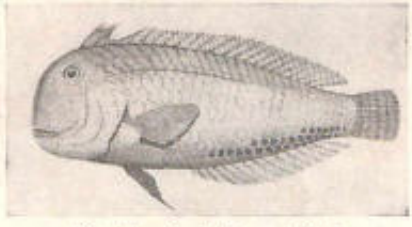
Government Bream

The broadarrow mark on this tropical fish (*Loxolutjanus sebae*) brands it with its vernacular name, Government bream. It is a beautiful pinkish fish which grows to a large size, and is of value for food. It is a member of the hussar family (Lutjanidae), which often undergo considerable color-changes with age.



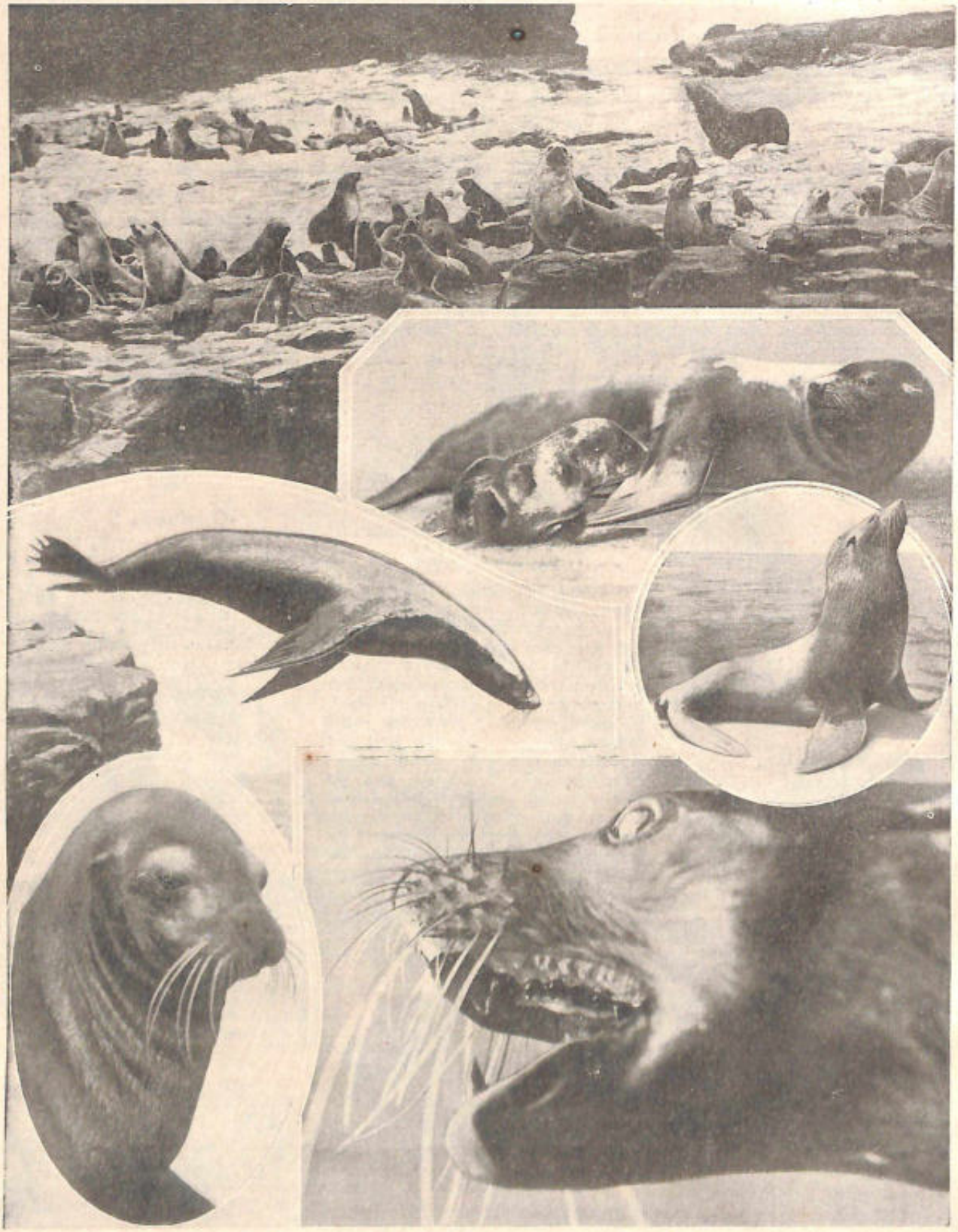
The Anemone Fish

Gaily-colored fishes of the genera *Actinicola* and *Amphiprion* live among the tentacles of giant sea anemones in our coral waters. They are immune to the stings of their hosts, which doubtless provide them with free board in the form of rejected food, as well as lodging; for sometimes the anemone fish will actually enter the mouth of its anemone. Often a red, white and orange shrimp shares an anemone with one or more fishes.



Keel-headed Parrot Fish

The keel-headed parrot fish (*Novaculichthys jacksonensis*) has the front edge of the head as sharp as a blade and can dive head foremost into the sand with great rapidity.



Seals at Home

A view of the Seal Rocks Rookery, Victoria, and portrait studies of some of the inhabitants.

The Story of the Seals

SEALING was a profitable industry in Victorian and Tasmanian waters in the early years of the Nineteenth Century. Both French and American vessels were engaged in sealing operations, and during the period, 1800 to 1810, it is estimated, nearly 250,000 seals were killed in Bass Strait. This ruthless destruction ruined an industry that might have flourished to this day.

Though the herds that had dwindled to the verge of extinction have gradually increased in recent years, seals are not yet sufficiently numerous again in Bass Strait to justify resumption of sealing.

Seal Rocks, off Phillip Island, is the headquarters of the animals in Victorian waters; another rookery exists on Julia Percy Island. The seals, however, have many island haunts, from Seal Rocks, off Port Stephens, New South Wales, to the Eclipse Islands, off King George's Sound, Western Australia. Both hair and fur seals visit the isles and rocks.

Five kinds of seals occur in Australasian seas. Two are only visitors from the Antarctic pack-ice and sub-Antarctic islands—the crab-eating species and the sea-leopard or leopard-seal. The most recent appearance of the latter was on the Ninety Mile Beach, south-eastern Victoria, at the end of December, 1932. A specimen was captured alive by fishermen.

Formerly the sea-elephant frequented the waters around King Island and the island shores, but it was exterminated by the sealers, and for many years has not been seen nearer to Australia than the sub-Antarctic wonderland, Macquarie Island, home of a million penguins, as well as sea-elephant herds and other creatures of the icy realm.

The Australian eared seals, which associate in herds and form rookeries on small, wave-beaten islands, are familiar animals, but often it is an adventure to visit them "at home." They favor rocks and rocky islets in the open sea, and the surf is rarely silent around their rookeries. In boisterous weather landing is dangerous, if possible at all. But thousands of holiday-makers have viewed the tenants of Seal Rocks, Phillip Island, from a tossing boat; fortunate parties have landed, on calm days, and wandered through the rookery—a memorable moving picture of wild life—sound and all!

The low reefs and islands, where the young are born, are frequented by seals at all seasons, but the gatherings are greatest during the last three months of the year and January. The pups are born in November, December and January.

The Australian fur seal (*Arctocephalus doriferus*) inhabits our south-eastern seas. It is polygamous, and harems are formed by the fierce and aggressive old males, who collect their mates in no gentle manner, and defend them savagely against intrusive suitors. Also the males restore order among the females which are inclined to quarrel among themselves. Seals feed chiefly upon squid, but such fishes as leather-jackets and parrot-fish are included in the dietary. The harm done to fisheries by seals has been exaggerated. Mostly, they take fishes that we class as non-edible, varieties that are not marketed. An exception is the barracouta, of which the seals in Bass Strait take heavy toll. Yet the barracouta remains amazingly abundant.

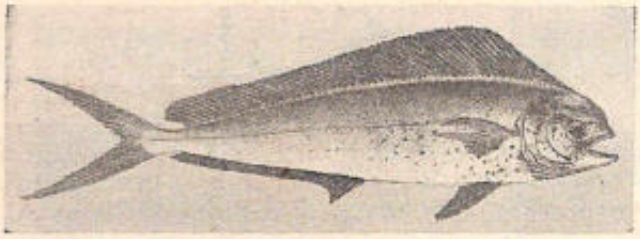
Brown, fawn-brown, sometimes grey in general color, the male Australian fur seal attains a length of 5 feet 6 inches, from nose to tip of the tail; the female, whose color is lighter than that of the male, grows to about 4 feet 9 inches in length.

The sea-bear or New Zealand fur seal (*Arctocephalus forsteri*), of southern New Zealand and southern Australian seas, is bigger than its ally, the male attaining a length of 7 feet or more; the female, from nose to tail-tip measures about 5 feet 6 inches. Grizzled grey is the general color, above, of this species, the under surface being chestnut brown. Pale fawn is the color of the dense, fine under fur.

The Australian sea-lion (*Eumetopias albicollis*) ranges from Houtmans Abrolhos, Western Australia, to islands in the vicinity of Spencer's Gulf, South Australia. It grows to a length of 7 feet; the female, 5 feet. The fur of the adult male sea-lion is dark brown, the color being darker on the under surface. A yellow patch ornaments the crown of the head, on the back of the neck is another patch of the same color.

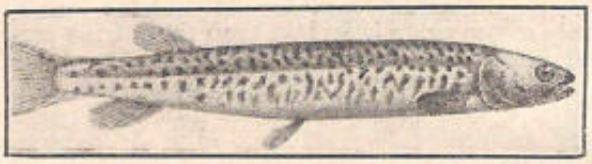
As regards the value of Australian fur seal skins, the following is quoted from a report of the Chief Inspector of Fisheries and Game on the feeding habits, etc., of seals in Victorian waters (1929):—

"In order to decide whether the seal colonies were worth developing from the point of view of the value of the skins, the Tasmanian Government in 1927 sent some skins to the Imperial Institute, London, for valuation and report. The reports obtained from a firm of fur skin dyers, dressers and merchants in London were to the effect that the largest skins were of too low a quality to be worth the cost of dressing and dyeing, and the other two skins of moderate and small sizes were considered to be of only fair quality but suitable for dyeing and dressing. The firm valued such skins at current auction prices in London at about 8/ to 10/ each for the large sizes, and about 20/ to 25/ each for the two smaller sizes. They further pointed out that very large skins from old seals and very small skins from small immature animals were of practically no commercial value."



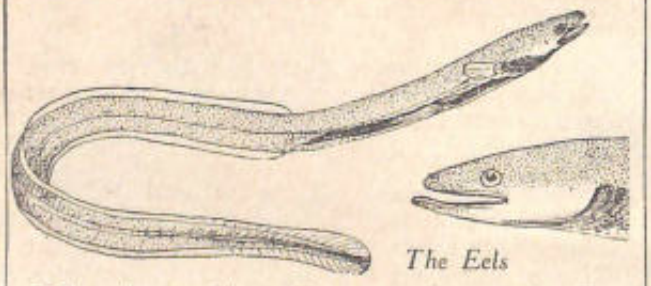
The Dolphin

The fish called dolphin or dorado (*Coryphaena hippurus*) was commonly caught by windjammer sailors, as these gorgeously colored fishes played around their boats in the doldrums. Dolphins chase flying fish with skill and rapidity, and grow to a large size. The general shape is mackerel-like, but the head is elevated and compressed and the whole back traversed by a crest-like dorsal fin. The sea-pig, commonly called porpoise in Australia, is a mammal allied to the whale, and is a true dolphin, not the porpoise of the Northern Hemisphere.



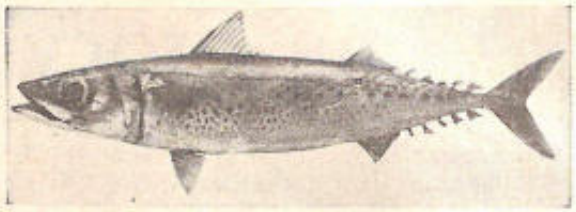
Whitebait

Whitebait is the term applied to the young of various kinds of fishes which ascend rivers in large numbers, and are caught and made into fish cakes or such-like delicacies. In New Zealand, whitebait mainly consists of young *Galaxias* and *Retropinna*, two genera of small freshwater fishes which breed in the sea. While whitebait migrations are not noticed in Australia, we have at least one species of smelt (*Retropinna*), and many species of mountain trout (*Galaxias*), most of which probably breed in freshwater, though one, the jollytail or eel-gudgeon (*Austrocobitis scribia*), emerges from the sea when young. These graceful fishes, though generally quietly colored, are favorite aquarium pets, and feed on insects. The species illustrated is *Galaxias olidus*.



The Eels

Eels are longate fishes without trace of ventral fins. There are many different kinds, some superficially like snakes, others worm-like, and many, among coral reefs, brightly colored and always ready to bite. Freshwater eels migrate to the sea to breed, and the eggs give rise to transparent, leaf-shaped fishes known as "glass eels." These reach the mouths of rivers, which they ascend in great numbers, as elvers, or young eels, about 2½ inches in length. The accompanying figure was drawn from living elvers caught in early spring, near Sydney. These "young" eels may be several years old when they leave the sea, but soon make their way to the sources of rivers or to inland lakes, ascending waterfalls, or even crossing dry land during rain or dew to reach their freshwater destination. Before maturity, they return to the sea and there develop the reproductive organs and breed. The freshwater eel (*Anguilla*) has very minute scales arranged in criss-cross rows, but the marine species are scaleless. Their gills and naked bodies distinguished them from sea-snakes.



The Horse Mackerel

The horse mackerel of New South Wales (*Sarda australis*) is a striped, bonito-like fish, which appears in schools at times and is caught by trolling a bright bait behind a launch. In other States, the name horse mackerel is applied to *Trachurus*, a less mackerel-like species so far as scientific classification goes and called Yellowtail in New South Wales. The common mackerel (*Pneumatophorus australasicus*) is illustrated for comparison.



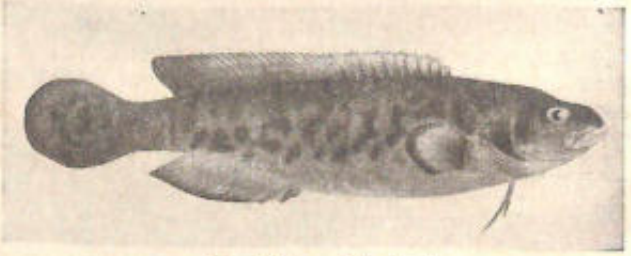
The Catfishes

Catfishes are appropriately so named on account of their feline appearance, the barbels or feelers of the face looking just like a cat's whiskers. There are hundreds of different species, both marine and freshwater, in the East Indies, but very few have crossed to Australia, where we have some unimportant species of which the freshwater catfish (*Tandanus tandanus*) is famed for its nest of stones on the beds of rivers. There are a few marine or estuarine species, all dreaded because their venomous fin-spines can inflict a nasty wound.



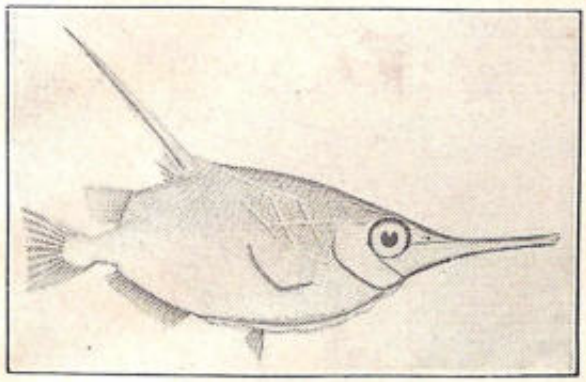
The Clingfishes

Clingfishes (*Volgiolus costatus*) may sometimes be seen in rockpools adhering to stones by means of a sucker situated near the ventral fins. They are only an inch or two long, and usually pinkish in color.



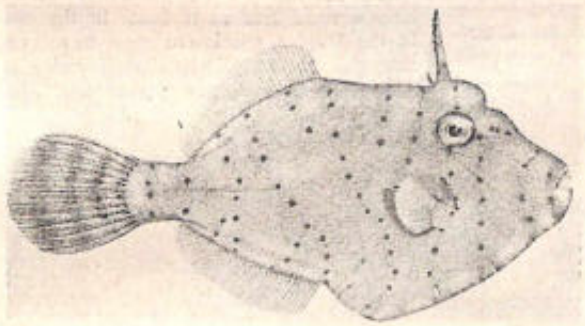
The River Blackfish

Familiar to anglers, the river blackfish (*Gadopsis marmoratus*) belongs to a very remarkable genus—one that links two groups of fishes: it provides an intermediate type. Its headquarters are in Victoria and Tasmania; it occurs also abundantly in some streams in New South Wales and South Australia. This "giant" blenny grows to a length of over 2 feet. Above and on the sides it is a brownish-olive colors, yellow beneath. The upper half of the body is "marbled" with brown.



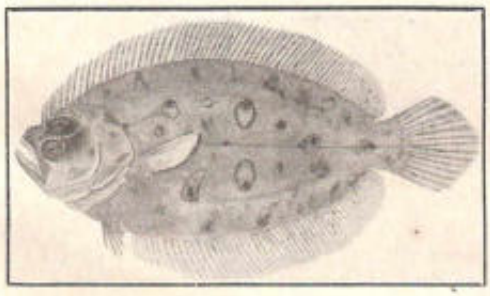
The Bellows Fish

The general resemblance in outline of a pair of bellows is responsible for the name of the bellows fish (*Macroramphosus elevatus*), a common little fish in deep water, where it is caught in hundreds by the trawlers.



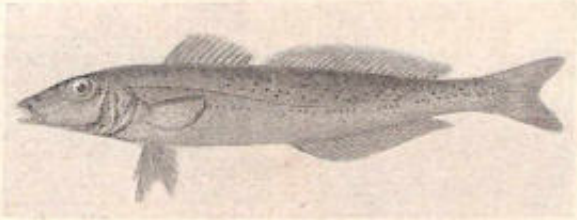
The Leatherjackets

There are many species of Leatherjackets (family *Aluteridae*) in Australia. All have the skin leathery or spiny and have a prominent spine over the head. The colors of leatherjackets are constantly changing and variable with age and sex. In the large colored plate (Figure 7) is shown the horseshoe leatherjacket (*Meuschenia hippocrepis*), and in the coral pool color picture the brilliant little orange-spotted leatherjacket of the tropics (*Oxymonacanthus longirostris*). Victoria boasts a large variety of leatherjackets, including the rare *Blandowskius*, a spotted species with two bumps on the front of the head.



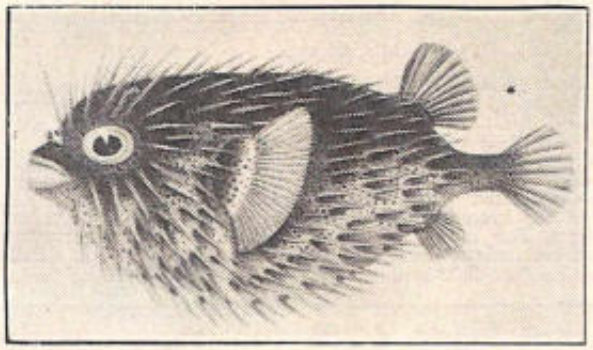
The Flounders

The flounder (*Pseudorhombus anomalus*) lies on one side at the bottom of the sea, so that both its eyes are on the uppermost surface of the head. It can change its color, chameleon-wise, to imitate its surroundings. There are many different Australian species of *Pseudorhombus*, found on sandy bottoms in estuaries and offshore.



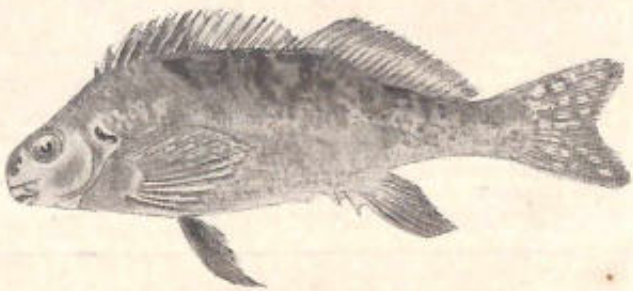
The Whiting

The whiting (*Sillago*, various species) is a very tasty fish, which swims over sandy shallows. There are several closely-allied species on our coasts, one of which, *Sillaginodes punctatus*, is ornamented with dark spots.



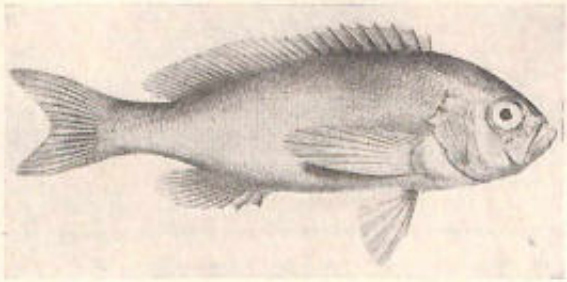
The Porcupine Fish

The porcupine fish (*Diodon*) is much like a toado, but the body is protected by very strong spines, from which its name is derived. Common in harbors and poisonous as food.



The Rock Cale

The rock cale (*Crinodus lophodon*) lives in the same waters as the kelp fish. It has the scales very small, a blunt, rounded snout, and a long, low, spinous dorsal fin. In many respects, this fish is intermediate in character between the perch-like forms and the blennies.

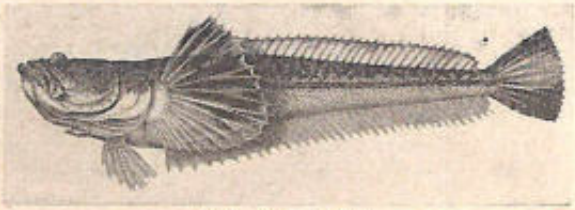


The Longfin

The longfin (*Caprodon longimanus*) is a beautifully colored perch, caught by the trawlers in fairly deep water.



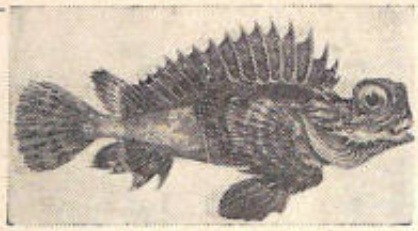
Head of the Stonelifter



The Stonelifter

The stonelifter or stargazer (*Kathetostoma* and *Ichthyscopus*) lies buried in sand in our harbors, gazing upwards with its tiny eyes, set in a squarish bony head, with almost vertical mouth. It probably can give an electric shock, like the numbfish, but its habits in Australia are little known. In Tasmania *Kathetostoma laeve* is called catfish

The Goblin Fish

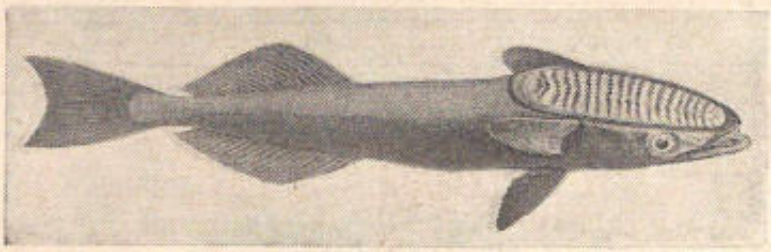


Most grotesque-looking of all the members of the rock cod tribe is the goblin fish (*Glyptauchen panduratus*). Its length is six inches, and it is of a purplish-brown color. The head is hollowed out above, giving to the little fish a weird expression. The goblin fish has been likened to an unfledged parrot. For hours, perhaps for days, it lies motionless, awaiting its prey. It has spines similar to those of the notorious cobbler fish, and probably they are capable of inflicting very painful injury.



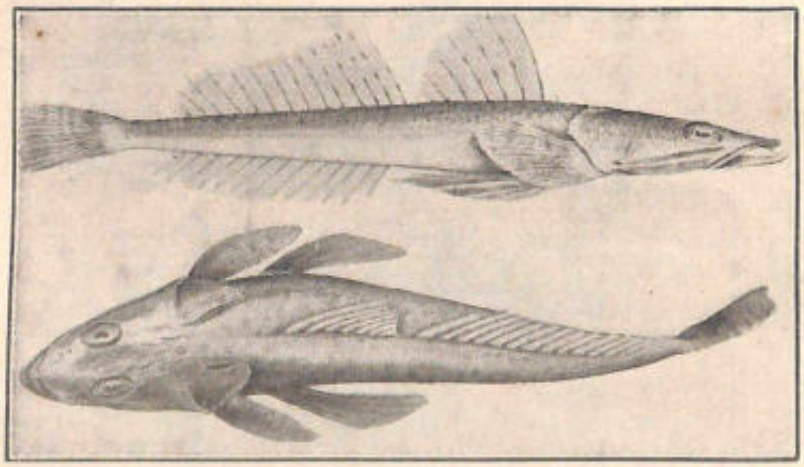
The Batfish

The batfish (*Platax pinnetus*) simulates a dead leaf as it floats in the sea. In the tropics, specimens grow to a large size, and are peculiarly shaped owing to the greatly developed dorsal and anal fins.



The Sucker Fish

The sucker fish (there are various species of *Remora* and *Echeneis*) is often confused with the pilot fish. It may, however, readily be recognised by the elaborate sucker, on the top of the head, which enables it to travel without exertion. By its sucker this very curious fish attaches itself to sharks and turtles, even to ships. Sometimes, when a shark is captured, a Remora also is taken attached to the big fish



The Tiger Flathead

There are many different genera and species of flathead (*family Platycephalidae*) in Australia, and all are excellent as food. The strongly depressed head, with the large eyes on top, is characteristic. The tiger flathead (*Neoplatycephalus macrodon*), characterised by its large teeth, is a staple article of food.



Deep Sea Batfish

The trawlers occasionally bring to light the deep sea batfish (*Halieutaea brevicauda*), a somewhat stingray-shaped ally of the angler fish. It has a little fleshy lure on the end of the snout and swallows crabs and prawns and fishes whole.

Australian Shells

OWING to its great extent, Australia can boast of some thousands of different kinds of shells, large and small, beautiful and obscure, gaudy and modest.

In the south, somewhat sombre coloration is the rule, though gaily colored species occur. On the coral reefs of Queensland and north-western Australia all the bright shells so delightful to the collector are found. It must be emphasised that many of these when the animals are alive are covered with a skingrowth which hides the brilliant colors of the shells as seen in collections. Consequently, though more than 1000 different kinds have been recorded from Victoria, New South Wales, Tasmania or South Australia, probably only 200 would be of sufficient size, form and color to attract attention.

Notwithstanding the fact that between 2000 and 3000 kinds are known from Queensland, again, not more than 300 or 400 would stand out; but of these probably half would be more spectacular than any of the southern forms as regards coloration and shape.

Yet, in the south we have the extraordinary bivalve called *Trigonia*, which is a relic of a far-gone age, when such molluscs dominated the seas. In every other sea these have been exterminated, the last, lingering remnant haunting the shores of Australia. While corrugated outside, the inside is a delicate pearl of wonderful shades, varying from pure gold to royal purple.

In the south also are numerous volutes, some of them of very large size, and others small and exquisitely marked. They extend all around Australia, so that of these choice shells we possess the greatest number of kinds. Again, in the south we have one of the most remarkable of cowries, the wonder cowry, a large shell with rather prolonged ends for this group and a hollow in the anterior end. Living in the cold, deep water off the south coast, it offers a great contrast to the majority of the members of this well-known group, which live in the hot shallow waters of the tropics. Associated with the tropical cowries are the cones, olives and mitre shells of which Northern Australia has its full share, though these may be more common on some of the island groups of the Indian and Pacific Oceans.

The greatest number of molluscs live below low water-mark, on and under rocks and in the sand, but a small proportion live between tide marks, and can be collected without even wading. Still, many dead shells are cast up on the beaches, and these first attract anyone visiting the seashore. They are all clean, and show their natural coloration more or less clearly according to the length of time they have been drifting about since the animals that made them have died.

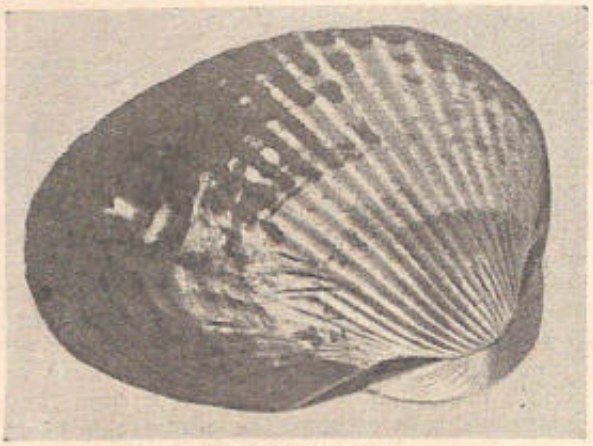
On every sandy beach shells may be found, but when the beach is favored by surfers only small ones will be met with. It is astonishing to count the number of small species on any beach, even one which at first sight appears to be barren of shells. A visit to a beach not easily accessible usually shows a wealth of shells, and in our own country many are still rare or little known. These dead shells simply require drying, and they then will keep without further trouble; but if a shell is collected with the living animal in it this must be removed at once. Generally, dipping in boiling water and picking the dead animal out will suffice; but care must be taken that the whole of the animal comes out, and this often requires careful rinsing with cold water.

When the opportunity offers, the best way for cleaning the highly colored tropical shells is to bury them in dry sand for a fortnight and then rinse out the remnants of the animal. The most important matter is the locality, so that whenever shells are collected the place where they were secured should always be written down and the record kept with them. By this means the shells will always have some value to every other collector; without it they will be valueless. Today shells have very little monetary value, but this has not always been the case. About one hundred years ago there was a great demand for shells as interesting objects, even as postage stamps are valued today, and as much as £50 has been given for a shell.



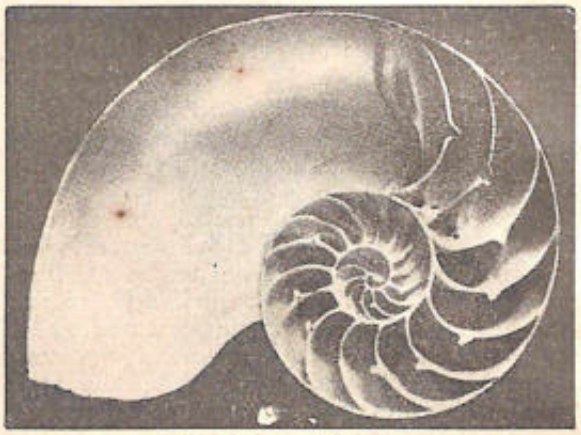
Cameo Cut in Helmet Shell

When our forefathers were desirous of making a fine present to a lady they secured a cameo. The cameo is a picture engraved on a piece of shell, the shell possessing two layers, the upper one white, the lower, red brown. The picture was cut out in the white portion standing in relief against the red-brown background. The shell which provided the material was called the helmet shell, as it vaguely suggested in shape the helmet of the Ancients. The shell illustrated is *Cassis cornuta*.



The Sydney Cockle

Very common on the muddy estuaries of our coast, shellfish abounded which became the main food of our aboriginal predecessors. For some unknown reason, the name cockle was assigned to this species (*Anadara trapezia*), and it became familiar as an article of food to the earlier settlers under that name. It is not related to the English cockle at all, but is a member of the family known as arks, a name given to the most remarkable kind on account of its resemblance to the children's Noah's ark. All arks show a hingeline with many teeth, while the cockles have very few.

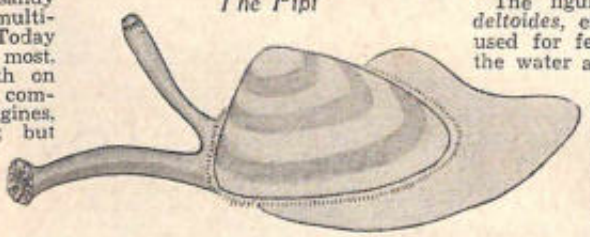


The Pearly Nautilus

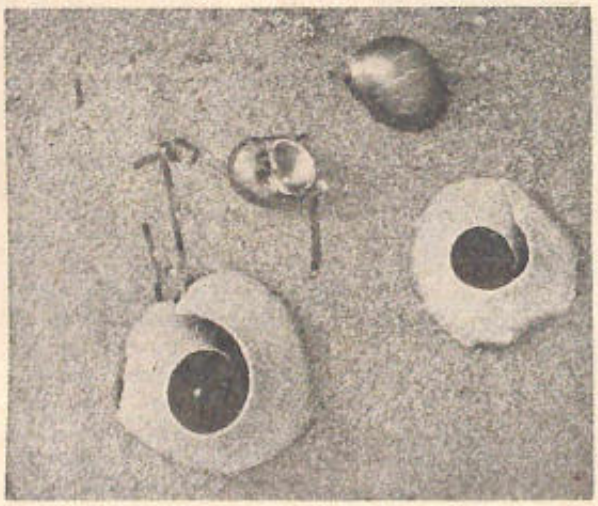
One of the most remarkable of all living shellfish as restricted to molluscs, is the pearly nautilus (*Nautilus pompilius*). This always attracts attention whenever it is seen or found, on account of its beauty, form, and the curious shelf inside. A section of it is here illustrated; the outside is too well known to need a picture. The inhabitant is a very curious adaptation of the sea devil, in which the eight arms are split into many smaller tentacles.

A few years ago most of the sandy beaches were the living places of multitudes of shells known as pipis. Today surfing has banished them from most, and only rarely are they met with on unfrequented beaches. They were commonly used for food by the aborigines, and later as bait by fishermen; but they are closely related to the toheroa, still used by New Zealanders, and imported into Australia. In America they would be called clams and furnish many clam pies.

The Pipi

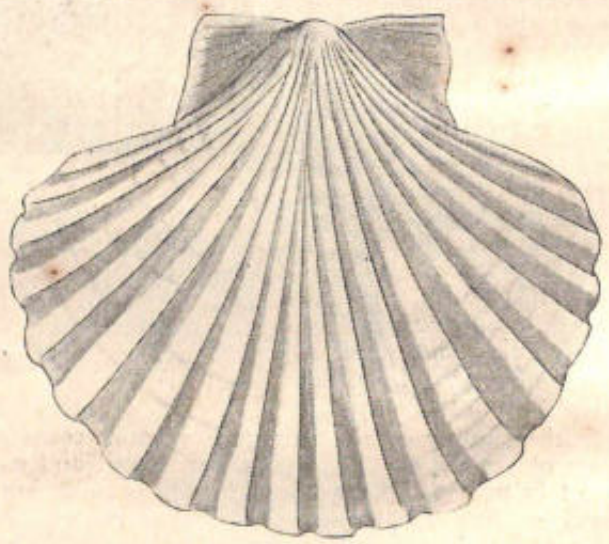


The figure shows the animal, *Plebidonax deltoides*, extended, the two long tubes being used for feeding and breathing, one inhaling the water and animalculae, the other exhaling the waste water. The large foot is used for digging. Commonly called pipis are unrelated shells, as, for instance, mactra, which inhabits the same districts, and may be met with beside the true pipis. The animal differs, and the shell shows a different hinge.



Sand Snails and Nests

Curious sandy rings are picked up, and examination reveals the fact that these are composed of thousands of minute sea snail eggs cemented into sand. The maker could not be guessed, and when it is found that they belong to the rather inconspicuous snail here shown, wonderment still grows. This very simple type of shell gives no clue to the large voluminous animal which envelops it when expanded. The sand snail shown in the illustration is *Polinices plumbea*.



The Scallop

Although much prized as a dish for epicures in Europe, the scallop (*Pecten fumatus*) is neglected by Australians, save in Tasmania; yet it is much superior to the oyster. The animal is a great swimmer when young, going from place to place and only settling for a while; when adult it settles down and does not move much. Generally there is one convex and one less so, even flat or concave, and curiously enough it rests at the bottom upon the convex valve. The animal has many beautiful eyes all round its edge, which are highly organised.



Australwelk

The Australwelks are very handsome, both as regards their shells and their animals. Moreover, they are large, and live on the rocky points in pools, and can be seen breeding in the springtime. Some shells are bright red, marbled with darker hue; others straw-covered with a thick hairy covering; while still others show a light silky coat. Many small forms may also be met with. Some of the larger shells contain animals which are brown, spotted with yellow, others red marbled with brown. The species illustrated is *Charonia rubicunda*.

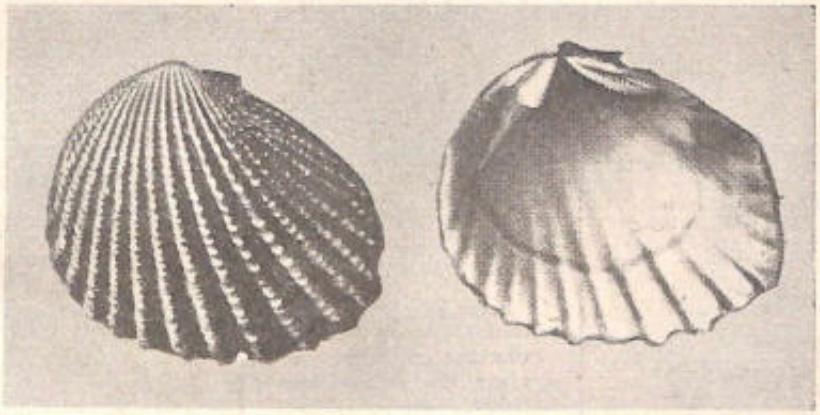


False Bailer Shell

One of the most sought after of the popular group of shells is the volute here figured, which grows to more than a foot in length. It was very rarely washed up on the southern beaches after gales, but is now fairly common through the trawlers bringing in shells. It is so large that it is brought up in the trawl, often through the fact that a hermit crab has made use of a dead shell. When alive it crawls about on the sand, and buries itself when danger approaches, so that the trawl passes over. In Queensland the melon shell is known as the bailer, and the species illustrated (*Livonia mamilla*) may be called the false bailer, as it is too uncommon to be used for bailing purposes.

The Trigonia

One of the most interesting of all Australian shells is *Neotrigonia margaritacea*, characterised by a brilliant internal sheen of gold or purple. Commonly used for ornament, these shells are rather too heavy for popular usage, though their beauty is admitted by all. The hinge is very notable, having a few long teeth which interlock very tightly by means of strong cross bars on their edges. Otherwise the Trigonias



deserve a lot of attention as they are the last living remnants of a very large group which peopled the seas of the whole world some millions of years ago. Nowadays only four or five species exist around the coasts of Australia; elsewhere they have entirely vanished. When the French voyagers first met with Trigonia they regarded it as their greatest prize, and the first living specimen was also considered a most valuable reward.



The Shell Carrier

Trawled off the coast are curious shells, which, at first sight, are scarcely recognisable as such, for they are covered with other shells and stones. The old shell collectors called them "conchologists," and surely no other animal ever merited so truly such a paradoxical name. When dredged among shingle, dead and living shells, they can easily be passed over. In general appearance they resemble the trocas, but the animal inhabiting the carrier shell is of a different nature. The scientific title of the shell illustrated is *Onustus peronianus*.

The Mother Cockle

Found among the Sydney cockles, on mudflats, this large and handsome shell (*Proxichione materna*) has been given the above useful name, though it is not a cockle as regarded in England. It really belongs to the group named after Venus, on account of their beauty, and in association with the mythological tale of the birth of Venus. The erect lamellae are a striking feature, but just as many relatives are smooth.





The Finger Oyster



The name finger oyster has been given by fishermen to the very elongated bivalves which live buried in sand or mud on the seashores or mudflats. They are regarded as excellent bait here, though elsewhere they are used as food itself. It is quite a task digging for them, as they can almost dig faster themselves. They are called razor shells in some parts of the world, but this name has here been discarded on account of the use of the razor edge for the pinna. The species illustrated is *Solen correctus*.



Sea Slugs

Very beautiful, but exasperating, are the sea slugs, as in life they excel in form and beauty, yet when dead become ugly shapeless masses of jelly. Colored figures, painted from living specimens, have been published in the "Victorian Naturalist," the journal of the Field Naturalists' Club of Victoria



The Tapestry Shell

This bivalve shell (*Paphia turgida*) received its popular name from the painting on it, which, to some old-world student, recalled tapestry work. Today, while the shell is still common, tapestry is rare and unfamiliar, but the name is retained as an historical reminder. Most of the shells of this kind are elegant in shape, and favorably, but not brilliantly colored. There are many somewhat similar shells that bore into soft rocks and these are regarded as relatives of the tapestry shell.



The Sea Pill-bug

Some minute animals cause a great deal of trouble, and there are many little crab-related animals somewhat recalling the familiar "slater" of our gardens. These may be seen under stones between tide marks, where they do no harm; but they also bore holes in wood and attack the piles used in building wharves. The sea pill-bug's associates in its damaging work are two smaller animals, also of crustacean relationship. The species figured is *Sphaeroma walkeri*.



The Razor Edge

This name has been given to one of the most famed of shells on account of its sharp edges, just projecting above the mud, cutting like razor blades should an unwary foot be placed upon them. The large fan-shaped shell is buried in the mud, and held there by a wisp of golden threads. From these threads fine cloth has been woven and gloves made, but never in Australia. The large animal is furnished with brilliant eyes on the edges, which seem to gleam against the gloss of the inside of the shell. The comradeship between this shell and a little crab is a familiar "fairy tale of science." The species illustrated is *Pinna menkei*.



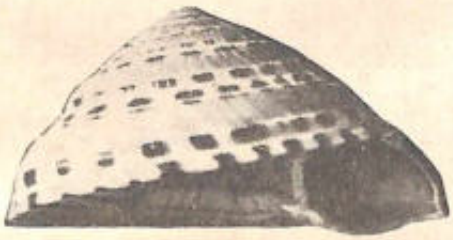
Bubble Shells

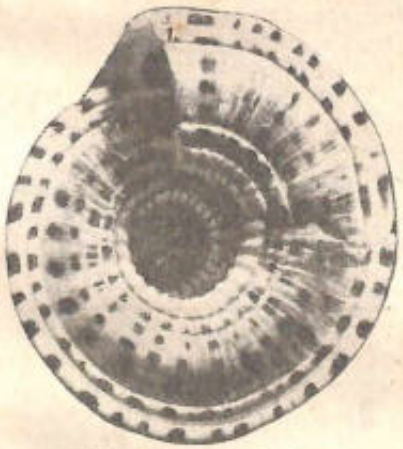
Many simply coiled, rather thin shells have been termed bubbles, but probably the finest is the one here shown with its animal extended. The shell is attractive, the chocolate bands contrasting with the bluish white ground color; the animal also is most charmingly colored, the edge being bluish and yellowish. The banded bubble (*Hydatina circulata*) is illustrated.



The Pearl Shell

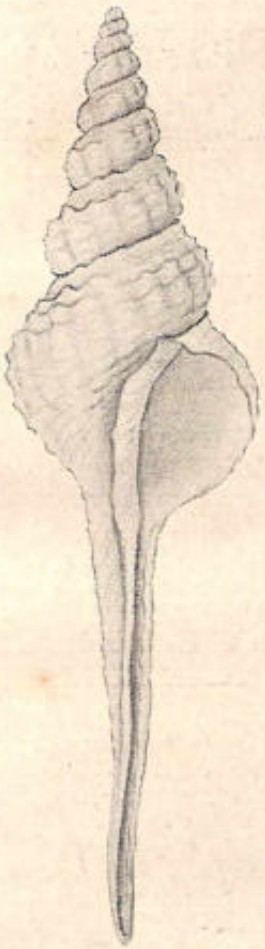
Three-quarters of the pearlshell of the world comes out of Australian waters. Such a statement might cause astonishment, but it is true. In Torres Straits huge quantities of pearlshell (*Pinctada carchiarum*), are collected by divers, and in Western Australia pearls also are sought. The huge shells, which range up to 12 inches across, are sought after for the preparation of buttons, etc., and the few pearls found become part of the pay of the diver.





The Staircase Shell

Washed up on the beach are found occasionally somewhat depressed conical shells, *Architectonica grandiosa*, whose under-surface displays a wide open conical cavity, the edges of which show ridges. A superficial resemblance to a winding stairway caused the name staircase shells to be given to the largest species. Without the added attraction of the staircase, the shell is a notable one from its shape and coloration, creamy white marbled with red.



The Spindle Shell

While its popular name suggested the shape of the shell to our forefathers, it is scarcely applicable today, when spindles are almost unknown. This shell (*Colus novaehollandiae*) is gracefully shaped, and is commonly trawled up to 10 inches in length; smaller ones may be met with on the seashores at times, after gales. The animal is carnivorous, and this can be remembered by the long tail; all carnivorous molluscs have a tail like this, but sometimes very much shortened. Many kinds of spindle shells occur, the northern forms being more painted.



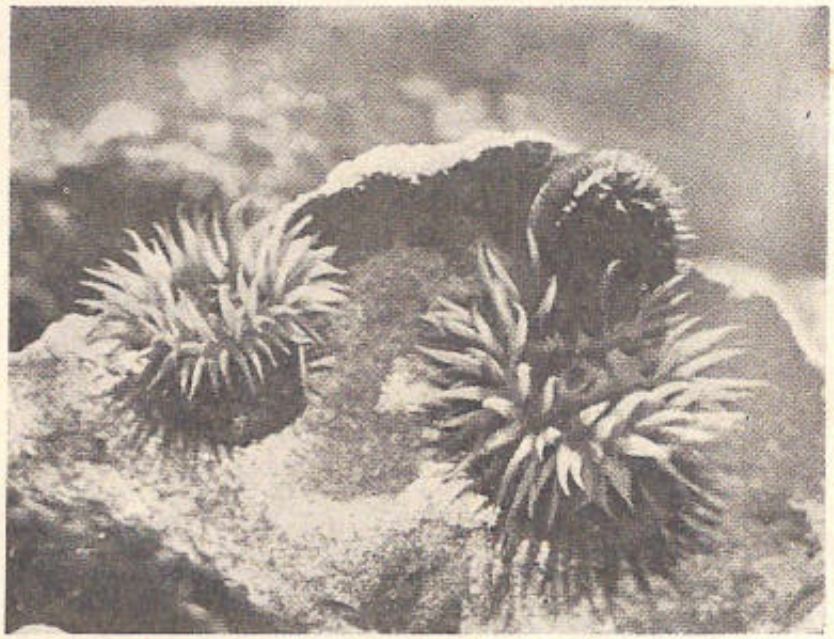
The Mud Oyster

Around Sydney the mud oyster is now nearly exinct, but it is still common in Tasmanian waters, and in South Australia attains a very large size. The rock oyster (*Saxostrea commercialis*) is the shell most valued around Sydney, where it is cultivated extensively. It differs from the mud oyster, *Ostrea angasi*, in being in the form of a cup, the lower valve strongly attached to the rock, and generally it is of a bluish color, the upper surface banded and wrinkled.



The Sydney Whelk

Almost the first Australian shell to attract the attention of Captain Cook's scientific friends was a large one unlike any they had seen at home Nevertheless, this shell, *Pyrazus herculeus*, which they called Hercules's club, was christened by the early settlers the whelk, and then became known as the Sydney Whelk, though it is very unlike the English whelk in every way. This shell also holds pride of place in that it was the first Australian shell to be figured in color. It belongs to a very large group of shells that seem to be taking to a land existence, as they are most numerous in shallow mud flats and mangroves, and even climb trees to get out of the water



Sea Anemones

Curious lumps of crimson or green jelly may be noted clinging to rocks when the tide recedes; but what a different picture when seen in pools under water! Then beautiful waving filaments catch the eye, and the name selected is justified. The crimson anemone has been called the sea waratah, but the hard beauty of the land-flower is excelled by the delicate softness of the sea-flower.



The Sea Bluebottle

Many people who go sea bathing know this animal (*Physalia megalista*) only too well, and most fear its stinging capabilities. It lives on the surface of the water, and is only met with on the beaches through adverse wind conditions. The length of the stinging tentacles is extraordinary, some having been measured to 30 feet! The pain resulting from a sting is relieved by ammonia or the blue bag.

The Cunjevoi

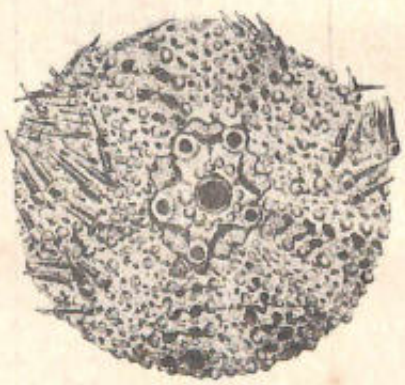
The animal called cunjevoi (*Lais praeputialis*) and used by fishermen for bait, is one of the most extraordinary of the many peculiar animals to be met with on the seashore. It begins life as a small creature having a distinct tendency to develop a backbone, but, instead, it loses this feature and becomes a backbone-less animal fixed to one spot.

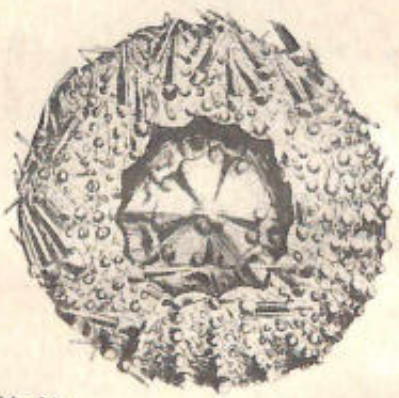




The Sea Tulip

This is another of Nature's strange instances of misdirected ideas. Like the cunjevoi the sea tulip begins life with the idea of becoming a backboned animal, but forsakes that to live fixed to one spot as an animal without any backbone. Unlike the cunjevoi, however, it has developed a long stalk and at the end a bulbous colored lump, not unlike a crude tulip, but as it grows in company and waves about in the swell of the sea it shows a beauty worthy of the name now given it. The scientific name of the species illustrated is *Boltenia australis*.





Sea Urchins

Very interesting are the curious sea-animals known as sea urchins, an Old World name, in this case somewhat appropriate. Urchin is an old English name for the hedgehog, a creature something like our spiny anteater, all covered with long spines. The urchin shells are commonly met with deprived of spines, and look very different from the living animal.

Australian Kingfishers

The laughing kookaburra (*Dacelo gigas*) is a kingfisher which seldom takes fish. Frequenting open forest country chiefly, it preys upon small snakes and lizards, land and freshwater crustaceans, large insects, and the eggs and young of other birds. So far as food habits are concerned, then, it differs greatly from the small kingfishers that flash along streams, or, perched on snag or overhanging bough, are ready to dart instantly upon any fish that comes into view.

Our laughing bird, the great brown kingfisher, has a blue-winged cousin (*Dacelo leachi*) with similar habits, which occurs in New Guinea, the Northern Territory, north-western and mid-western Australia, and Queensland.

There are more than 200 species of kingfishers, 112 being found in the Australian region. Australia itself possesses only 10 kinds.

The sacred kingfisher (*Halcyon sanctus*), next to the kookaburra, is the best known of the Australian species. Its range extends from Sumatra and Borneo to New Caledonia and New Zealand. It is found throughout Australia, the central area only excepted; and in many districts is rather a common bird. Its food includes small lizards, large beetles and other insects, small fishes and crustaceans, notably the yabbie. The nest is made in a hollow limb of a tree, or at the end of a hole drilled in a termites' (white ants) mound on a stump or the bole of a tree; sometimes in a river bank. The eggs are pure white, and the clutch consists of from four to six.



The Sacred Kingfisher

Six of the other species range from New Guinea into Australia. The range of the red-backed kingfisher (*Halcyon pyrrhopygius*) is Australia generally, but its haunts are chiefly the inland areas. Like the laughing kookaburra, it is purely an Australian species; and, also, like that famous bird, it seldom, if ever, "fishes" for a living. Its prey consists of small lizards, and the larger kinds of insects and their larvae. Often it is met with far from even a water-hole.

Macleay's kingfisher (*Halcyon macleayi*), also called the forest kingfisher and the bush kingfisher, inhabits north-western, northern and eastern Australia (north-eastern New South Wales). In habits it differs little from the sacred kingfisher; and its nest is made in a termites' nest affixed to the trunk of a tree.

Two only of the 10 Australian species are true kingfishers (*Alcyone azurea*) and the little kingfisher (*Alcyone pusilla*). They are characterised by long bills, short tails, and weak legs and feet. Their feet are three-toed—two toes in front, the other behind. The remaining eight Australian species are wood-kingfishers.

Both the little and the azure or blue kingfishers are brilliantly colored. The former is a diminutive bird with blue plumage above and silky-white lower-surface. It inhabits the Moluccas, New Guinea, and the Solomon Islands, North Queensland, and the Northern Territory. Its favorite haunts are the banks of small mangrove creeks and those flowing through dense scrubs. The little kingfisher lives upon small fishes, and nests in holes in the banks of streams or in tree stumps.

Water kingfisher and river kingfisher are popular names for *Alcyone azurea*, which show that it is a true member of the group to which *A. pusilla* also belongs. The former species is not confined to the tropics; its range includes northern, eastern and southern Australia, and Tasmania, besides New Guinea and the Moluccas. The azure kingfisher always lives about creeks or rivers—either fresh or saltwater streams; and feeds upon small fishes, crabs and other crustaceans, and insects. It flies swiftly, as a rule close to the surface of the water, and its dives after fish are arrow-like. The victim is carried up to an overhanging bough, where it is killed by blows against the perch and swallowed whole by the long-billed bird.

There is no prettier sight along an Australian river than an azure kingfisher, quiet and watchful, on a low branch above the water, or flying from one reach to another—a living flash of blue. The back is ultramarine and the under-surface of a bright chestnut color.



The Australwink and the Noddiwink

Corresponding in habits with, and related to, the periwinkle of England, we have the Australwink (*Melarhaphe unifasciata*), a pretty little blue shell, which is common on all the rocks above low water, and ranging to above high water. Clustering in crevices, these shells are seen to become larger and fewer as high water is reached, where they attain a size of half an inch. From this habit of living out of the sea, it appears that, in time, they will become land-shells, as it is thought that all shells first inhabited the sea. As a matter of fact, some kinds climb the mangroves, and live on the branches and leaves, going higher as the tide increases. Closely allied to the Australwink is the noddiwink (*Nodilittorina nodulosa*), which has nodules around it, instead of being comparatively smooth, and this has taken to living a little higher up the rocks than its relation.

Much more numerous in some places than the Australwink, lives alongside it the conniwink (*Bembicium melanostoma*), a curious Australian adaptation of the periwinkle, having taken on the form of a brown cone, quite unlike the elongate blue Australwink.



The Hermit Crab

Some forms of crablife have taken refuge in shells, losing their crab-like form, but retaining the nippers. If a shell at the bottom of a pool be seen to move quickly, then you can be sure that it is inhabited by a hermit crab, as no shell animal moves rapidly. When such a shell is picked up the animal retreats inside, but after a moment or so the arms will be pushed out, a wary eye following. As they are great fighters among themselves, as well as having many enemies, hermit crabs are constantly on the alert. The shell illustrated is the well-known Australian whelk (*Neothais succincta*), which was first collected by Captain Cook's naturalists. The crab is *Diogenes custos*.



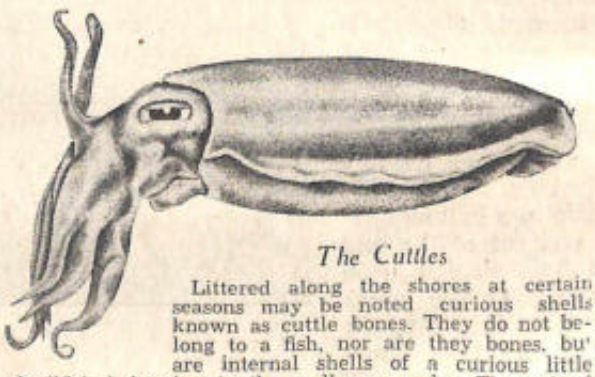
The Sea Devil

Similar in some respects to the cuttle and the squid are the sea devils, so called. These have only eight long and thick arms, with strong suckers and, instead of a long body with a "bone" or pen, they have a short, thick, fleshy bag. They can swim very well, like their relations, but can also crawl about, which the others cannot do. Although generally feared on account of the sucking feeling of their arms, the fisherman turns the tables on sea devil fish. Their flesh is an excellent bait. However, in Victorian waters, large specimens occur, which must be treated with respect. The species figured is *Octopus cyaneus*.



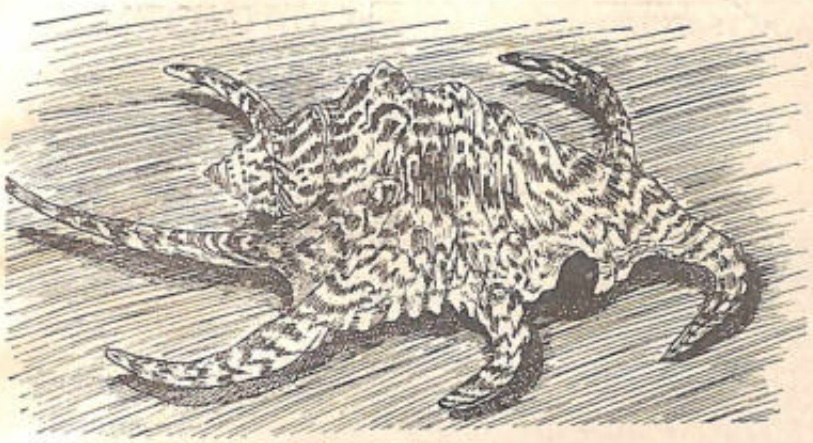
Soldier Crabs

One of the most delightful sights to a naturalist is that of a multitude of soldier crabs (*Mycteris longicarpus*) marching and wheeling in military formation. Probably scuttering would be a better word to describe the movements, but the massed effect of the small blue animals is that of a Lilliputian army. Sometimes it appears that animals of the same size congregate so that groups of steps and stairs in animal sizes may be seen together.



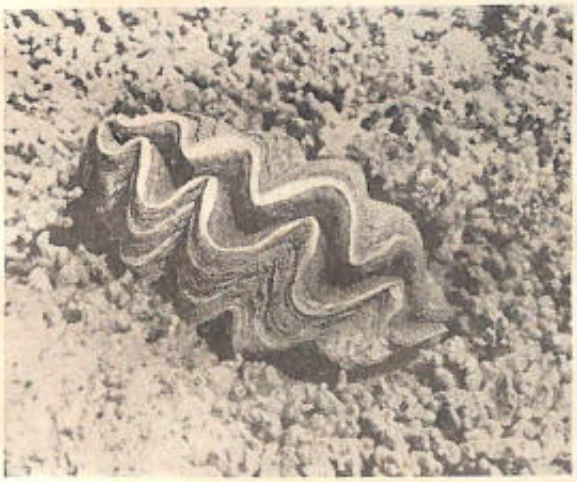
The Cuttles

Littered along the shores at certain seasons may be noted curious shells known as cuttle bones. They do not belong to a fish, nor are they bones, but are internal shells of a curious little devilfish belonging to the molluscan order. The animal is possessed of 10 arms furnished with suckers, eight short and thick, more or less equal in length, two longer and slender, and capable of being coiled and thrust out by the owners as by a spring to catch their prey. Cuttles float by means of side flaps, and swim backwards by the use of a siphon through which they inhale water. Moreover they can change color according to the kind of sea-bottom they frequent, thus upon a sandy bottom they appear a sandy color, but immediately upon passing to a weedy patch they assume a dark variegated coloration entirely masking their position. The "bone" is in their back similar, but not analogous in any way, to our back bone. Squids are more elongate, have terminal flaps, and, instead of a calcareous bone, they possess a long thin, horny "pen," and as they carry about with them a bag of ink, they were known as the complete clerk. The one figured is *Solitosepia plangon*



The Spider Shell

One of the most curious of the common large shells found on the coral reefs of the Queensland Coast is the spider shell (*Lambis lambis*). The half-dozen long fingers projecting from the aperture, which is very narrowed, vary in the different species, as does the coloring of the mouth. Curiously enough, the animal is rather active, and moves with a series of jerks. It has brilliant eyes on long stalks, which seem to look inquiringly at the observer.



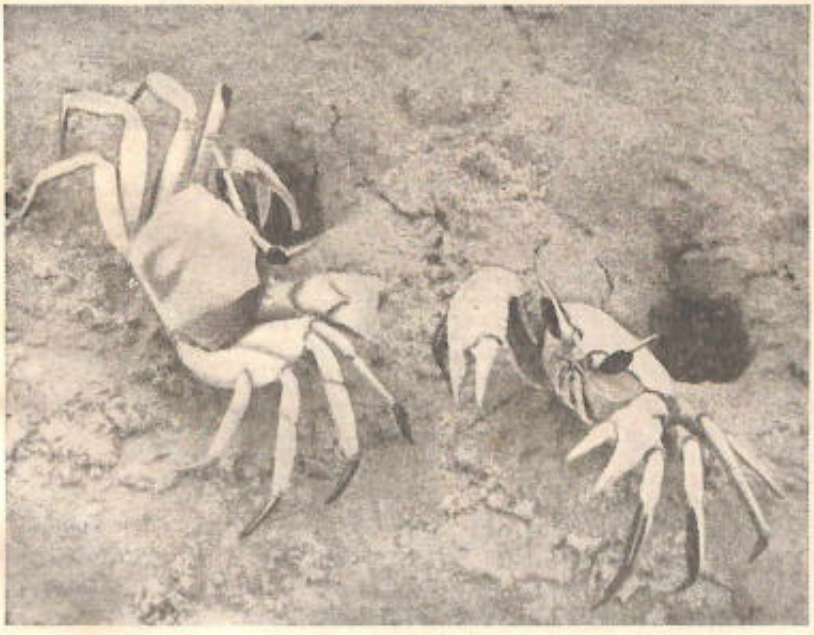
The Giant Clam

The largest molluscan shell in the world is here called the giant clam (*Tridacna gigas*), and the word clam is altogether restricted to this kind of shell, whereas in America many ordinary bivalve shells are called clams, and used for food. The giant clam lies on the coral reefs off the coast of Queensland, and there attains a length of nearly four feet, though accounts of much longer shells have been given. Its very sharp teeth and large size constitute it a danger to the unwary, and in other countries there are tales of divers being trapped, but no such accident has yet been reported in Australia.



The Elephant Snail

A common, large, black slug bearing upon its back a white, shield-shaped shell, has been called elephant fish (*Scutus antipodes*). This curious name has been given on account of the long proboscis hanging down, and its two feelers, but the name is very inept.



The Sand Runner

At times, along the sandy beach, may be seen a grey streak as of a dead leaf blown by the wind. Approaching closer, the streak will be repeated and the movement will be seen to be due to a sand-colored crab whose actions almost baffle the eyes. It should be watched carefully, as when it stops it begins to burrow and may suddenly vanish. The sand runner's scientific name is *Ocypoda cordimana*.

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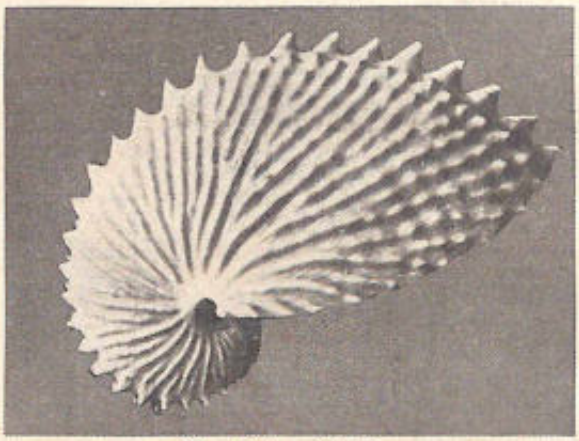
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THE SAILFISH

In the cover design a sailfish (*Istiophorus indicus*) is seen, leaping right out of the sea, after being hooked. Sailfishes are noted for their brilliant coloration. They are of large size, and the number of species is few.



The Paper Nautilus

This very beautiful shell (*Argonauta nodosa*) is sometimes cast upon the beaches in numbers—and then questions arise. The maker of this delightful piece of shellwork is a devilfish, and the animal uses it as a cradle for its eggs; consequently it is not a true shell, as true shells are a part of the animal, not an external, unattached item. Apparently only during this "sitting" season do these animals come to the surface of the sea, and then rarely meet with adverse winds which drive them and their treasures ashore so that the cradles become real treasure-trove.

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SUN NATURE BOOKS

No. 1—BIRDS & BLOSSOMS (Out of Print). **No. 2.—AUSTRALIAN ANIMALS. No. 3.—BIRDS & BUTTERFLIES.** Copies of Nos. 2 & 3 may be obtained from all Newsagents (price sixpence each), or Post Free 7d. from The Manager, The Sun, 62-74 Flinders Street.



THE SWAMP-HEN

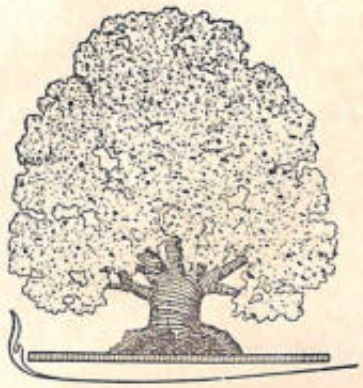
There are two species of these handsome birds (*Porphyrio*) one confined to South-western Australia; the other, known as the Eastern Swamp-hen, ranging over Australia generally (the south-western portion excepted), Tasmania and New Zealand, also occurring in New Guinea, New Caledonia, Norfolk and Lord Howe Islands. The bald coots, as they commonly are termed, frequent the riverside, the margins of lakes and lagoons, and swamps. One sees them usually in pairs or in flocks. The Eastern Swamp-hen has red legs; those of the Western species are green. The color picture, reproduced from Diggles's work on Australian birds, shows the blue-breasted or Western Swamp-hen (*P. bellus*).



RIVER LIFE

The Murray Cod (*Maccullochella macquariensis*) and the Azure Kingfisher (*Alcyone azurea*)

Printed and published by LAWRENCE KAY, of 100 Barkly St., St. Kilda, for Pictorial Newspapers, at its offices, 62 to 74 Flinders Street, Melbourne



FOREWORD

By A. V. GALBRAITH, Chairman, Forests Commission of Victoria.

For countless generations trees have been a dominant feature of the earth's surface and in no small measure have contributed to man's well-being and enjoyment in materialistic and other ways. A remarkable feature is that their influence is felt both while they are living and after they are dead. Living, they shelter our homes and beautify our streets and gardens; they conserve water supplies and protect the soil; they afford a harbor for useful insectivorous birds and a home for other wild creatures. Dead, their timber and other products serve mankind in a multitude of ways.

A tree is a wonderful creation and, just like a human being, is a living thing, breathing, feeding, and reproducing its kind. In one respect at least it has a decided advantage over mere man, for if not interfered with it may live to be hundreds, and even thousands, of years old. It is really remarkable to think that there are trees standing today which have lived through successive dynasties and the changing fortunes of the world since long before the days of early Christian civilization.

Trees, like people, are naturally gregarious and form forests often over immense areas. Each forest has its own characteristics according to the conditions under which it grows and to the peculiarities of its component individuals. Australia's forests form an intensely interesting study, for they have no counterpart outside the confines of the continent. The unique constituent flora, the rapid rate of growth, and the extraordinary dimensions attained by individual trees, make these forests an object of wonder and admiration, especially to visitors from other lands. For this reason, even if for no other, they are surely worthy of closer study and greater appreciation on the part of the people of this country; but when we take into consideration also the wealth in timber and other products, as well as the innumerable indirect benefits derived, it must be conceded that the forests are indispensable to the community and that each person should do everything possible to assist in their preservation and perpetuation.

In an endeavor to foster a love of trees for themselves and to inculcate a "forest conscience" in the people of this State, it has been found by experience that the education of the school children in this direction is of very great assistance. Such projects as the School Endowment Plantations Scheme, and the more recently inaugurated road tree-planting schemes sponsored by The Sun News-Pictorial, were designed to interest the children in trees in a practical way, and undoubtedly have proved their value.

In this educative campaign, the excellent publication which has been prepared by Mr. Charles Barrett should be of the greatest value, not only to young students, but also to the public generally, for it presents a wealth of information on the trees and forests in a particularly attractive and interesting form.

THE SUN TREE BOOK

by

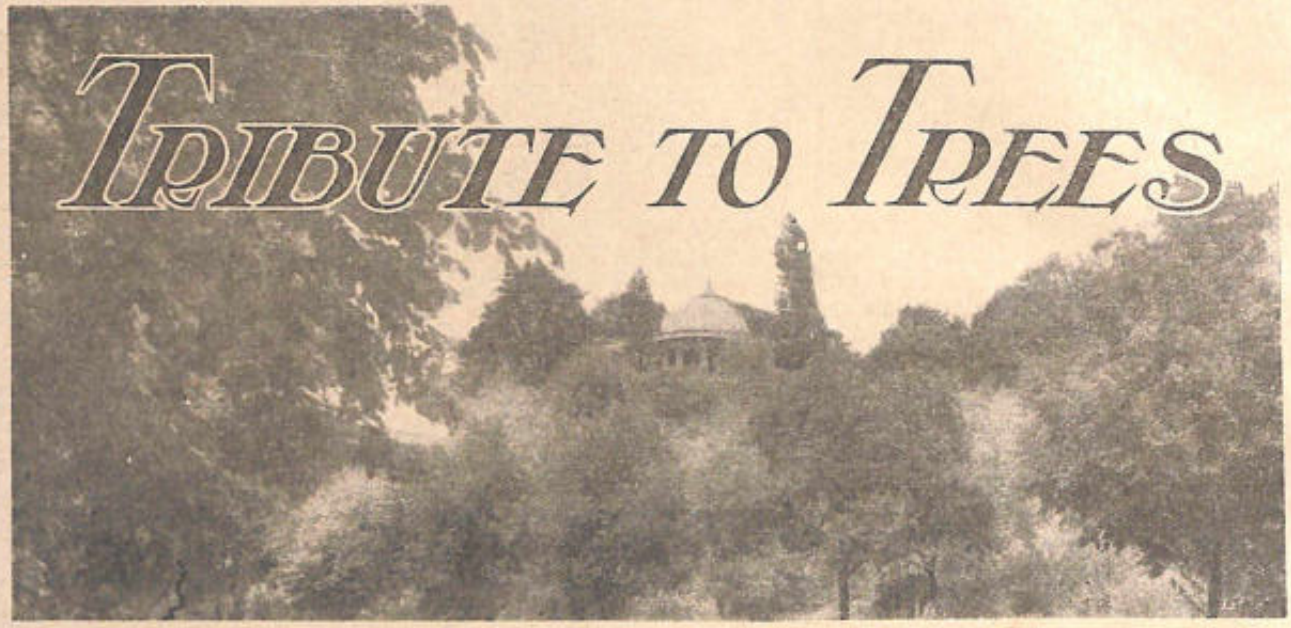
Charles Barrett

C.M.Z.S. (London & New York)

In collaboration with

C. R. G. Venville

Dip. For., Superintendent, State Nursery, Macedon.



TRIBUTE TO TREES

FOREST and stream, when the world was young, made beautiful country that for a century now has been under cultivation. To the pioneer settlers of Australia, trees were enemies, to be attacked with axe and fire.

Trees native to the soil had very few champions in those times, when the bush closed in around little settlements destined to become cities or towns.

So the destroyers of trees, unchecked and uncriticised, carried on what they regarded as the good work. And indeed, they were justified, since wild nature may not keep all her territory when a young nation needs an ever-larger share. The blame lies on later generations, which ruined great tracts of forest that should never have been given to selection at all.

One may be reasonable, and a forest lover too; admit that the trees must go from millions of acres, but deplore the spoliation of forest areas that are not really required for settlement and cultivation. In Victoria, as in other States, there are graveyards of trees that a wise policy of conservation would have left growing still.

Happily, the old foolish way with our forest heritage has changed; and all over Australia people are learning to value trees growing wild, as well as along streets and in parks and gardens. Tree planting has become a pleasant duty. We are proud of tree-shaded highways; of townships and towns whose streets are beautiful with trees; of garden cities and suburbs where trees have been planted for everyone's pleasure, and round about homes.

This love of trees for their own sake, not for their monetary value, is evidence of good citizenship. For trees are living things that share in our civic life, citizens themselves, if you please. A street without them, in any residential area, is lacking in beauty which might easily be possessed. Home gardens are for trees as well as flower-plots and shrubs; even the smallest garden may have a small tree, for the choice is wide, among natives and exotic kinds.

There is pleasure in watching a young tree grow up; in measuring its progress with your own years. Some who, in boyhood, stubbed acorns into the ground, in middle age are enjoying summer-time hours in the shade of spreading oak trees.

It is better to plant a tree than to make a rose plot or a border of gay little annuals. To do both these things is good, only, the first is more desirable. Trees may become green memorials of those who planted them, so that our pleasure in them is not merely selfish. Our children, and their children, may enjoy them. That is a charm of many trees—their longevity. Over there in Britain, whence our shade trees came, ancient oaks and elms are almost venerated. There are some in Australia nearing the century; trees that were planted by early settlers, whose descendants know the worth of a grand old tree.

These are the stray thoughts of a tree lover who is not exclusive in his likes but, in common with thousands of other folk, delights in gums and wattles, and finds beauty also in trees native to other lands than Australia.

Europe has given us trees for our streets and public gardens; America, trees for our great plantations. Ornamental trees and trees for timber, we have gathered from many lands. And some of these countries have taken from us eucalypts and wattles, other trees too; a fair exchange.

This small book, a tribute to trees, is offered in the most friendly, "unpreferential" way. The author's preferences, if mentioned here and there, are only for the reader's acceptance if he pleases, as a choice of beautiful trees. Hardly a tree that grows is wholly without charm, if not mis-shapen or niggardly from no fault of its own.

THE EUCALYPTS

OTHER nations share with Britain "dominion over palm and pine," since many of these trees are native to lands beneath their flags. But the eucalypts are ours alone, growing in their age-old haunts. All but seven of the 500 or more species are purely Australian, the exceptions being Malaysian forms.

The gums are as "national" as kangaroos and emus; yet few of us are able to distinguish one kind from another, when red gum and blue gum and mountain ash are marked off. Their variety is bewildering; and botanists who have devoted themselves to the eucalypts, differ among themselves. One man's species is merely a variety to another.

Identification is often so difficult that even the specialist makes mistakes. No schemes of classification are final; only there are workable ones: and after all, what need has the tree lover to



Bole of Messmate Stringybark

worry over problems of nomenclature and the splitting or lumping of species? None at all. He may become acquainted with perhaps fifty kinds

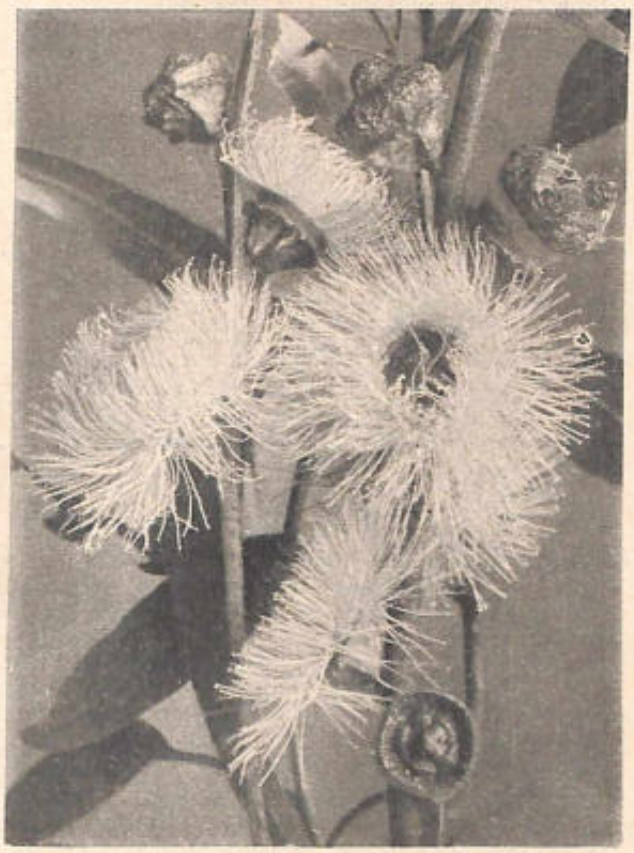


Photo by F. J. Bishop
Blue Gum: Blossom and Fruits

of eucalypts, and feel at home in any Australian forest, for some at least of its trees will be familiar friends.

The vegetation of Australia is dominated by one genus—*Eucalyptus*. From Cape York to Cape Howe, and from Howe to the Leeuwin across the continent, and east and west of the Overland, gum trees are present—wherever trees grow. And the genus is represented from seashore to mountain top. Snow gums contrive to live on Bogong and Feathertop and other Alpine peaks; some eucalypts take the spray of breakers on the beach. Where the drover boils his quart pot, when bringing cattle down south from the Gulf country; where the swagman camps beside a lonely trail; and where, in Arnhem Land and the Wild North-West, aborigines live still in their age-old manner, the gum tree is a feature of the landscape.

Of course, there are tracts of country without eucalypts; nevertheless, it is true that they dominate the mainland vegetation, that of Tasmania and lesser islands, too. No other genus rivals *Eucalyptus* in variety, value of timbers, and chemical products. We are fortunate in our national trees; and should not only preserve them as forests, but also plant gums.

Some day a gum tree may grow in every home garden; choice of species is wide and one



THIS MOUNTAIN ASH, king of the Stony Creek State Forest, Narbethong, was 303 feet 6 inches in height, with a girth measurement of 25 feet 7 inches at 6 feet from the ground.

to suit even the smallest plot may be found in a nursery; besides many for larger grounds, and for parks and plantations.

Gums, though a visitor used to forests of deciduous trees or conifers may find them monotonous at first, display much diversity; individual trees of a species are variable enough to bewilder the botanist at times.

In his "Introduction to the Study of Eucalypts," Dr. Charles S. Sutton says: "In the great brotherhood of trees clothing wide areas of the earth's surface, and ministering so essentially to the needs, the comforts, and the delight of men, the genus *Eucalyptus* takes a very high place.... Although the undiscerning complain of the monotony of our forests, perhaps the most striking thing about the eucalypts is their great diversity and individual variability, and it is these qualities, subtle enough maybe in many of the groups, which make the genus such a fascinating study .... The boles may be massive, buttressed, rugged, or shaggy, or slim, sleek, and white as the limbs of Adonis, or again beautifully blotched with greys, buffs, reds or purples. Many kinds have their own schemes of branching, and in a tree such as the red gum of our river plains, the contorted picturesqueness of its massive limbs gives such individuality to each tree that no two are alike.... In spite of detractors, there is great diversity also in the tone and texture of the foliage, which, if it does not run the gamut of all the greens—for it must be admitted it perhaps never has the lush quality to be seen in that of deciduous trees, and is doubtless dull and sombre in some species—is in most cases bright and sparkling and in springtime often most delightfully lit with fire or frosted with silver."



The Grey Box

The tints of "gum tips," ranging from pale amber and rose-pink to wine-dark purples, and red and lucent yellow-browns, are so charming that vast quantities are gathered for home decoration. If a forest is Nature's cathedral, then an Australian gum tree forest has, in the season of young foliage, glorious "stained" windows formed not of glass, but of leaves.

Beautiful as the mists of morning rise and the trees are unshrouded, an Australian forest is enchanting when sunlight falls on leaf and bough and makes flickering shadows on smooth white boles, or touches the bark with golden fingers. There is no "drab monotony" here; but charm, and even a magical quality.

Then, in the evening, as dusk makes them dim, gum trees are strangely alluring. Night with her train of stars, or clouded sky, changes their mood again. A camp fire gleaming on the gums around makes them friendly shapes looming from darkness into the light.

More than 500 species, if we take the larger view; and only seven occur beyond the limits of Australia. New Guinea has five or six kinds; two being confined to the great tropic island, while one, *Eucalyptus alba*, is found also in Timor and Java. The Bismarck Archipelago has *Nandiniana*, while another species is found in the Philippines.

DAY OF DISCOVERY

Specimens gathered from a tree growing near the future site of Hobart gave science its first knowledge of the eucalypts. The day of discovery was January 26, 1777. Dr. William Anderson and his assistant, David Nelson, share the honor of making the gum tree known to the world—meaning the savants of Europe.

These two men, whose names deserve remembrance, were members of Captain Cook's Third Expedition to the Pacific in the *Resolution* and *Discovery*. The ships anchored in Adventure Bay; and one imagines the joy of naturalists in rambling on shore among strange new shrubs and flowers and trees. They wondered at the tall gums, and Nelson collected the specimen from which, a year later, the great genus *Eucalyptus* was botanically described. The species was named *obliqua*—the "messmate," as pioneer settlers called it, or "stringybark," popular names still in general use for *obliqua*.

Surgeon on Captain Cook's second expedition, William Anderson must already have noticed gum trees, for he gave to them the musical name *Aromodendron*. But the French botanist L'Heritier who described the genus scientifically, coined the



Gum Trees Beautify Country Roads

word that has become familiar all over the world: *Eucalyptus*, meaning well covered, and referring to the cap or lid of the bud, shed when the flower is ready to open.

"Gum trees" the eucalypts were called by the earliest settlers. The name has persisted because it is homely, short and appropriate, at least for some species, though the exudation which appears on their trunks is a kino, and not a gum, as even now is generally believed. This substance, resembling gum, contains a large proportion of tannic acid.

Some little-known writers in Britain, who thought that their knowledge was wide, described Australia as a topsy-turvey land, where birds had no song, fruits bore their seeds outside; and the trees shed bark instead of their leaves. They were wrong about the birds and the fruits; but correct as to the trees. Many of the gums shed their bark in ribbons or in flakes, bark both of trunk and limbs; some species being more or less completely "undressed."

There are half-barked eucalypts, so called because their bark, rough or friable, is persistent from the butt to a varying height, the remainder of the bole being smooth. There are scaly-barks, trees with a persistent hard and flaky bark, frequently cracked or tessellated; eucalypts which are rough-barked to where the branches begin, and whose bark is persistent; and stringybarks, whose thick bark is stringy and, to a greater or lesser degree, deeply and coarsely fissured. Still another group is formed by the trees with hard and deeply furrowed bark, which is friable, dark colored as a rule, but grey in some cases: the ironbarks.

Baron von Mueller, one of the greatest botanists who ever lived, divided the genus *Eucalyptus* into the six groups; using the bark as a basis of classification. Another authority (R. H. Cambage) made five divisions of the barks: (1) Smooth, (2) scaly, (3) scaly to sub-fibrous, (4) sub-fibrous, (5) fibrous and furrowed. The boxes are included in division 3, the stringybarks in 4, the ironbarks in 5. Division 1 contains the gums which grow mostly on the uplands, particularly mountains above 4000 feet, but are found also in coastal regions, though less abundantly. The bloodwoods form division 2; none of them occurs in Tasmania, nor do any members of division 3.

Both fruits and flowers, of course, must be carefully studied if one would learn to know the gums. In most cases, indeed, the fruits — gum nuts—are chiefly relied upon for identification of these puzzling trees.

GUM NUTS

Gum nuts, quaint and charming objects often used in toy making and for decoration and figured in art designs, are to the botanist the fruits by which he may know the trees—distinguish one kind from another. This applies not generally, but in the great majority of cases, gum nuts decide identity. They are of distinct shapes, grouped as follows:

(1) Globular, semi-globular, and bowl-shaped.
(2) Ovate, semi-ovate and ellipsoid.
(3) Pear-shaped.
(4) Campanulate or bell-shaped.
(5) Urceolate or urn-shaped.

These hard, woody objects, known universally as gum nuts, vary in size from that of a large pinhead to nearly three inches in diameter; the giant fruits being those of *Eucalyptus pruinosa*.

More than 60 species of *Eucalyptus* occur in

Victoria—original inhabitants; others have been introduced. We have some of the principal forest trees of Australia in the eastern States, and the student of eucalypts need not travel far to see a diversity of these trees as they grow, in a wild state or in cultivation.

Native to south, north-eastern and eastern Victoria, the blue gum (*Eucalyptus globulus*) belongs also to New South Wales and Tasmania, and besides, has been extensively planted, oversea as well as in Australia. It is one of our valuable timber trees, attaining a height of 200 feet to 250 feet when about three centuries old. It grows rapidly, up to 8 feet in a year when conditions are favorable.

This is the gum which Californian folk like to claim as their own; and it *is* a naturalised American tree. Some authorities believe that the true *globulus* is confined to Tasmania and Flinders Island, the Victorian blue gum, which differs from it chiefly in the fruits, being the spotted or small-fruited blue gum (*E. Maidenii*), which grows to a height of 100 feet to 150 feet. Both in Victoria and Tasmania this species grows in natural forests, often at a considerable elevation on the hillsides; at nearly 4000 feet spotted blue gums have been found. Thousands were destroyed, whole belts of trees, when the land they occupied was desired for dairy farming in Gippsland.

No other eucalypt has been so widely planted in other lands; the blue gum is *the* gum tree to people in Europe, Africa, and North and South America. We heard during the recent war of the blue gums of Abyssinia. These trees were planted in large numbers around Addis Ababa, capital of Abyssinia, for the sake of their timber and also for use as fuel.

An Australian visiting Italy feels at home seeing blue gums close to Rome—on the Campagna; in Spain, too, he would meet with this old bush friend, and in Algeria and Tunis.

Australian soldiers on active service in Egypt were delighted to find gum trees growing there. At Ismailia on the Sweet Water Canal, there are groves of eucalypts, notably at Lake Timsah.

One of the typical Mallee scrub species is *Eucalyptus dumosa*, a shrub or a small tree, the height varying from about 10 feet to 15 feet (rarely). Its smooth bark is persistent and varies from a whitish hue to pale greenish-brown. Yellow Mallee (*E. incrassata*) reaches a height of 30 feet, but commonly is only of shrub proportions.

Sugar gums (*E. cladocalyx*) are very familiar in cultivation in Victoria, but their native home is in the Flinders Ranges, South Australia; there the trunks often are over 4 feet in diameter. Picturesque trees are the sugar gums, from 20 feet up to 60 feet tall, with thick, smooth bark.

Woollybutt (*E. longifolia*), with its rough, brittle, fibrous bark of a greyish hue, grows to a height of 100 feet to 150 feet. The red, hard timber is very durable, and is used for wood paving blocks, sleepers, fence posts, etc. Bloodwood (*E. gummifera*), which ranges from North Australia and Queensland to Eastern Victoria, usually is a small tree, but may attain a height of 50 feet to 80 feet. Its rough bark is persistent.

Growing to 150 feet, with a trunk up to 6 feet in diameter, the spotted gum (*E. maculata*) has smooth bark, whitish to reddish-grey in color, which is shed in flakes, giving to the bole its mottled appearance. Native to Queensland, New South Wales and Victoria, this species is rare in the last-named State, being confined to the eastern district.

Eastern Victoria also is a home of the mahogany gum (*E. botryoides*), native also to New South Wales and Queensland. It has rough, furrowed bark and grows to a height of 60 feet or 80 feet. The hard red timber of this handsome tree is close-grained and resembles true mahogany.

The smooth-barked swamp gum (*E. ovata*), widely distributed in Victoria and occuring also in Queensland, New South Wales, South Australia and Tasmania, varies in height from 70 feet



Photo by J. Kauffmann.

"Golden Gleams." Sunlight on the white-boled Gums.

or 80 feet to 120 feet; in favorable conditions, it may be very much taller. A tree that likes moist places.

Among the "boxes" are the long-leaf species (*E. elaeophora*), from 40 feet to 90 feet high; apple box (*E. stuartiana*), red box (*E. polyanthemos*), yellow box (*E. melliodora*), black box (*E. bicolor*), white box (*E. albens*) and others.

Grey box (*E. hemiphloia*), usually a tree of slow growth, has pale grey, rough or scaly bark. It may be only a shrub, but usually grows tall — from 60 feet to 120 feet. Besides southern, central and northern Victoria, grey box is found in Queensland, New South Wales and South Australia. Its pale to light-brown colored timber is tough, hard and durable.

All five of the principal members of the stringybark group are native to Victoria, while one, *Eucalyptus obliqua* (the "historic" gum) is the chief forest tree in wide areas of Tasmania. One of the stringybarks occurs in South Australia.

Among the most useful hardwood trees of south-eastern Australia and Tasmania is the messmate stringybark (*E. obliqua*), whose height varies from about 80 feet to 250 feet. Yellow stringybark (*E. Muelleriana*), which has dark grey or yellowish bark, is one of the good timber trees, found chiefly in south and north Gippsland, especially undulating areas where the soil consists of coastal sand or sandy loam.

Thick, fibrous furrowed bark of a greyish color, which goes up to the tree's small branches, is that of the white stringybark (*E. eugenoides*) which, usually 50 feet to 100 feet high, may grow to 150 feet exceptionally. Besides south and eastern Victoria, it is found in Queensland and New South Wales.

Excepting the south-west, brown stringybark (*E. capitellata*), a tree from 50 feet to 150 feet in height, is widely spread in Victoria, also occurring in South Australia and New South Wales. It grows at higher elevations than does the white stringybark, and sometimes is met with among mountain ash trees, when it may be nearly 200 feet tall, with a broad crown.

The very fibrous bark of red stringybark (*E. macrorrhynchus*) is reddish colored and deeply furrowed and goes to the tree's main branches. In height this species varies from 50 feet to 150 feet; it is the only member of its group found west of "The Divide."

Native to eastern New South Wales and Victoria the mountain grey gum (*E. goniocalyx*) grows, as a rule, in isolated colonies at high elevations. It is one of the giant species, attaining 200 feet to 250 feet; straight-boled, with greyish or yellowish green bark, smooth excepting on the lower trunk, where it is rough and flaky. The leaves measure up to 15 inches in length, and are thin and narrow. This nicely balanced tree sheds its bark in ribbons. It is fairly well distributed in southern, north-eastern and eastern Victoria, and belongs also to New South Wales.

Eucalyptus regnans, the white mountain ash, tallest of all Australian trees, and also the largest at the base, is native to New South Wales and Tasmania as well as Victoria. In the Otway Forest, its western limit, white mountain ash flourishes at an elevation of about 4000 feet. Trees in that district established the record for trunk proportions, measuring from 72 feet to 75 feet in circumference. Red mountain ash (*E. gigantea*), native to New South Wales, Victoria and Tasmania, attains a height of 250 feet, the finest specimens, while the average tree is about 100 feet.

Both plains and hill country are favored by the manna gum (*E. viminalis*), a small tree usually, though it may grow tall—from 50 feet to 200 feet occasionally. It is widely distributed in Victoria, the far north-western region excepted, being

(*Continued on Page* 35)



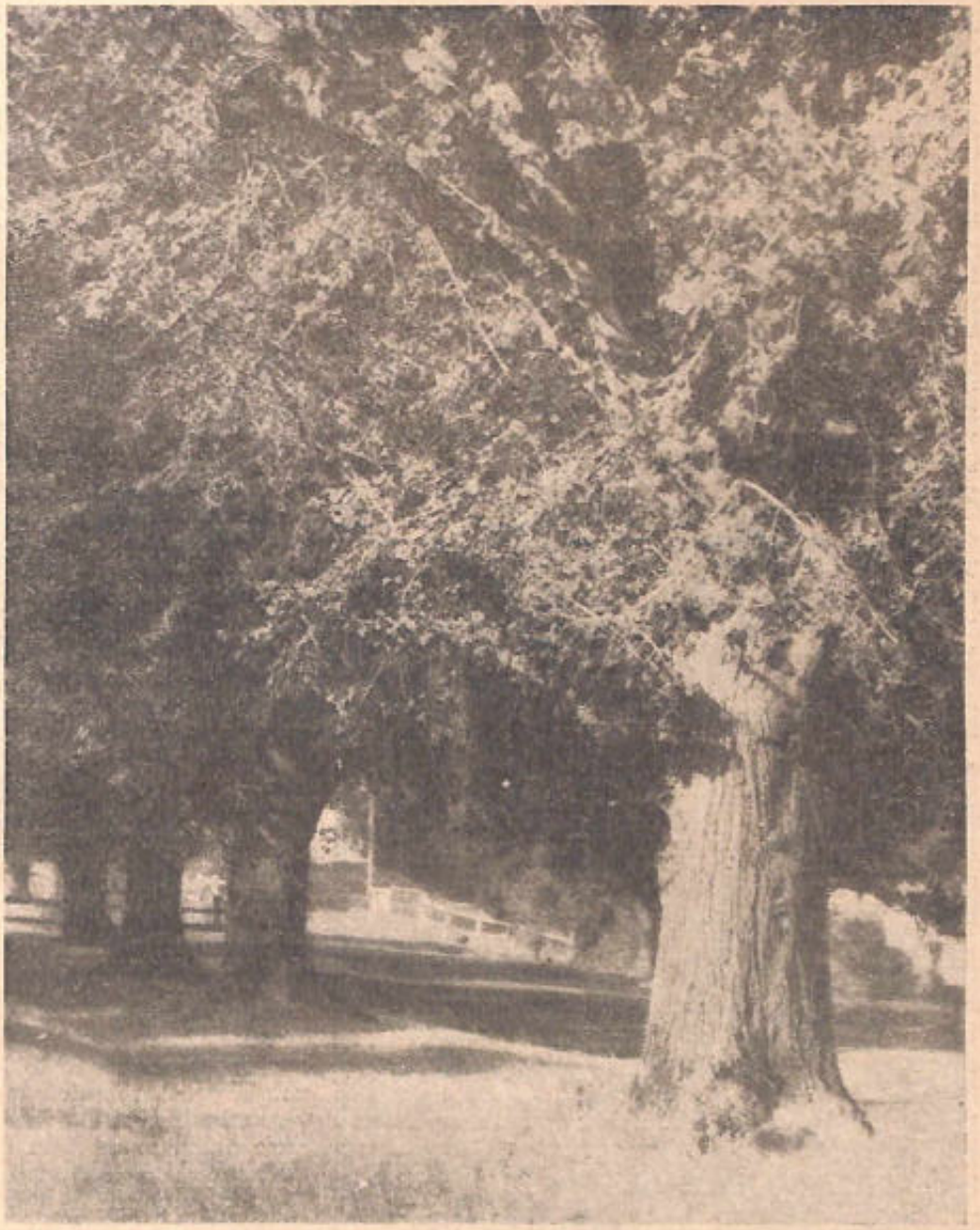
A GUM TREE HOME

This section of a giant gum tree, lying amid the ferns in a gully of the Dandenongs, was converted into a "hut."

TREES To PLANT

CHOICE is so wide that sometimes even the experienced planter cannot make up his mind. At least a few varieties of trees can be found for every conceivable site, be it wet or dry, exposed or sheltered, poor soil or rich, on highland or plain.

What are the best varieties? Advice can be obtained from many sources. The staff of the Botanic Gardens, parks and gardens curators, the Forests Commission, nurserymen, and the Tree Planters' Association, all are willing to assist the beginner, but the beginner should be prepared to help himself. Many leisure hours might be spent learning the habits and peculiarities of trees. Much can be gained from visits to Melbourne Botanic Gardens, suburban and country public gardens and parks.



Sunlight and Shade: Elms in Early Summertime.

Because common names for plants are not universally adopted they are both misleading and confusing. The same common name is given often to different species. To memorise a botanical name entails no greater effort than to learn a popular one, and the former is much to be preferred.

It is the drier parts of Victoria that are most in need of trees, and some varieties suited to hot localities will be discussed.

The most versatile tree introduced to Victoria is the sugar gum, *Eucalyptus cladocalyx*. It will grow in practically all parts of the State, and quickly provides shade, shelter and beauty. Its beauty is often marred by the maltreatment it receives at the hands of the inexperienced pruner. A bushy type of sugar gum, developed in recent years, is proving more suitable for a dense windbreak than the parent type. This tree must not be despised because it is common, for it is serving man in many windswept and sunbaked districts, and it will continue to serve him. The tree is so hardy that, where nothing else will grow, sugar gum may succeed.

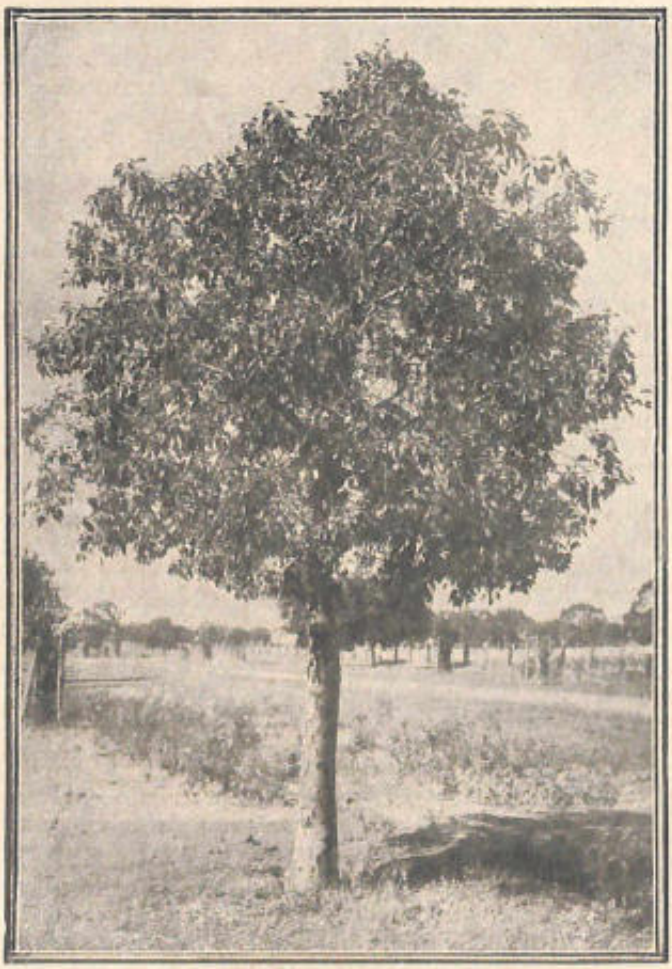
Gippsland mahogany gum, *E. botryoides*, has a larger crown than the sugar gum, but it grows as rapidly and in similar sites. The yellow gum, *E. leucoxylon*, and the red ironbark, *E. sideroxylon*, are hardy tall-growing trees both available in red-flowering varieties. The lemon-scented gum, *E. citriodora*, receives its name from the perfume released by the leaves when crushed. The

pink or white bark of the tall, straight trunk is conspicuous.

The West Australian tuart, *E. gomphocephala*, promises well as a shade and shelter tree in the drier parts of Victoria. It is fast growing and hardy, and though only found on limestone formations in its native habitat, thrives on a variety of soils in the east.

Queensland Silky Oak, *Grevillea robusta*, also found in New South Wales, is a stately tree with peculiar orange-colored flowers, rich in honey. The ornamental fern-like foliage has made it a favorite pot plant for indoor decoration. It is a very popular tree in Ceylon, where often it is grown as a shelter for the tea plantations. Although it is a native of the wet scrub forests, it stands drought to a marked degree when cultivated.

Lagunaria Patersonii is a beautiful tree which warrants a better common name than "cow-itch." This title should be abandoned for either of its other names, pyramid tree, or Norfolk Island white oak. It is a fast-growing evergreen tree with showy pale pink flowers. The interior of the seed pod is lined with delicate hairs which cause irritation to the skin if touched — hence the name "cow-itch."



The Currajong

Agonis flexuosa, or willow myrtle, as it is called in Western Australia, has fine, drooping foliage, and, in the spring, is covered with small white flowers. It deserves to be more widely planted.

The currajong, *Sterculia diversifolia*, is a notable native tree; in times of drought stock have been kept alive, and even fattened, on its foliage. This has led to its extinction in parts of its range. It occurs in Eastern Victoria along the ranges of the Hume and Snowy rivers, and also is native to New South Wales and Queensland. In old age it develops a peculiar bottle-shaped trunk. The shining green leaves are very variable in shape. The bark provided the aborigines with fibre for the making of rope and mats, and they named this *Sterculia* currajong, which denotes a fibre-giving tree. It is used as an avenue tree in Southern Europe.

The currajong's near relative, the flame tree, *S. acerifolia*, is deciduous, and before the leaves reappear the tree is gay with scarlet flowers. It does not produce flowers until it has reached a good age, but some nurserymen have counteracted this disadvantage by grafting scions of the tree on to suitable stocks. A hybrid of the two species of *Sterculia* has been cultivated and used for street and park planting. It combines the flowers of the flame tree with the foliage of the currajong.

The pincushion flower, *Hakea laurina*, is a small, hardy tree with curious globular flowers. The "cushion" part of the flower is deep crimson, and the "pins," complete even to heads, are cream colored. Because of its fascinating flowers, this *Hakea* is worthy of a place in any planting scheme, and it will thrive from the north to the south of Victoria.

The carob tree, or St. John's bread, *Ceratonia siliqua*, is believed to be the locust-tree of Scripture. In Mediterranean countries the large nutritious pod-like beans, produced by the tree, are much in demand for stock fodder. St. John is supposed to have subsisted on these beans while in the wilderness. The tree is a handsome, hardy evergreen which flourishes in some of our northern districts. It is essentially a tree for warm climates.

Sheokes, or Casuarinas, are worthy of mention, because, like the currajong, they provide food for stock. They are trees which have had to adapt themselves to very arid conditions. This adaptation is in evidence on the branches, where the leaves have been reduced to a mere toothed row to decrease the loss of moisture by transpiration. What appear to be needle-like leaves are actually the branches. The drooping sheoke, *Casuarina stricta*, with weeping grey-green foliage, is the most common species in Victoria. It has taken kindly to cultivation and is a useful shade tree in northern districts.

Camphor Laurel, *Camphora officinalis*, is the tree which produces the camphor of commerce. It has pleasant shining foliage and it will flourish in hot districts if given occasional waterings.

VII CONIFERS



MANY of the conifers are familiar trees — pines, firs. spruces, cypresses, cedars and junipers. They belong to the class of plants known as Gymnosperms, which are unique in that the seeds are borne naked, and are not enclosed in any definite protective tissue, as is the case with most other flowering plants.

Conifers are typically cone-bearing trees, and have many interesting characteristics. Some very ancient families are represented among them, and ages ago they formed an important part of the earth's flora. Some varieties are now extinct, and conifers are, indeed, a vanishing race.

The male and female flowers are somewhat inconspicuous, and are produced separately in cone-like structures, either on the same tree or on separate trees. In some species the male flowers have a distinctive color, usually yellow, purple, or shades of crimson. Particularly noticeable is Lawson's cypress (*Cupressus Lawsoniana*) which often produces an abundance of rosy-purple flowers giving the tree a very striking appearance. The pollen grains produced by the male flowers are sometimes winged for distribution by the wind, and in the springtime clouds of sulphur-colored pollen may be seen drifting from the flowers. Some kinds have winged seeds, the wing serving to keep the seed afloat in the wind and so carry it far from the parent tree.

With few exceptions the conifers have needle-like, evergreen leaves, and numerous branches arranged in whorls about a prominent trunk. The diminution in size of the branches from below upward gives the trees a typical conical shape.

Conifers form a distinctive feature of the forests of the temperate and sub-tropical regions of the Norther Hemisphere. Australia has but few representatives of the family, and these are being rapidly depleted. The hoop pine and kauri forests of Queensland, the Huon and celery-top pine forests of Tasmania, and the Murray or cypress pine forests of Victoria and New South Wales are quickly disappearing before the settler and the saw-miller.

Economically the conifers are important because they furnish the world's supply of softwood timber, which is imported into Australia in large quantities. From the west coast of North America

Cones of the Atlantic Cedar



Photo by Henry Irving



The Atlantic Cedar

comes our supply of oregon, which is the wood of the Douglas fir (*Pseudotsuga Douglasii*). Norway and Sweden provide us with Baltic pine, which is the wood of the Norway spruce (*Picea excelsa*), and red deal, obtained from the Scots pine (*Pinus sylvestris*).

Fortunately, some of the Old World timber-producing conifers have proved themselves suitable for cultivation in Australia and a few have even regenerated themselves naturally. The landscape of some parts of our country is being changed by the establishment of large plantations of conifers, which are being grown to meet our own demands for softwood timber. Already small areas of some of these plantations have been utilised commercially and have yielded timber for which a ready market was found.

Not only are many of the conifers economically important, but they also provide us with some very beautiful and decorative species suitable for planting in the cooler parts of Victoria. No other group of trees can furnish such beauty of form and color, or such density of foliage, as do the conifers; and their beauty is not fleeting. In winter, when deciduous trees are bare, they stand out as living sentinels, dignified yet graceful. We have the reddish-bronze of the Japanese cedars, the intense golden-yellow of some of the cypresses, the silver-grey of other cypresses and some spruces, and green in all its varied hues. In planting conifers we plant permanent beauty.

Of our native conifers the most widely distributed are the "cypress pines." Their genus, *Callitris*, is confined mainly to Australia and occurs in all the States. These conifers are important because they are adapted for dry, arid country, and the timber is resistant to the attacks of white ants. The trunks yield a hard resin called "sandarac." That derived from North African species is shipped for the manufacture of varnishes, and it is also recorded that the early Egyptians used this resin to embalm mummies.

Callitris glauca, the Murray pine, is the most widely distributed species of the genus, being found in all the States, and occurring as scattered

Ripe Cones of the Silver Fir

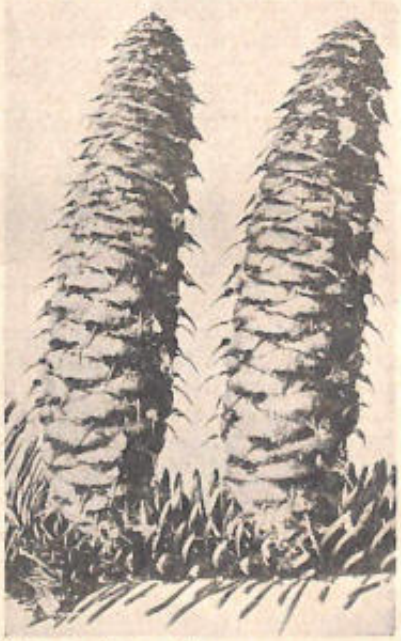


Photo by Henry Irving.

forests in the Mallee. The black cypress pine, *C. calcarata*, is found on the Ovens River in Victoria, while *C. cupressiformis*, the cypress pine, ranges from the hills of East Gippsland to the Grampians and the sand plains of the Wimmera. The latter species has been cultivated, with good results, in southern Victoria, and it is a very ornamental tree when young. *C. intratropica* is native to the Northern Territory, and a rare variety *C. propinqua* is indigenous to Kangaroo Island, South Australia.

Australia has but two representatives of the ten recorded species of *Araucaria*. Hoop pine (*Araucaria Cunninghami*), so named because of the peculiar hoop-like banding of the bark, attains great height in Queensland and New South Wales and is also found in New Guinea. The tree yields excellent timber which is the most extensively used of all the Australian coniferous woods. Much of it is utilised for the manufacture of plywood,

a very important industry in Queensland; it is also a favorite cabinet wood. Every time an Australian-made match is struck some Hoop pine wood is consumed. California and Honolulu have appreciated the ornamental beauty of this species much more than we Australians, for it is planted in those countries more extensively than in our own. The tree is one of striking beauty and it should enjoy greater popularity in the planting of parklands in moist localities.

Associated with hoop pine in the scrub forests of Queensland is the Bunya pine (*A. Bidwillii*)—one of the most picturesque of our native trees.



Photo by Henry Irving

The Stone Pine.
Second and Third Year Cones.

The shining, pointed leaves and compact branches, arranged in regular whorls about the trunk, combine to form a handsome tree worthy of much wider cultivation. Although a lover of rich, moist soils in its native forests, the Bunya will thrive on poorer and drier soils when once established by artificial planting.

Sometimes confused with the Bunya pine is the Chilian species, *A. imbricata*, or monkey puzzle tree. Any small boy who aspires to climb the prickly network of branches will appreciate the suitability of the common name. Rarely, if ever, does an opossum attempt to nest among the limbs of one of these pines. It is hard to imagine a plant more completely covered in sharp, scaly leaves than the monkey puzzle, and this feature never fails to attract the attention of the passer-by. Given ample room for development, it is suitable for growing as a specimen tree, in groups, or even to form avenues. It likes moist soils, but has also adapted itself to drier localities.

Perhaps the best known Araucarian is *A. excelsa*, the Norfolk Island Pine, a tree of bold outline. From butt to tip the branches are arranged in a most orderly manner, resembling the ribs of an umbrella. Essentially a coastal tree, it has been planted to advantage in many of our seaside towns. Where summer moisture is available it thrives even in the sandy soils inland, but it is liable to frost damage when young. As a pot plant for interior decoration it is popular the world over, and finds its way into many Australian homes as the children's Christmas tree.

A tree famous for the excellence of its wood is the Queensland kauri, *Agathis robusta*, the only Australian representative of the genus. Vying with hoop pine in size, it is confined to a limited area in its native habitat, and has not been widely planted in other States. Because of its grandeur and majesty it has been incorporated in the planting scheme at the Shrine of Remembrance.

Of the beautiful conifers that come to us from other lands only some of the more important ones can be mentioned. The world is rich in varieties of the true pines, members of the genus *Pinus*. A feature of pines is that the needle-like leaves are enclosed in a basal sheath in groups of twos, threes, or fives—a feature which is used to classify members of the genus. Several species have been cultivated successfully within our shores.

Western Yellow Pine (Pinus ponderosa)



The Monterey Pine, *Pinus radiata,* or *P. insignis* as it is better known, has been with us so long that many people consider it native. With other varieties, this tree was introduced by our early colonists, who made good use of it to provide shelter from wind and sun. It is better known here than in its Californian home, where it is mainly a stunted tree. A botanist has described it as the Northern Hemisphere's greatest gift to the South.

The tall growing, shapely western yellow pine, *P. ponderosa,* produces excellent lumber in North America. It is used there for large constructional works, and many of the railroads rest on yellow pine sleepers. It thrives in moist heavy soils in Victoria where specimen trees up to 120 feet high, with a basal diameter of four feet, are growing.

The Canary Island pine, *P. Canariensis,* is an upright variety having long, soft needles, and together with the Aleppo pine, *P. halepensis,* has proved suitable for planting in the drier parts of our country.

The Mediterranean countries have given us the Corsican pine, *P. laricio,* and the maritime species *P. pinaster,* the cluster pine. The latter species was successfully planted in the Landes Province of France to fix moving sand dunes, and through the agency of the forests so established. man has won back for man thousands of acres of otherwise doomed agricultural land.



Photo by Henry Irving.
The Deodar

The cypress trees form another large and useful group of conifers, and are widely planted for their ornamental qualities. They thrive in a variety of soils, and are available in several permanent colors. When grown from seed many species produce numerous undesirable types, and this necessitates the propagation of the desired types from cuttings. Growth by this method is slow and as a result young plants are expensive to purchase, but they develop rapidly when established.

From the Monterey cypress, *Cupressus macrocarpa,* has been developed the variety *Lambertiana,* a very desirable tree which should always be grown from cuttings. Its long, closely spaced, spreading branches make it the ideal tree for shelter, shade and ornament in the southern parts of Australia. Who has not admired the beautiful golden variety of this plant, as it rears its yellow-green, spear-shaped limbs to Heaven? Popular as *C. Lambertiana* is today, it is destined to play a still bigger part in our future ornamental plantings.

The Mediterranean cypress, *C. sempervirens,* is a tree of the ancients noted for its longevity and ability to withstand dry conditions. The columnar habit of the cultivated variety, *stricta,* or Roman cypress, make it a favorite for formal plantings.

The foliage of the Arizona cypress, *C. arizonica,* is glaucous to a marked degree, and with its near relative the Mexican cypress, *C. lusitanica,* is hardy and suitable for planting in dry sites. The many forms of Lawson's cypress, *C. Lawsoniana,* provide foliage in shades of green, silver, and gold, but they all demand good soil and ample moisture for best growth.

Of the three species of the true cedars the deodar, *Cedrus deodara,* from the Himalayas, and Atlas cedar, *C. atlantica,* from the mountains of that name in Northern Africa, are the most popular, though the Cedar of Lebanon, *C. Libani,* is just as noble and majestic in habit. All are available in attractive silver varieties and the golden deodar is not yet very common. Except on the leading shoots the needles are arranged in peculiar tufts on the cedars, and the barrel-shaped cones are borne erect.

Japan has given us a most colorful tree in the elegant variety of the Japanese cedar, *Cryptomeria japonica* var. *elegans.* Several varietal forms are in cultivation, but the elegans type with its soft plumose foliage, changing from green to reddish-bronze with the approach of winter, never fails to brighten the most dismal prospect. Sugi, as the Japanese call this false cedar, thrives in a variety

of moist soils and produces color wherever it succeeds.

Some important conifers which thrive only in deep, moist, well-drained soils, are the Douglas fir, *Tsuga Douglasii*, a tree with striking deep green, fern-like foliage, and members of the genus *Abies* (firs), and *Picea* (Spruces). The three genera are often confused. The true firs bear their cones erect on the branches and the cones disintegrate when ripe; whereas spruce cones are pendulous and do not break up. The cones of the Douglas fir, which is not a true fir, hang down, and have peculiar forked, tongue-like bracts projecting from between the cone scales. The warmly colored cones of this group are striking in their beauty. Fine specimens of firs and spruces may be seen in many of our mountain resorts where they attain great heights in the sheltered valleys. An outstanding spruce, not commonly grown, is the Colorado Blue Spruce, *Picea pungens*. Its conical shape and dense silvery blue foliage stand out in any garden picture.



Bunya Bunya Pines

The Sequoias, or mammoth trees, are worthy of mention because they rival some of our giant eucalypts in size and beauty. In girth and height they are undoubtedly the largest trees in the world, and among the very oldest. *Sequoia gigantea*, the Big Tree or *Wellingtonia*, attains some height in our moister districts, but it has lost in popularity as a park-land tree, probably because it makes such vigorous demands upon the soil. The famous Redwood, *S. sempervirens*, has but few representatives in Australia and is not suitable for general planting.

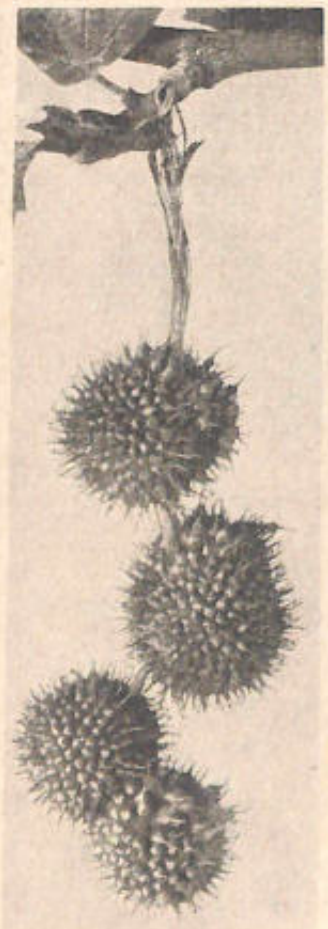
Other conifers of less importance are *Libocedrus*, among which *L. Doniana*, the New Zealand kawaka, is worthy of better recognition by the tree planter, members of the juniper family, *Juniperus*, and the large family of *Thuya*, or Arbor-vitae.

TREES FOR HOME GARDENS

NO home garden, however small or wherever situated, would be complete without its complement of trees. They are the most permanent feature of the garden and often endure longer than the home itself. Just as the florist blends the leaves of trees with showy blooms, so can the foliage of the garden trees be mingled with the showy annuals or flowering shrubs. They may serve to form a background for some wanted view; to break the bareness of a grassy sward; to obscure some unsightly object; or even to emphasise the architectural lines of the home. Trees give us hedges, both formal and informal, and when small are familiar as the popular tub plants. Such trees as the Norfolk Island pine, when grown in pots, often find their way indoors to improve the decoration.

The average-sized garden will not allow of the growth of large and spreading plants, but most trees take kindly to pruning and clipping, and so may be kept within the bounds of space.

For any but low hedges the cypresses are most adaptable. Lambert's cypress gives a finely textured green wall, but its golden relative has a tendency to lose much of its color when clipped at regular intervals. For drier sites the Arizona and the Mexican cypresses produce a front of silvery-grey foliage. For the more informal type of hedge, suitable for backgrounds or for providing shelter, the Himalayan cypress, *Cupressus torulosa*, is satisfactory. Its bright green color and ascending habit are very pleasing. For the same purpose one of our own Victorian natives is an ideal tree — the lilly pilly. *Eugenia Smithii*. It grows luxuriantly in the gullies of East Gippsland and has been successfully transplanted to many home gardens. Its white flowers resemble those of our gums, to which it is related. The mauve berries and shining green leaves make it a most attractive tree.



Fruits of Plane

Specimen trees for lawns or other positions, are available in great variety. Deciduous kinds, which will not obstruct the rays of the winter sun, and yet possess beauty in their nakedness, include the slender silver birch, liquidambar, golden English ash, golden poplar (*Populus monilifera aurea*), English aspen (*P. tremula*), and many more. The aspen-poplar is a treasure. Erect in habit, it bears small leaves which are for ever on the move, and from this comes its other names, trembling or whispering poplar. Autumn fades the leaves from green to delightful hues of gold and russet, and winter reveals the silvery stem. For an evergreen specimen *Cryptomeria elegans* is showy; so are the golden varieties of the Lawson's cypress and the deodar cedar.

Lovers of full sunshine are the Erythrinas or coral trees. *Crista-galli* is the best known species and grows taller than the variety *Blakei*. In the summer the trees produce large spikes of crimson flowers. Another sun lover is *Feijoa Sellowiana*, a South American native, whose dark green foliage is covered in silvery down on the reverse side. Its beautiful crimson and white spring flowers are followed, in the autumn, by an edible, green, guava-like fruit, which emits a pleasant perfume when fully matured. A much larger tree for warm open spaces is the Cape chestnut *Calodendron capensis*, a native of South Africa. It is a magnificent tree, producing large, showy panicles of loosely arranged, flesh-colored flowers, and luxuriant foliage. Its generic name has been well chosen for it means beautiful tree. When its beauty becomes better known it will be much in demand for planting.

The beauties of eucalypts and wattles must not be overlooked in the selection of garden plants. Acacias may be short-lived, but they are fast growing and produce bloom at a very early age—often in their second year from seed. The scarlet-flowering gum, *Eucalyptus ficifolia*, is world famous, but it is a very variable type under cultivation. Many specimens become stunted, mainly because they are the descendants of poor-type trees. *Ficifolia* is always raised from seed and the colors of the flowers cannot be relied upon, for they may vary from white through pink to crimson. If this gum could only be successfully raised from cuttings, the desirable features of good specimens could be perpetuated. It does best in moist, sandy soils in warm sites.

Several other low-growing species of "flowering" gums come to us from the goldfields district of Western Australia, but they have not all been thoroughly tested in our climate. One of the most reliable is the Coolgardie gum, *E. torquata*. It makes fairly rapid growth and has the virtue of producing salmon-pink flowers at an early age.

THE WATTLES

Beautiful Trees for Park and Garden

If the Eucalypts are Australia's national trees, the Acacias or wattles may claim second place. Wattle blossom, indeed, generally is regarded as the national wild-flower, at least in Victoria and South Australia, though New South Wales favors the Waratah. Many of the Acacias are shrubs, so that the gums retain their title as *the* trees of Australia. Still, much of the bushland's beauty is golden, when, before winter is over, the pageant begins, and the flowering of Cootamundras by the roadside and in parks and gardens is followed by that of other Acacias, such as *pycnantha* and the silver wattle, which grows wild, as well as in cultivation.

Of Acacias native to our country there are several hundred species; some of the shrubby forms are popular with home gardeners, as also are *Acacia saligna*, *Baileyana*, and a few others that attain the dignity of tree-hood.

Specimen trees of the silver wattle and Cootamundra, of the blackwood, *Acacia melanoxylon*, and the early black wattle (*Acacia decurrens*), are attractive in a small garden, while hedges of the last-named species in blossom-time provide a pageant of their own. An orchard may be hidden from the road by a row of these wattles, whose foliage is almost as charming as the rich golden-yellow bloom. *Acacia decurrens*, which grows to a height of 30 feet to 50 feet, is a variable species. *Normalis* is one of the finest varieties, and *mollissma*, the black wattle of Victoria and Tasmania, another attractive tree; "green wattle" it was called by the early colonists.

Acacia longifolia, known as "golden wattle" in New South Wales, or, sometimes, "White Sally," is called sallow Acacia in Victoria, where it is widespread, excepting in the north-west. It may be either an erect shrub or a small tree. There are at least half a dozen varieties, including, perhaps, the coast Acacia (*sophorae*) which often, on the sand-dunes and also within a gull's flight of the sea, forms dense thickets, shelter for burrowing rabbits, and small birds tired of wind on the heathland. Commended for cultivation is the Sydney golden wattle (*longifolia*), if your garden is large enough for this strong-growing form, in



Early Black Wattle: Normalis variety.

full bloom a blaze of gold. In wintertime its season begins. *Sophorae*, with its drooping branches reaching the ground and growing on and upwards again, may be trained into a natural arbor.

The sunshine wattle (*Acacia discolor*) is another shrub or tree species, varying in height from about 10 feet to 25 feet. It is native to New South Wales, Victoria and Tasmania. In the mountains of Gippsland and low heathy tracts of eastern Victoria, the sunshine wattle is at home.

Silver wattle trees, so decorative in natural groves or misty in the dawn along the banks of streams, attain a height of 80 feet or even more, though the average tree is under 40 feet. This is the wattle, whose blossom is sold in England as "mimosa"; bloom gathered from trees on the Riviera, where *Acacia dealbata* is extensively cultivated.

Ranging from Queensland to Victoria, *Acacia implexa*, the "lightwood," is nearly related to the blackwood (*Acacia melanoxylon*) and varies in height from 30 feet to 160 feet, with a bole up to two feet in diameter. It bears small and dense heads of white flowers; those of the blackwood, too, are white or very pale.

Melanoxylon is a tree of much nobler proportions than lightwood, for it grows to a height

of 40 feet to 200 feet, and the stem may be 3 feet in diameter. It grows slowly as a rule, but in favorable conditions after five or six years a blackwood planted as a stripling will be perhaps 20 feet tall.

Cootamundra is less satisfactory than many other species of *Acacia* for cultivation in the home garden, since it is subject to disfiguring galls and the attacks of wood-boring grubs. Many a fine Cootamundra, the pride of the garden in July and August, before it is twenty years old has become unsightly and ready for the axe; it may be blown down in a storm, a ruin with its stem riddled by grub-holes.

Less attractive as a tree than most of the other Acacias in cultivation. the golden wattle (*Acacia pycnantha*) has few rivals among them for beauty of blossom; its large globular heads are of a rich, deep-yellow color, and fragrant. But this is *the* golden wattle, familiar to every one. It has been widely planted, and grows wild in three of the States — New South Wales, Victoria, and South Australia. Unfortunately, it frequently is damaged by boring grubs, and frosts affect it, especially in an easterly aspect. Golden wattle flourishes on clay subsoils.



A Fine Blackwood

THE BUSH

Give us from dawn to dark
Blue of Australian skies,
Let there be none to mark
Whither our pathway lies.

Give us, when noonday comes,
Rest in the woodland free—
Fragrant breath of the gums
Cold, sweet scent of the sea.

Give us the wattle's gold
And the dew-laden air,
And the loveliness bold
Loneliest landscapes wear.

—JAMES LISTER CUTHBERTSON

A tree up to 40 feet high, hickory wattle (*Acacia penninervis*) grows chiefly on granitic mountains and ranges, and is native to Queensland, New South Wales and Tasmania, as well as Victoria. It has small flower-heads. The river wattle (*Acacia subporosa*), a tree of forest gullies in New South Wales and Victoria, reaches a height of about 40 feet, and has slender branches. In Victoria, it is confined to the range at the State's eastern boundary.

Other "tree" Acacias that occur in Victoria are the coast myall (*Acacia glaucescens*), from 20 feet to 50 feet in height; the leumong or Dalby myall (*Acacia stenophylla*), a hard-wood species, from 40 feet to 60 feet tall; the currawang, often only a tall shrub and reaching a maximum height of 35 feet; and the yarran (*Acacia homalophylla*), whose height varies from 15 feet to 40 feet, while the bole seldom is more than 12 inches in diameter. Silver mulga (*Acacia brachybotrya*) is only a shrub, rarely growing above 12 feet, and often not half that height, but its beauty commends it, for many a *brachybotrya* is silvery or has a golden sheen. The silver mulga, with its musical name, is a shrub of the Mallee region.



Photo by Victorian Government Railways.

WATTLE TIME

A Riverside Scene in September.



THE SENTINEL TEA-TREE



MOUNTAIN GUMS



Photo by Victorian Government Railways.

GIANT MOUNTAIN ASH

FOREST GIANTS—PAST AND PRESENT

Among the big trees of the world, only Sequoias outsoar the surviving giants in Australia. The claim of the redwoods is undisputed; they are the tallest of all living trees; some of them; for the average height is nearer 200 feet than 300 feet; and we have many eucalypts that could rub shoulders with ancient Sequoias.

Australia's tallest living tree is a mountain ash of the famous Cumberland Valley group; its measured height is 301 feet 6 inches. Reliable figures for Sequoias are: 363 feet, 325 feet, 319 feet, and 310 feet. The "Mark Twain" tree, which crashed to the ground many years ago, was 331 feet in height.

The Douglas fir may rank with *Eucalyptus regnans*, but this is doubtful, and we may fairly claim that our Cumberland giant is entitled to second place among the biggest trees in the world.

Living trees are referred to; if the past be considered, then Australia has the honors. No Sequoia, so far as authentic records go, ever reached the height of the Thorpdale Tree—375 feet.

Baron von Mueller quoted figures for trees on the Black's Spur that are even more impressive; but we take leave to doubt their accuracy, they being estimates only. It is hard to believe in trees 100 feet taller than the tallest Sequoia. The Thorpdale Tree, however, was measured by a licensed surveyor.

And yet, those other trees, vanished half a century ago, are ghostly shapes in the Forest of Might-Have-Been.

A mountain ash, 346 feet to where its top was broken off, was recorded by a surveyor, long after he had measured it. He, and others, had noted many trees exceeding 300 feet, but failed to record them, because at the time accounts of eucalypts, 450 feet, or more, in height were current; their trees were dwarfed in comparison.

Perhaps 400 feet may be allowed as the height limit of *Eucalyptus regnans*; though never again shall we see one so tall. Forests have been searched in vain for rivals; the "King" of Cumberland Valley remains the tallest known tree in Australia. An authority on big trees, Mr A. D. Hardy, formerly of the Forests Commission, has reached this conclusion: "The tall tree forests of Victoria contain many trees something over 200 feet, rarely over 250 feet." Until the Cumberland giant was discovered, the tallest tree measured by Mr Hardy was a slender mountain ash, near the summit of Mount Beenak. The computation made it 297 feet 6 inches, but its diameter was only 4 feet 6 inches. About 10 feet was missing from the top, so that, once, this tree was well above the 300 feet mark.

On the New Turkey spur of the Yarra-Latrobe divide, in the Parish of Noojee, stood a mountain ash which measured an inch over 226 feet. The Government, in 1888, offered substantial rewards for the discovery of big trees, and the "New Turkey" was the tallest recorded as a result of this "official campaign."

Near Cumberland Creek, a generation ago, stood a famous old tree called "King Edward VII." It was destroyed in a bush fire but is remembered still by old residents of Marysville. Its discoverer and others believed it to be the largest tree in Victoria; a reasonable belief, since the girth measurement was 70 feet.

Western Australia has trees worthy of a place in any account of the big trees of the world. The tallest karri (*Eucalyptus diversicolor*) known, measures 275 feet in height, with a girth of 26 feet. It grows in the National Park, where, too, is another giant, a karri 269 feet in height and 159 feet from the ground to the first limb. The timber contained in the bole is estimated at 2500 cubic feet. A karri 265 feet in height and 33 feet round the trunk at less than 5 feet from the ground, was felled, some years ago, by State Saw Mills, at Pemberton.

At the close of the 19th Century, according to a report on Western Australian forests then made, trees up to 300 feet in extreme height were not uncommon, on the Warren River. But no karris so tall are to be seen today.

A pity that more big trees were not spared, in the East and the West, for the wonder and delight of future generations. They were felled for profit. Would we not gladly pay, to win back a gum tree taller than any now living, more than its timber earned for its destroyer? There were giants in those days, but they were trees, not men of vision.

It is good to know that the Cumberland trees are safe from the axe and the sawmills. They are worth more to the State, as they grow, than they would be as timber. A memorable experience is a trip to the Valley of big trees.

Old photographs, faded yellow, make the past live again. Some there are, of giant trees before they were felled, and of the mighty butts of trees already down. Homes have been made in the trunks of dead trees; and many a swagman, and many a wanderer bushed at nightfall, has camped in a big hollow stump.

The tree which moves some to tears of joy is in the eyes of others only a green thing which stands in the way. . . . But to the eyes of the man of imagination Nature is Imagination itself. As a man is so he sees.

—William Blake

CUMBERLAND VALLEY

THE Cumberland Valley fulfills the promise of beauty in its musical name, a valley where forest and stream have combined to make a perfect setting for Australia's tallest trees. No other spot in Victoria has more to offer a nature-lover whose chief delight is in trees and ferns and running water. Sylvan wildness, with a charm of birds too, and away from the track and the clearing, silences and undertones of sound: the forest primeval.

Cumberland State Forest comprises an area of, roughly, 2500 acres, embracing the upper catchment of the Cora Lynn and Cumberland Creeks, and forms part of the extensive belt of country which represents the Upper Yarra watershed. This is one of the few remaining areas carrying the giant trees of the virgin mountain forests, and 1000 acres, surrounding the Cora Lynn Falls, has been permanently reserved.

The Cumberland Valley is situated approximately 65 miles north-east of Melbourne. The route from the metropolis is through Lilydale, Healesville and Marysville. Leaving Marysville the road ascends the steep slopes of Mount Grant over Robley's Spur. A magnificent panoramic view of the Cathedral Range and the Taggerty River Valley is gained from Nicholl's Lookout. After passing Tommy's Bend, a celebrated beauty spot, the road crosses the Dividing Range into the Yarra watershed on the southern fall. Descending the slope towards the Cumberland Valley, many noble trees are seen. In this locality, about half a mile from the road, formerly stood the gnarled giant mountain ash known as "King Edward VII."

The Valley is a favorite resort, not only because of the beauty of the Cumberland and Cora Lynn Falls, but also because of the wonders of the forest itself; a forest typical of those clothing the mountain ranges in the central highlands of Victoria. The rainfall is heavy, averaging over 60 inches a year, and the soil is deep and fertile. These factors contribute to the rapid growth of big trees and the dense luxuriance of an under-storey of shade-loving trees and shrubs.

Two distinct forest types are characteristic of this wonderland: the white mountain ash (*Eucalyptus regnans*), which occupies the valleys, lower slopes and southern ends of the ridges, and the red mountain ash (*Eucalyptus gigantea*), which reaches its best development on Mount Arnold, Snowy Hill, and the higher ground forming the northern boundary. The forest within the scenic reserve consists almost wholly of the white mountain ash type. It is a virgin forest of giant trees, untouched by fire, although there are indications that, at some time during its history, trees have been felled and utilised for the production of split palings.

Apart from giant eucalypts, the vegetation consists of a great variety of smaller trees and shrubs, particularly in the moist sheltered gullies. Conspicuous among these are the following — Myrtle beech (*Nothofagus Cunninghami*), blackwood (*Acacia melanoxylon*), sassafras (*Atherosperma moschatum*), hickory wattle (*Acacia penninervis*), hazel (*Pomaderris apetala*), musk (*Olearia argophylla*), soft tree fern (*Dicksonia antarctica*) and other kinds of ferns, Austral mulberry (*Hedycarya angustifolia*), blanket-leaf (*Bedfordia salicina*), various tea-trees and paperbarks, mountain pepper (*Drimys aromatica*), and hosts of other plants.

There are 27 trees in the Cumberland acre plot. The average total height is 266 feet, and average girth, at 10 feet from the ground, 13 feet 5 inches. Total volume of timber, 21,657 cubic feet.

The tallest tree measures 301 feet 6 inches in height, with a maximum girth of 20 feet 5 inches. The diameter 174 feet from ground level and just below the first branch is 3 feet 3 inches.

Two trees in this plot measure 285 feet in height and one has a girth of 17 feet 2 inches, breast high. Height measurements of other giants are: 283 feet (girth 20 feet 5 inches). 279 feet (girth 22 feet 7 inches), 273 feet, 271 feet, 268 feet, and 262 feet (girth, 22 feet 8 inches).

The white mountain ash is the tallest growing hardwood tree in the world. Although the majority of the magnificent trees discovered in early pioneering days have been destroyed, there are still giants in the Cumberland Valley, including the tallest living tree known to exist in Australia.

A magnificent avenue of tree-ferns forms the approach to the Cumberland and Cora Lynn Falls, whose charm is that of Devon in the Australian bush.



Autumn Spreads Her Carpet of Multi-Colored Leaves.

DECIDUOUS TREES

THOUGH they shed their leaves and become "bare ruin'd choirs" for the winter, deciduous trees are pleasing all the year round. Leafless grey, brown or mottled limbs etched against a cold blue sky, dimly seen through mist, or jewelled with rain-drops, are beautiful. Spring, with catkins, opening buds, and the wonderful green of young leafage, gives them another charm; summer gives maturity; then autumn comes with her rich color schemes for the leaves.

Little is known of the cause of the coloring in autumn foliage except that it is due to chemical changes between colored pigments contained in the plant. Plants owe their green color to a pigment called chlorophyll and they also contain yellow-orange (carotinoids) and red-purple (anthocyanins) pigments. With the advent of cold weather these pigments are present in variable quantities and this variability is reflected in the multi-colors seen in the autumn leaves.

Australia lacks deciduous trees to a marked degree. There are but few kinds; at least one of them has been much grown in the northern parts of Victoria. This is the white cedar, *Melia Azedarach*, a native of Queensland and New South Wales. Its variety *umbraculifera*, often called umbrella cedar, because of the shape of the crown, is much better suited to cultivation than the type plant. It has a more reliable and attractive shape, is a rapid grower in hot climates, and comes true from seed.

Though the jacaranda is a South American tree it mixes well with the umbrella cedar, and the two have been planted together in northern Victorian towns. Some day the jacarandas will be the glory of these towns. The foliage is soft and fern-like, and as the tree is frost-tender when young it must be protected during winter months. It can be grown in Melbourne if well established plants are used at planting, and if placed in a warm position; but growth is not so good as in the hotter districts.

Practically all of the other deciduous trees, elms, poplars, planes, willows and oaks, cultivated here are introduced species, natives, chiefly, of Old World countries. It is surprising that most of them show no signs of attack by the diseases and parasites which they are heir to in their natural homes. The English oak, *Quercus robur*, is an exception, for with us it is so badly attacked by scale insects that its cultivation has been almost abandoned. The treatment of affected trees with spray compounds is a well-nigh impossible task. Planes, also, are sometimes attacked by disease.

Of the oaks, *Quercus palustris*, the pin oak, and *Q. coccinea*, the scarlet oak, are closely allied, and both provide red autumn leaves. The spreading Portuguese oak, *Q. lusitanica*, has become so acclimatised in our latitudes that many specimens are losing their deciduous habit, and becoming partially evergreen. This variety attains good size in some of our parks and gardens.

The English ash, *Fraxinus excelsior*, is a tree which has gained in popularity during recent years. It thrives in cool localities and produces soft golden leaves in autumn. The golden variety has golden foliage and branches. The claret ash, *F. Raywoodii*, derives its name from the bright claret color assumed by the leaves during late summer time. It is of fairly rapid growth, and will enjoy greater popularity when it becomes better known. One of the hardiest of the ash family is *F. Americana*, the American ash, a tall growing tree having dark green foliage.

The more delicate types of deciduous trees are at home in the cool, moist soil of the sheltered ranges, although good specimens often are grown in suburban gardens.

Best known of the maples are those which come from Japan, and it is doubtful whether any other deciduous trees excel them for ornamental foliage. There are varieties in abundance. All are lovers of rich, moist soil, and demand protection from hot winds and the sun. They color reasonably well in Melbourne, but are seen at their best in mountain gardens.

Fruits and Foliage of



The Horse Chestnut

Much hardier and taller than their Japanese relatives are the English maple, *Acer campestre*, the Norway maple, *A. platanoides*, the box elder, *A. negundo*, and the sycamore, *A. pseudo-platanus*. The sycamore has escaped from many of our hill gardens to neighboring roads and eucalypt forests, so that before long we shall have self-sown groves of this handsome tree. As is the case with most other deciduous species, the sycamore is a good soil improver, its rotting leaves producing an abundance of leaf-mould.

The silver birch, *Betula alba*, has been aptly named the "lady of the forest." Its graceful, slender branches and picturesque white bark are very pleasing. It is a tree of striking beauty in all four seasons. When protected from hot winds it thrives in city gardens.

Essentially a tree for the mountains, in our climate, is the common beech, *Fagus sylvatica*. The copper-leaved variety, *purpurea*, or copper beech, is most beautiful. Many of the leaves are almost black in color, and the variety, *tricolor*, has each leaf colored purple, white, and crimson—a rare combination. In England the downy male flowers of the beech formerly were used to fill the poor man's pillow. Together with the acorns of the oaks, the fleshy seeds are much prized for hog-feed.

Almost every color of the spectrum may be seen in the star-shaped autumn leaves of the American sweet gum, *Liquidambar styraciflua*, a favorite tree for mountain parts. It is fast-growing and tall, and when aged the bark becomes corky. In its autumn gown this is one of the most colorful of deciduous trees. It does well and yields color in many sheltered suburban gardens.

One of the few deciduous trees having conspicuous flowers is the tulip tree, *Liriodendron tulipiferum*. Unfortunately the remarkable tulip-like flowers are not produced until the tree has become well established; but even lacking them it is attractive for its large green leaves which change to gold at autumn's approach. For successful growth the tulip tree needs deep, rich, moist soil.

The sweetly-perfumed flowers of the magnolia are found on two varieties that are small deciduous trees—*M. Soulangeana* and *M. Kobus*. They give distinction to any garden, and can be grown in hill garden or in sheltered city sites.

Taxodium distichum, or swamp cypress, is one of the few deciduous conifers, and it will grow in wet sites. If its roots are completely submerged by water, it sends up peculiar knee-like structures and through these the roots obtain air.

The lime or linden tree, *Tilia europea*, has made a Berlin street world-famous. "Unter den Linden" is planted with lime trees. The small, fragrant flowers hang in bunches and are followed by bright-green leaves. Before falling the leaves become golden and then are revealed the shining brown twigs. The lime grows rapidly in cool, moist places, and is an excellent tree for the planting of drives or avenues.

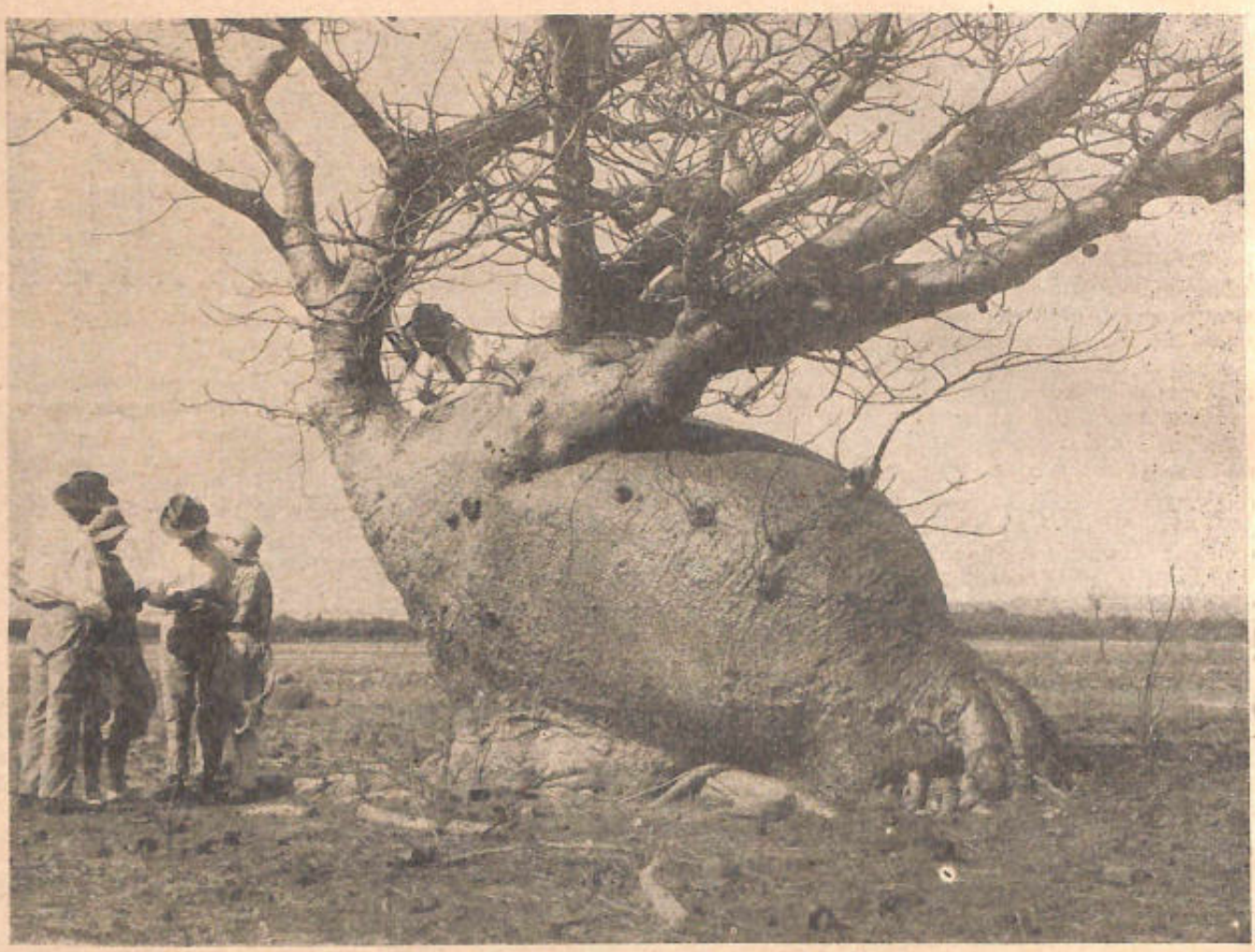
THE OAK





Photos by Henry Irving

In Summer (above)—and Wintertime.



The Baobab Tree assumes grotesque shapes.

AUSTRALIA'S WONDER TREES

EVERY tree is wonderful, as a living thing, but many Australian species are notable for their quaintness, because of giant size or their associations. Oddity has made bottle-trees famed the world over, though seen only in pictures by most people. More attractive, and equally remarkable, are some other native trees too little known.

Queensland's beautiful umbrella tree, praised by the "Beachcomber" in his books, is happily named. It has graceful, glossy foliage, and heads of red flowers, which for months yield nectar, attracting birds and butterflies—a host of gaily-colored revellers, and industrious bees. So freely is sweetness distilled that crystal drops fall from the flower studs of the umbrella tree. The average production of a fairly crowned tree was estimated by the late E. J. Banfield (the "Beachcomber") at a gallon of nectar a day. And hundreds of these natural distilleries brighten all parts of Dunk Island with their red rays.

Sun-birds gather to the feast; red-collared lorikeets, too, and honeyeaters. Hustling, squabbling, calling, and sipping nectar clear as dew, the birds spend hours every day until the long season of distillation ends. Splendid black-and-blue swallowtails and bird-winged butterflies glittering in emerald and gold, are light-winged visitors that share in the harvest, but often are jostled by greedy birds whose bills drip nectar among the flower studs and glossy leaves. It is all faithfully described by the nature lover who lived for so many years on an island where umbrella trees flourish on the beaches, on hillsides, and the edge of the jungle itself.

The Feast of the Bunyas no longer is celebrated, for it was an aboriginal gathering and the tribes have all vanished who went to the feast, or they are represented now only by a few black-

fellows who have ceased to follow the old tribal ways, being civilised. Station hands, mission blacks, and others here and there in odd jobs, or none at all, are descendants of those who shared every year in the great Bunya Feast.

When the pine trees were in fruit, in those almost forgotten days, blackfellows travelled from places far and near to the Bunya Mountains; coastal tribes and inlanders, chiefly the former, many of whom made a hundred miles' journey to be there. The marks of their axes — steps cut for naked feet — still are plainly visible on many an old tree. In the clever aboriginal way, the active men climbed to reach the Bunya cones, whose large, egg-shaped seeds were relished alike by piccaninny and old fellow — by every one of those primitive people, who have become, like their annual feast on pine nuts, a memory.

No tree has more right to a place in the story of the aborigines than *Auracaria Bidwillii*, the Bunya pine of South-eastern Queensland — its territory lies between the Bunya Mountains and Gympie. The seeds were not eaten raw, but roasted, and hundreds of little fires were lit among the gums where the seed-eaters camped on the lowland.

The Bunya pine, usually with a dome-shaped crown, grows to a height of about 140 feet, with a stem three feet in diameter; unbranched stems may reach a length of 80 feet. Handsome and stately, this pine often is planted as an ornamental tree, while the timber is used for the same purposes as that of the hoop pine—lining, flooring, butter boxes, etc. The mills have taken heavy toll, but a large area of the Bunyas is reserved now, and there the wonder trees have sanctuary.

Bottle-trees (*Brachychiton*) are planted not only in parks and gardens, but also along the streets of some Queensland towns and townships. Quaint trees, often with the bottle-shaped (lower) portion of the stem six feet in diameter, they are confined to Queensland, and in the districts where they flourish are valued as native fodder trees, nearly the whole of the green plant being edible. The Queensland bottle-tree has many allies, the genus *Brachychiton* being represented in Australia by a dozen species, including the beautiful flame trees.



An Umbrella Tree on Dunk Island, Queensland.

In Northern Australia, the bottle-tree of Queensland has a rival, a tree even more remarkable than *Brachychiton rupestris*, for its barrel-shaped bole may measure up to 60 feet in circumference, though the tree, as a rule, is only 30 feet or 40 feet in height. The Australian baobab (*Adansonia Gregorii*, named in honor of the explorer) often is called bottle-tree; another popular name for it being "gouty stem." It grows in thousands in many parts of its range.

A Queensland plant of very ancient lineage, one of the cycads, attains tree proportions, and a curving gently. These are wonder trees, and some day, instead of foreign species as the Canary Island palm, Australians will grow more native palms; even in the south some kinds may do well in park and garden.

Old as the hills, they seem, and some at least were seedlings several thousands of years ago; myrtle-beeches of the Cumberland Valley, Warburton Ranges, and Otway Forest gullies. Age-old, beautiful trees, with dead and broken tops and leafless branches grey with lichen, or with green crowns, those of a younger generation than



Giant "Banyan" Fig Tree, North Queensland

specimen on Tambourine Mountain, known as "Grandfather Peter," was perhaps the oldest living plant in the world, its age being estimated at 10,000 years. Recently, it was cut down, a vandal act that incensed the nature lovers of all Queensland. The trunk was replanted, but not hopefully. We fear that Grandfather Peter is dead.

Rich in palms are Australian rain-forests and sub-tropical scrubs or brushes. Palms as tall and as graceful as the coconut of tropic beaches, some taller and even more beautiful, with noble crowns and stems straight as a wireless mast or the old man beeches, in whose shade rites practised by the Druids would scarce seem strange. Among the myrtle-beeches comes remembrance, to some, of England when Stonehenge was an unbroken circle and folk believed the legend of the Golden Bough. Science calls these trees by an ugly name—*Nothofagus*, the spurious beech.

Banksias and Casuarinas are wonder trees and the native cherry (*Exocarpus*), with its little fruit on a succulent red pedicel, is of their company.



Coconut Palms on a Tropic Beach

Then the fig trees, of which there are some forty species in Australia, best known of all being the Moreton Bag fig (*Ficus macrophylla*), because in cultivation for so many years, as a street tree as well as in parks and gardens. Still, old warrior fig trees remain standing in old gardens, or shading a homestead with their wide-spreading boughs. Still there are veterans in public gardens. But hundreds of Moreton Bay figs have been felled to enable a street to be widened, or for other reasons, not all good. These trees are not suitable for all situations, and may be troublesome growing along a street, with their great roots pushing up the pavement and their large-leaved branches keeping out the sun where grass is desired.

Native to Queensland and New South Wales, the Moreton Bay fig grows to a height of 60 feet to 80 feet, but is not the giant of the genus. Several other species grow taller, one attaining a height of 150 feet. Some, in their habit, resemble the poet's Indian tree, the banyan, whose branches drooping to earth become rooted and grow up again, or send down rows of stout cable-like roots, until root and stem become almost a maze. Banyans, these native fig trees are called, wherever they grow — mostly in the tropical north. There are banyans centuries old hidden in northern brushes; fruit-bats or flying-foxes have their "camps" in these trees. Great buttresses, like flanges forged by a giant smith, support the trunks, or a meshwork of aerial roots form a fig tree column in the jungle.

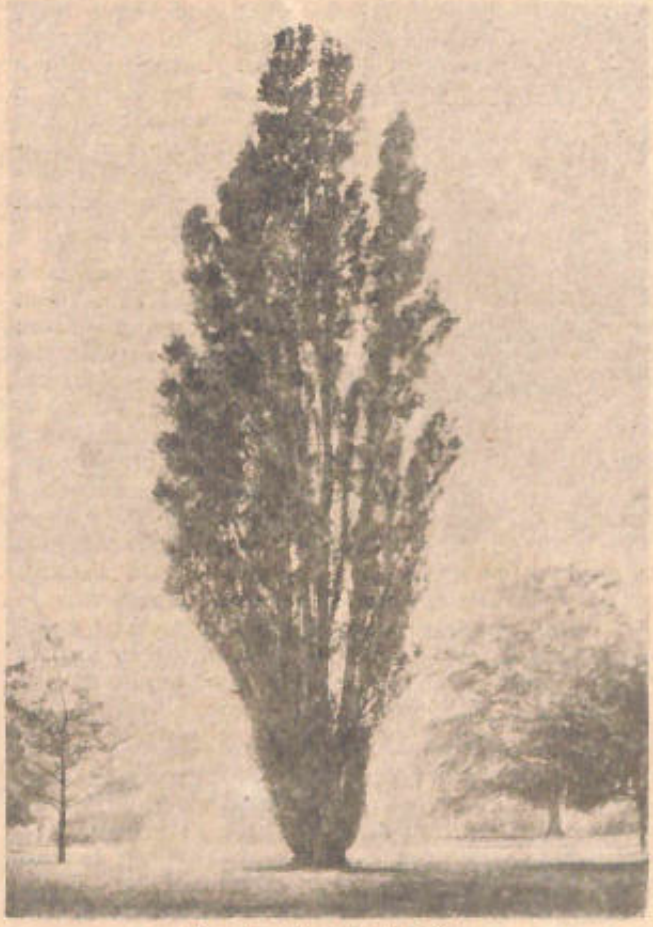
Laportea gigas is a soft-wooded rain-forest tree, ranging from Gympie, in Queensland, to Bega, New South Wales — its furthest south. It grows to a height of 120 feet, with a stem more than six feet in diameter. A tree to be treated always with respect, for its young shoots and branches, as well as the leaves, are covered in stiff stinging hairs. Virulent are these hairs, containing formic and acetic acids in concentrated form. The shining-leaved *Laportea* is smaller than *gigas*, but its stinging powers are strong enough for one to rue contact of his flesh with the leaves.

Pisonias are the upas-trees of Australian tropics. Their seed-vessels exude a viscid substance, and a bird flying against them may become caught as if with birdlime. Wing feathers are clogged by the sticky seeds, and falling to the ground means only worse entanglement: more seeds cling to the feathers, and debris mingles with them, until the victim is an unsightly, pitiable object, doomed to slow death.

HIGHWAYS and BYWAYS

THE planting of our metropolitan streets and roads is the responsibility of the local Councils, but they should be encouraged by the active co-operation of the citizens themselves. The beauty of trees can be enjoyed by everyone, no less than the pride of having helped to make some tree-less vista tree-clad. A city or suburb may become noted for its trees.

The world's most famous avenues of trees derive much of their beauty from the uniformity of outline obtained by planting species pure, either in groups or in rows, and because they are planted in congruity with their surroundings. Too often may be seen discordant mixtures of dissimilar species. To obtain the best effects there should be continuity of varieties; or, failing this, at least varieties that will harmonise with each other. The loveliness of conifers and our native gums is often marred when they are injudiciously planted in mixture. If our highways are to be noted for their scenic grandeur the jumbling of a host of species must be avoided, and distant views and landscapes must not be hidden by tall-growing trees.



The Lombardy Poplar

Trees are available in such variety that each bend of the road, each hilltop climbed, should open up fresh vistas. Here, a dark green wall of Roman cypress, broken at intervals, maybe, with groves of Lombardy poplar; there, widely spaced green *Lambertiana* cypress mingled with the brilliant hues of the golden variety; or, farther on, a copse of spreading eucalypts blended with scarlet-flowering sorts.

Time used in planning the layout for highway and byway plantings is time well spent, for it is very difficult to rectify any mistakes in design, when they become apparent, long after the trees are planted.

There seems to be little prospect of power and telegraph lines being placed underground. This means that either low-growing trees must be planted, or tall varieties which can be kept within bounds by pruning. The beauty of existing trees should be preserved by wise pruning.

The development of the small tree seems more desirable than persevering with the taller kinds. Repeated lopping entails a vast amount of work and must exhaust the vitality of the plant much sooner than if it were allowed to grow naturally. With some species, lopping has the tendency to foster the growth of root suckers, often inside a treasured garden plot. Trees with extensive surface root systems are not popular with suburban gardeners, and they have a right to expect that the root systems of street trees will not interfere with their garden pursuits.

More highly ornamental varieties are available for city and town avenues than for the more exposed sites of most country roads and lanes. Here such disadvantages as poor soils, lack of summer moisture, and exposure to strong winds, makes compulsory the choice of only hardy kinds. In the warmer climates inland water is most often the limiting factor, and drought-resisting species must be chosen. It must be remembered, though, that some trees, not normally drought-resistant, can accommodate themselves to dry conditions if they are assisted to form a deep root system in early life, by surface cultivation and occasional watering through the summer months. The methods adopted by the dry country farmer to conserve moisture, might well be used to encourage the growth of young trees, in similar country.

The value of some of our native trees for planting on exposed roads must be recognised, as

well as the beauty and worth of trees from other lands. It is possible to preserve a balance of each type and still not offend the most ardent advocate of Australian trees.

The attributes looked for in trees for town street cultivation are mainly beauty and shade-giving, but ability to weaken the severity of strong winds is a characteristic highly desirable in trees for country road planting. Some of the spreading varieties, of bushy habit, fulfil these demands, and the outstandingly suitable type of tree for general planting on the roads of southern Victoria is the Lambert's cypress in either the green or golden variety. Such spreading trees demand room for optimum development and would be quite unsuitable for use on many of our narrow one chain roads. Here more upright-growing varieties will serve, or landholders with property adjoining roads could be encouraged, and even assisted, to plant trees along their road frontage. Such a windbreak would not only improve the landholders' property, but would allow of the growing of spreading varieties adjacent to narrow thoroughfares.



Buttressed Stem of a Jungle Fig Tree

The EUCALYPTS —Continued from Page Ten

seen at its best, and growing most abundantly, in fertile districts, for it is a lover of coolness and moisture. The leaves are pleasantly scented. Manna gums are favorite trees of the koala, which has decided preferences and will not eat the foliage of any kind of eucalypt it dislikes, even though very hungry.

From 80 feet to 150 feet in height, the forest red gum (*E. tereticornis*) enjoys a wide range from Papua to Victoria, where it is confined to the north-eastern and the eastern districts. Closely related to *tereticornis* is the river red gum (*E. rostrata*), that grand old gum which makes a picture by the waterside wherever it grows; a tree from 80 feet to 150 feet high, and up to 10 feet in diameter. River flats often are dotted with red gums, but we associated them chiefly with the banks of streams; they are the true "river" gums; and in Victoria are found from the Yarra right to the Murray. In east and west the river red gum grows; the Northern Territory, Queensland and New South Wales are included in its range, South Australia, too.

Blackbutt (*E. pilularis*) ranges from Queensland to Victoria; in the latter State it is limited to the north-east and east. Blackbutt grows rapidly, reaching 50 feet perhaps in a quarter of a century. At maturity the height varies from about 100 feet to 150 feet.

Common peppermint (*E. australiana*), sometimes growing to a height of 100 feet to 150 feet, as a rule is a much smaller tree, 50 feet or under. The leaves have the peppermint scent. This familiar gum is native to New South Wales and Victoria; as also is blue peppermint (*E. dives*), with broader leaves than its ally.

Yellow gum (*E. leucoxylon*) is a tree of medium size, growing sometimes to a height of 60 feet to 90 feet. It is widely distributed in Victoria. Red ironbark (*E. sideroxylon*), a tree from 40 feet to 60 feet high, is common to four States: Queensland, New South Wales, Victoria and South Australia. Excepting the north-west, red ironbark is widespread in Victoria, but grey ironbark (*E. paniculata*) is confined to the eastern district; it is native to the same States as *sideroxylon*. Of moderate size as a rule, grey ironbark grows at times into a tall tree, 80 feet to 120 feet.

The four species of gum-myrtle (*Angophora*) are Australian, and form a link, as it were, between *Tristania* and the eucalypts. Only one gum-myrtle (*A. intermedia*) occurs in Victoria; a tree with rough persistent bark, it grows to a height of 80 feet or more.

Of Tristanias there are some 20 kinds in eastern Australia and Malaysia, but one is Victoria's share, the kanooka, *Tristania laurina*, which, in favorable conditions, attains a height of 40 feet to 60 feet. Kanooka is a Gippsland native, growing chiefly on river banks; it is also found in southern Queensland and New South Wales.

THE FORESTS



Climbing a Giant Gum

CONTRASTED with other mainland States of the continent, Victoria is fortunate in being comparatively well forested, for out of a total area of 56 million acres it is estimated that more than 20 per cent. carries forest of some kind. The State Forest area at present is 4,799,272 acres, and it is intended eventually to maintain at least 5½ million acres of such reserves, in order to ensure adequate timber supplies for future industrial requirements.

The forests are well distributed throughout the State, but vary greatly in character and composition. There are all gradations of soils from rich, deep, volcanic loams to sterile sands. Rainfall varies from over 70 inches a year to less than 10 inches; altitudes range from sea level to alpine heights of more than 6000 feet elevation; and topography varies from precipitous highland slopes to coastal dunes and flat inland plains.

Possibly the most characteristic, and certainly the most widely distributed forests in Victoria are those of the stringybark and peppermint type, which extend from the New South Wales border in the north-east, to the South Australian border in the south-west. These comprise a wonderful variety of different eucalypt species, of which brown stringybark and messmate in the south-west, messmate and peppermint in central districts, white stringybark and silvertop in East Gippsland, and messmate and red stringybark in the north-east, are the most typical and abundant. These stringybark forests attain their best development in cool, moist districts, notably in East Gippsland, in the south-west coastal districts, and in the Wombat, Mount Cole, and Pyrenees region. Enormous quantities of timber for sawmilling have been extracted from these forests in the past, in addition to poles, piles, fencing and mining timber, railway sleepers, and fuel. The present stands consist mainly of regrowth of all ages.

On the higher mountain ranges of the central and north-eastern highlands, and on the hill country of the Otway peninsula and South Gippsland, where soils are deep and fertile and rainfall is heavy, are found the dense, luxuriant forests of white mountain ash, red mountain ash, shining gum, and other fast-growing eucalypts, with their under-storey of shade-loving trees and shrubs. These are the forests of the giant trees, for conditions are conducive to rapid growth. Many of these tracts still carry the virgin stands, for they are difficult of access and the country is often steep and rugged. These forests are the mainstay of the sawmilling industry in Victoria at the present time, and very large yields of timber are obtained from prime areas.

In marked contrast to these mountain stands are the box and ironbark forests, which form the characteristic tree cover on the foothills north

of the Dividing Range. Here the soils are poor and shallow, while rainfall is light. In consequence the forests are rather open, undergrowth is scanty or absent, and growth slow. As an offset against this, however, the timbers of the principal species are unexcelled for strength and durability. Located as they are in the heart of the principal goldfields in the vicinity of Bendigo, Heathcote, Maryborough, and other northern towns, these forests were ruthlessly exploited in bygone days for the production of railway sleepers, poles, fencing and mining timbers, and fuel. Careful tending treatment has been necessary to restore them to a healthy, vigorous condition.

On the alluvial flats adjacent to the River Murray and its tributaries, the river red gum forests attain their highest development. Regular flooding from the overflow of the rivers contributes a system of natural irrigation which keeps the soil in a suitably moist condition and compensates for a deficiency in rainfall which, in some districts, averages less than 10 inches. These forests consist in the main of river red gum (*Eucalyptus rostrata*), which grows in dense stands in the low-lying depressions and along lagoons and water-courses. The best forests of this species are to be found along the Murray from about Yarrawonga to the South Australian border, on the lower reaches of the Goulburn, and around the headwaters of the Glenelg River. The forests have been intensively worked for more than 80 years, for the production of logs for sawmilling and of hewn timber for railway sleepers.

One noteworthy feature of these forests is the preponderance of gum trees. With few exceptions, other species are relegated to a subordinate position in the understorey. Over 30 of these eucalypts are recognised as valuable timber trees, besides many others which are of lesser value and not so abundant or well known.

The eucalypts yield a high grade hardwood timber, and so varied are the properties of the different timbers that material can be obtained which is suitable for practically any purpose for which wood is used. In heavy constructional work where strength and durability are the prime requisites, for instance as beams, railway sleepers, or bridge timbers, red ironbark (*Eucalyptus sideroxylon*), grey box (*Eucalyptus hemiphloia*), Gippsland grey box (*Eucalyptus Bosistoana*), and red gum (*Eucalyptus rostrata*) are unrivalled, with mahogany gum (*Eucalyptus botryoides*), yellow stringybark (*Eucalyptus Muelleriana*), and blue gum (*Eucalyptus globulus*) very little behind them. Messmate (*Eucalyptus obliqua*) and white stringybark (*Eucalyptus eugenioides*) are excellent all-round utility timbers used for general building construction, poles, and fencing. The lighter timbers of white mountain ash (*Eucalyptus regnans*) and red mountain ash (*Eucalyptus gigantea*) are extensively used for the manufacture of high quality flooring, lining, joinery, panelling and furniture. White mountain ash and silvertop (*Eucalyptus Sieberiana*) have been shown to be suitable for the manufacture of paper pulp.

Many species other than the eucalypts produce valuable timbers. The fragrant, durable timber of the native pine (*Callitris*) is practically immune from attack by white ants. The wood of myrtle-beech (*Nothofagus Cunninghami*) and blackwood (*Acacia melanoxylon*), species which frequent the deep, sheltered mountain gullies, often is beautifully figured and is highly prized for veneers, cabinet work, panelling, and furniture while satin box (*Phebalium Billardieri*), musk (*Olearia argophylla*), and other small trees characteristic of the cool mountain regions, produce highly decorative timbers.

Of forest products other than timber, wattle-bark and eucalyptus oil are the most important. The former is obtained mainly from the black wattle (*Acacia mollissima*) and the golden wattle (*Acacia pycnantha*), the extract from the bark being used in the tanning of leather. Eucalyptus oil is distilled from the leaves of different species. Oil used in metallurgical processes is derived chiefly from the broad-leaved peppermint (*Eucalyptus dives*) and the narrow-leaved peppermint (*Eucalyptus amygdalina*), while the best medicinal oils are extracted from blue mallee (*Eucalyptus polybractea*), red ironbark (*Eucalyptus sideroxylon*), and some of their associates in the northern forests.

Although Victoria possesses abundant hardwood timber resources, there is only one indigenous representative of the conifers which produce the softwood timber of commerce. This is the native pine (*Callitris*), which forms open forests on sandy rises in the dry north-west. While the timber of this species is of excellent quality, existing supplies are rapidly being depleted with the extension of settlement. Coniferous plantations are being created in suitable localities, the principal species planted being the Monterey pine (*Pinus radiata*) of California, the ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga taxifolia*) of North America, and the Corsican pine (*Pinus laricio*) of southern Europe. Up to date, nearly 48,000 acres of State-owned plantations have been established.

—*K.V.M.F.*

When the gnarl'd, knotted trunks
Eucalyptian
Seem carved, like weird columns
Egyptian,
With curious device, quaint inscription,
And hieroglyph strange;

In the Spring, when the wattle gold
trembles
'Twixt shadow and shine,
When each dew-laden air draught re-
sembles
A long draught of wine.

—ADAM LINDSAY GORDON.

"HONEYSUCKLES"

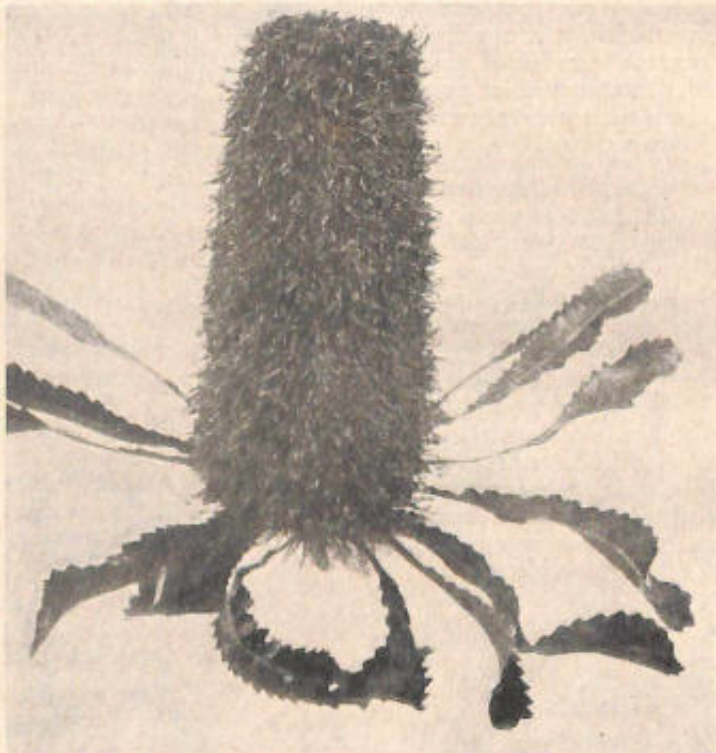
BELOW the tea-tree of the cliffs, with old grey stems and bent or twisted branches, here and there coast honeysuckles grow: lone sentinels, or so many together that they form a grove. Around Port Phillip Bay, where folk go picnicking on summer days, *Leptospermum* is dominant, forming the scrub through which too many pathways have been made.

But these are pleasant ways to follow; leading, some to the edge of the cliffs, some to clearings, a few to coigns or wide depressions where the scrub is densest and many birds find peace through nesting time. To a honeysuckle grove you come, out of the tea-tree white with blossom in Spring. And the Banksias have pale yellow cones, whose nectar attracts wattle-birds and honeyeaters, noisy in the trees daylong, during winter when the feast is provided.

Of Banksias there are nearly 50 species, mostly shrubs; and the genus is confined to Australia, excepting a representative in Papua which is Australian too.

The name of Captain James Cook's companion, Sir Joseph Banks, was given to our native "honeysuckles," in honor of a great man who has been called "The Father of Australia"—a title not undeserved. For Banks was not only a patron of exploration in Australasia, but also a wise and generous spender of his wealth in advancing science. A botanist, he made collections himself, and sent out some notable collectors of plants, among them being George Cayley and Allan Cunningham, famous in the history of botanical exploration in our island-continent.

An old, storm-beaten "honeysuckle" on the beach above high-tide mark, is a living memorial of the Father of Australia. Richer than other native trees in associations are the Banksias; and yet they are rare in cultivation, all but two or three of the more ornamental kinds, and these are rather shrubs than trees.



Flower-spike of Coast Honeysuckle.

Such old Banksias as are seen in gardens by the sea, were not planted there, but are trees spared when the land was being cleared for building.

Only five species occur in Victoria: the coast honeysuckle (*Banksia integrifolia*), the saw Banksia (*B. serrata*), the silver Banksia (*B. marginata*), the hill Banksia (*B. collina*), and the desert Banksia (*B. ornata*). Three of these are shrubs, including the hill Banksia, which has the most attractive flower-spikes or cones.

Silver Banksia, usually a low shrub, sometimes grows to a height of 30 feet, a handsome tree whose fruiting spikes have prominent capsules, half an inch across. The leaves of *marginata* are silvery beneath and its popular name, musical as any borne by a native plant, is apt for the silver Banksia, which ranges from Queensland to South Australia, and belongs to Tasmania too.

The saw Banksia rarely attains a height of 50 feet, from 20 feet to 30 feet being usual for this stout, rough-stemmed species, native to New South Wales, Victoria and Tasmania. It grows in poor, sandy soils, in coastal districts, and becomes dwarfed where it is unsheltered from the wind.

Coast honeysuckle reaches a height of 30 feet to 40 feet and many a veteran is about 4 feet in diameter. They look older than their years, though some really are ancient, with rough trunks and often broken branches and ragged crowns against the sky. Queensland to Victoria is the range of the coast Banksia, which, despite its name, is not confined to the seaside, but also grows inland, having been recorded from the Grampians.

Silver Banksia timber, soft and reddish colored, is used in furniture making and for veneers. That of the saw Banksia is hard and red to reddish-brown in color; bullock yokes and boat-knees are made of it, other things, too. Coast Banksia wood is pinkish colored, with a prominent grain and suitable for furniture and veneers.

Planting and Care of Trees

CHAPTERS could be written on the theory and practice of the actual planting of trees, and although most amateurs have some practical knowledge on the subject, they often fail to appreciate why some of the planting maxims are necessary.

To realise the necessity for careful planting it is essential to have some idea of just how the plant feeds and grows. Plants may be immobile, but they certainly are not lifeless. One eminent scientist has even said that "there is no characteristic action in the highest animal that has not a counterpart in the simpler life of the plant."

Unlike animals, however, plants receive all their food in a raw state, and it is elaborated within the plant structure. The leaves are highly specialised chemical laboratories, building up and breaking down food continuously. All the minerals necessary for growth must come from the soil in solution in the soil moisture. It is the tiny root-hairs, and not the large roots, which do most of the absorbing, and so it is important that these hairs receive as little injury as possible when planting. The large roots give the tree stability. Large quantities of water are absorbed by the roots and much of this is transpired to the air through the leaves. In this manner a large tree may lose as much as 10 gallons of water a day; and if this amount cannot be replenished from the soil, the tree wilts and then dies.

The tree breathes air as we do, and the roots demand air as much as the leaves. The three main essentials for growth, then, are mineral foods in the soil, moisture, and air, which includes sunlight necessary for the part of the plant above ground.

Sap rises from the roots below ground to the leaves, sometimes 300 feet above. Man would expend much energy in raising water to such a height. A noted plant pathologist now claims that sap can rise at the rate of 100 feet an hour by the pumping action of pulsating plant cells—a heart action.

Most soils contain mineral foods in sufficient quantities for growth, but no soil is so rich that it is not benefited by an application of manure. Well-rotted animal manures are better than artificial manures, as they improve the soil physically as well as chemically. The opinion is still held by many that native plants dislike artificial or natural manures. This idea is wrong, as practically all plants respond to an application. Natural manures should never be used when fresh and are best mixed with the soil before planting, whereas artificial kinds should be stirred into the surface after the tree has become established. The safest type to use is blood and bone, at the rate of 1-2 ounces a square yard.

No strict rule can be applied as to the actual size of the planting pit, because this largely depends upon the character of the soil, but it should be of generous proportions. In large scale plantings preliminary ploughing of the soil destroys the growth of weeds which compete with the trees for moisture during the hot months. As very few plants will succeed with their roots submerged in water, drainage is most essential. On low-lying sites the level of the pit may be raised above that of the surrounding soil. Drainage is retarded if too much subsoil clay is removed, and heavy clay should not be placed around the roots.

Only hardy, well-rooted plants should be selected for planting. A small, healthy plant will soon outgrow a taller, starved one. There is a popular fallacy that the roots of plants grown in pots must be disentangled before planting. This action quite often is the cause of failure, because great injury may be done to the growing root-hairs. The ball of soil and roots should be left intact, but any protective covering, such as grass or paper, should be removed. The sooner the roots come in contact with the fresh soil the sooner will they grow. They must not be allowed to become dry, for as little as ten minutes' exposure to the sun or wind may prove fatal. The plant may be dead physically, if not visibly.

Deciduous plants which have bare roots must be planted during the winter months when they are leafless, and any injured portions of the roots should be carefully removed with a sharp knife. All planting is best done during the rainy winter months although plants grown in pots can be planted the year round provided the soil receives an ample supply of water. Firming the soil after planting is important, and if the soil is at all crumbly the hole should be soaked with water. This materially assists in the consolidation of the soil. A surface mulch of decayed manure, straw, or dried leaves helps to prevent the evaporation of soil moisture and keeps the surface soil cool in summer.

Attention after planting often is sadly neglected, and yet it may mean the difference between a good and a poor specimen. Injury to the tree by animal agencies must be guarded against, particularly during early life. Occasional summer waterings, combined with soil mulching with the hoe, will help the tree to make a vigorous root system. This will be reflected in the growth of limb and leaf above ground. Where water is not available a surface hoeing and mulch with debris will often work wonders on the rate of growth.

Remember, above all things, that the health and vigor of trees depend largely upon the treatment they receive at planting and during their youth.

SPRINGTIME



TREE PLANTERS' CHOICE

This select list of trees to suit the various climatic conditions of the State was compiled by the Victorian Tree-Planters' Association, whose object is the gathering and dissemination of facts and information with reference to parks and gardens and tree-planting. Mr H. J. Owens, Town Hall, Melbourne, is honorary secretary of the Association.

TREES TO SUIT THE VARIOUS CLIMATIC CONDITIONS IN VICTORIA

COASTAL DISTRICTS

STREETS

Botanical Name	Common Name
Araucaria excelsa	Norfolk Island Pine
Eucalyptus calophylla rosea	Pink Flowering Gum
Eucalyptus botryoides	Mahogany Gum
Eucalyptus leucoxylon rosea	Pink Flowering Gum
Pittosporum undulatum	Sweet Pittosporum
Pittosporum eugenioides	N Z Laurel.
Pittosporum crassifolium	Parchment Bark Tree
Grevillea robusta	Silky Oak
Tamarix japonica	Flowering Cypress
Tamarix gallica	Flowering Cypress
Schinus molle	Pepper Tree
Populus alba	Silver Poplar
Populus canadensis aurea	Golden Poplar
Quercus cerris	Turkey Oak
Quercus palustris	Pin Oak
Quercus ilex	Evergreen Oak
Platanus orientalis	Oriental Plane

Elms in variety.

PARKS AND GARDENS

In addition to the above.

Acacia longifolia	Coastal Wattle
Araucaria Cookii	Capt. Cook's Pine
Protea mellifera	Cape Honeysuckle
Prunus pissardi	Cherry Plum
Rhus succedanea	Japanese Wax Tree
Angophora lanceolata	Gum-Myrtle
Araucaria Bidwillii	Bunya Bunya Pine
Araucaria imbricata	Monkey Puzzle
Arbutus unedo	Irish Strawberry Tree
Callistemon coccineus	Scarlet Bottle Brush
Callitris cupressiformis	Cypress Pine
Casuarina stricta	Sheoke
Melia azedarach	White Cedar
Cedrus deodara	Deodar
Eugenia myrtifolia	Native Rose Apple
Eugenia ventenatii	Drooping Myrtle
Lagunaria Patersoni	Cow-itch Tree
Melaleuca styphelioides	Paper Bark Tea-Tree
Quercus suber	Cork Oak
Tristania conferta	Queensland Brush Box
Camphora officinalis	Camphor Laurel

COLD DISTRICTS

STREETS

Botanical Name	Common Name
Acer campestre	Common Maple
Acer saccharum	Sugar Maple
Tilia europea	Lime or Linden Tree
Fraxinus excelsior	English Ash
Fraxinus excelsior aurea	Golden Ash
Fraxinus americana	American Ash
Liriodendron tulipifera	Tulip Tree
Platanus orientalis	Oriental Plane Tree
Populus alba	Silver Poplar
Populus fastigiata (dilatata)	Upright or Lombardy Poplar
Populus canadensis aurea	Golden Poplar
Robinia	False Acacia
Quercus lusitanica	Portugal Oak
Quercus palustris	Pin Oak

Ulmus (Elms) in variety.

PARKS AND GARDENS

In addition to the above.

Acer dasycarpum	Silver Maple
Acer tartaricum	Golden Maple
Acer rubrum	Scarlet Maple
Abies Nordmanniana	Silver Fir
Araucaria imbricata	Monkey Puzzle
Araucaria Bidwillii	Bunya Bunya Pine
Benthamia fragifera	Strawberry Tree
Cedrus atlantica	Mount Atlas Cedar
Cedrus deodara	Deodar
Cryptomeria japonica	Common Japanese Cedar
Cryptomeria elegans	Elegant Japanese Cedar
Cup. Lambertiana horizontalis	Cypress
Cup. Lamber. horiz. aurea	Golden Cypress
Dacrydium cupressinum	N Z. Rimu or Red Pine
Edwardsia microphylla	Lord Howe Island Laburnum
Nothofagus Cunninghami	Myrtle Beech
Fagus sylvatica	Common Beech
Fagus purpurea	Purple Beech
Fraxinus excelsior pendula	Weeping Ash
Larix europea	European Larch
Leucadendron argenteum	South African Silver Tree
Picea excelsa	Norway Spruce
Pinus canariensis	Canary Island Pine
Pinus halepensis	Jerusalem Pine
Pinus radiata (insignis)	Monterey Pine
Pinus pinaster	Cluster Pine
Pinus ponderosa	Yellow Pine
Sequoia gigantea	Californian Redwood
Pittosporum eugenioides	N Z. Laurel
Arbutus unedo	Irish Strawberry Tree

Crataegus (Hawthorns), Eucalypts, Eugenias, Hollies of kinds, Ginkgo Biloba (Maidenhair Tree), Elms in variety.

TEMPERATE DISTRICTS

STREETS

Botanical Name	Common Name
Eucalyptus cladocalyx	Sugar Gum
Eucalyptus botryoides	Mahogany Gum
Eucalyptus calophylla rosea	Pink Flowering Gum
Eucalyptus leucoxylon rosea	Pink Flowering Gum
Fraxinus excelsior	English Ash
Fraxinus excelsior aurea	Golden Ash
Fraxinus americana	American Ash
Ginkgo biloba	Maidenhair Tree
Grevillea robusta	Silky Oak
Populus alba	Silver Poplar
Populus fastigiata	Upright or Lombardy Poplar
Pittosporum undulatum	Sweet Pittosporum
Pittosporum crassifolium	Parchment Bark Tree
Pyrus aucuparia	Rowan Tree
Platanus orientalis	Oriental Plane Tree

Robinias, Canadian and English Elms.

PARKS AND GARDENS

In addition to the above.

Arbutus unedo	Irish Strawberry Tree	*Stenocarpus Cunninghami*	Fire Tree
Eugenia myrtifolia	Native Rose Apple	*Virgilia capensis*	Cape Virgilia
Eugenia ventenatii	Drooping Myrtle	*Lagerstroemia indica*	Indian Crepe Myrtle
Hakea laurina	Cushion Flower Tree	*Melia azedarach*	White Cedar
Melaleuca styphelioides	Paper Bark Tea-Tree	*Callistemon coccineus*	Scarlet Bottlebrush
Quercus coccinea	Scarlet Oak	*Camphora officinalis*	Camphor Laurel
Quercus ilex	Evergreen Oak	*Ficus australis*	Port Jackson Fig
Rhus succedanea	Japanese Wax Tree	*Jacaranda mimosaefolia*	Mimosa-leaved Jacaranda
Sambucus nigra	Common Elder	*Tamarix gallica*	Flowering Cypress.
Sambucus nigra aurea	Golden Elder	*Tamarix japonica*	Flowering Cypress

Acacias in variety, Flowering Gums, Peaches, and Almonds.

HOT DISTRICTS

STREETS

Botanical Name	Common Name	Botanical Name	Common Name
Callitris cupressiformis	Cypress Pine	*Sterculia acerifolia*	Flame Tree
Camphora officinalis	Camphor Laurel	*Sterculia diversifolia*	Currajong
Eucalyptus cladocalyx	Sugar Gum	*Tristania conferta*	Queensland Brush Box
Eucalyptus botryoides	Mahogany Gum	*Agonis flexuosa*	Willow Myrtle
Grevillea robusta	Silky Oak	*Platanus orientalis*	Oriental Plane
Jacaranda mimosaefolia	Mimosa-leaved Jacaranda	*Ulmus vegeta*	Huntingdon Elm
Robinia inermis	False Acacia	*Quercus palustris*	Pin Oak
Robinia bessoniana	False Acacia	*Quercus ilex*	Holly or Evergreen Oak
Robinia pseudacacia	Locust Acacia	*Quercus cerris*	Turkey Oak
Schinus molle	Pepper Tree	*Eucalyptus viminalis*	Manna Gum
		Eucalyptus ficifolia	Scarlet Flowering Gum

PARKS AND GARDENS

In addition to the above.

Angophora lanceolata	Gum Myrtle	*Eucalyptus maculata*	Spotted Gum
Callistemon coccineus	Scarlet Bottlebrush	*Ficus australis*	Port Jackson Fig
Casuarina stricta	Sheoke	*Lagunaria Patersoni*	Cow-itch Tree
Cercis siliquastrum	Judas Tree	*Magnolia grandiflora*	Laurel Magnolia
Eucalyptus citriodora	Lemon-scented Gum	*Syncarpia laurifolia*	Turpentine Tree
Eucalyptus radiata	Peppermint Gum	*Tamarix gallica*	Flowering Cypress

PALMS

Phoenix, Chamaerops, Diplothemium, and Washingtonia.

The Tree

Fair Tree! for thy delightful shade
'Tis just that some return be made;
Sure, some return is due from me
To thy cool shadows, and to thee.
When thou to birds dost shelter give,
Thou music dost from them receive;
If travellers beneath thee stay,
Till storms have worn themselves away.
That time in praising thee they spend,
And they protecting power commend.
Shall I then only silent be,
And no return be made by me?
No, let this wish upon thee wait,
And still to flourish be thy fate.
To future ages may'st thou stand
Untouched by the rash workman's hand;
Till that large stock of sap is spent,
Which gives thy summer's ornament;
Till the fierce winds, that vainly strive
To shock thy greatness whilst alive,
Shall on thy lifeless hour attend,
Prevent the axe, and grace thy end;
Their scattered strength together call,
And to the clouds proclaim thy fall.

ANN FINCH, Countess of Winchelsea.
(1660-1720)

Acknowledgments

Even a small book dealing with so great a subject as trees must incorporate the knowledge of several authorities. A lifetime might be devoted to one genus. The author of The Sun Tree Book gratefully acknowledges the help, very willingly given, of The Forests Commission of Victoria. The Chairman (Mr A. V. Galbraith) has not only written a foreword, but shown interest in the book from its inception. Several articles, notably that on conifers and the practical hints on planting, etc., were contributed by Mr C. R. G. Venville, superintendent of the State Nursery, Macedon; while Mr K. V. M. Ferguson, sylvicultural officer to the Forests Commission, wrote the account of Victorian Forests.

To the South Australian Centenary Committee thanks are due for permission to reproduce Captain Frank Hurley's fine study of sunlit gums (the cover design), and that of the "Ghost Tree." Some of Henry Irving's beautiful photographs are reproduced from "Trees and Their Life Histories," one of the finest works of its kind ever published. Several illustrations are from photographs kindly made available by the Victorian Government Railways. Others, including that of the Baobab are Australian National Travel Association photographs; many are the author's own pictures. Dr. Charles S. Sutton lent several photographs and permitted the use of his valuable notes on the Eucalypts.

To the Victorian Tree Planters' Association the author is indebted for permission to include in the book the Association's list of trees suitable for planting in the State.

The "Ghost Tree"



Photo by Captain Frank Hurley

A scene in the far north of South Australia. The "Ghost Tree" is a species of Eucalypt usually called the "whitewash gum;" its bole and boughs are covered in a white substance, which rubs off as easily as chalk on a blackboard. These trees are striking objects in the Central Australian landscape, in the Macdonnel Range and elsewhere. Against a blue unclouded sky, they are beautiful; at night, moonlit columns and strange white arms reaching for the stars. The photograph is reproduced by permission of the South Australian Centenary Committee.

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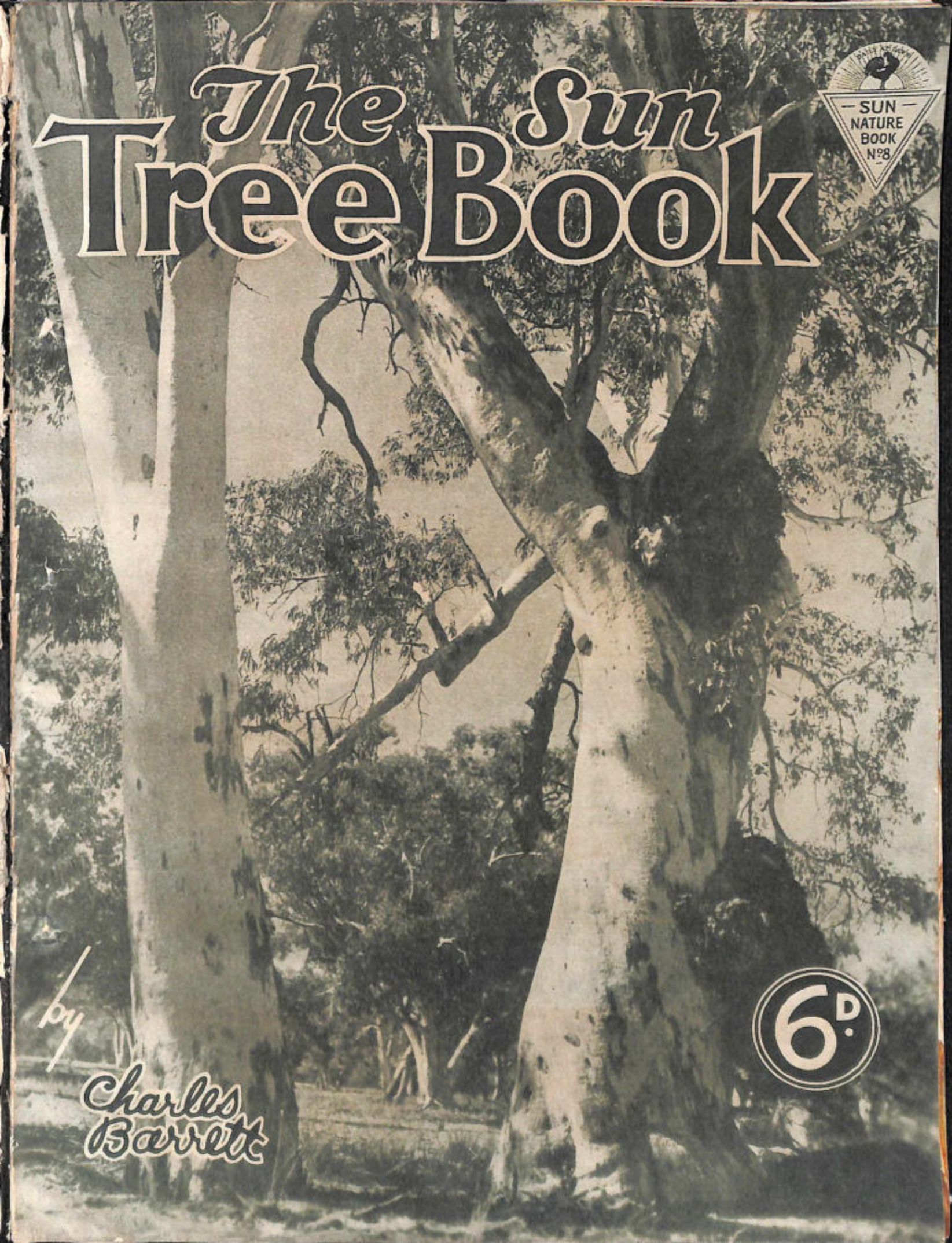
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The Sun Tree Book

SUN NATURE BOOK No. 8



by Charles Barrett

6D.



A people without children would face a hopeless future; a country without trees is almost as hopeless; forests which are so used that they cannot renew themselves will soon vanish, and with them all their benefits. When you help to preserve our forests or plant new ones you are acting the part of good citizens.

THEODORE ROOSEVELT

GEMS of the BUSH

SUN NATURE BOOK No 5

Featuring Orchids, Birds' Eggs, etc.

6d.



CHARLES BARRETT

Published by The Sun News-Pictorial, Melbourne.



THE HELMETED HONEYEATER

This rare and beautiful Honeyeater (*Meliphaga cassidix*) is confined to Southern Victoria, and has been recorded from only a few localities, notably Beaconsfield. It is pugnacious, and has been observed "rounding up" Sitellas and other small birds, venturing within its territory. The nest of the Helmeted Honeyeater, a deep, cup-shaped structure of bark, grass, etc., with a softer lining, is suspended, as a rule, from a slender branch of a tree or a bush. Two eggs form the clutch; they are flesh colored, ornamented with purple-grey and red-brown markings.

Illustration from the Painting by Neville W. Cayley. Reproduced by courtesy of the Field Naturalists' Club of Victoria.

FOREWORD

By The Director of Education, Victoria

The issue of another Sun Nature Book is a notable event. The preceding issues of the series have earned such universal commendation that one feels quite safe in predicting that Mr Charles Barrett's new book will bring interest and delight to an equally wide circle of readers.

The section on Australian orchids is most timely. We Australians are only just beginning to realize what a treasure-house we have in our indigenous wild flowers, and particularly in our orchids. These are, indeed, "gems of the bush," and well worthy of closer study. Mr Barrett will have deserved well of all nature-lovers if he succeeds in making us more fully aware of our fine national heritage, and in awakening a new sense of pride in our beautiful and unique native flora.

This publication is most opportune, also, inasmuch as it synchronises with the launching of the new League of Youth of Australia. One of the main objects of this League is to make our young folk more fully acquainted with and prouder of our native fauna and flora, and to take sturdy measures for their preservation. Every one who reads "Gems of the Bush" will be convinced that it was a wise step to form this League, and that it behoves every good Australian — young or old — to join up and further the attainment of its aims.

A specially attractive feature is the inclusion of several colored plates. Both artist and printer have done their work well. The illustrations are bold and clear, free from unnecessary detail, and they **do** really illustrate. I must confess, however, that the striking double page of colored illustrations of birds' eggs stirred in me some ancient memories not wholly pleasant. But, when I recalled the collection of birds' eggs that I had made as a schoolboy, my regret for this crime was softened by the knowledge that the youth of today have learned to love and admire these beautiful specimens without wishing to rifle the nests of their treasures.

Mr Barrett is greatly to be commended for the splendid work he is doing in communicating to others something of his own love of and delight in the world of Nature. A word of praise is also due to The Sun News-Pictorial for the enterprise that has made possible the publication of these attractive volumes at a price that is well within the reach of all.

J. McRAE.

GEMS OF THE BUSH

By

CHARLES BARRETT

C.M.Z.S. (London and New York)

Orchid Section

in collaboration with

W. H. NICHOLLS

This is the Fifth Sun Nature Book. The first of the series, "Birds and Blossoms," and No. 2, "Australian Animals," are both out of print; but copies of No. 3, "Birds and Butterflies," and No. 4, "Water Life," are still available. The color plates in these popular books are particularly attractive.

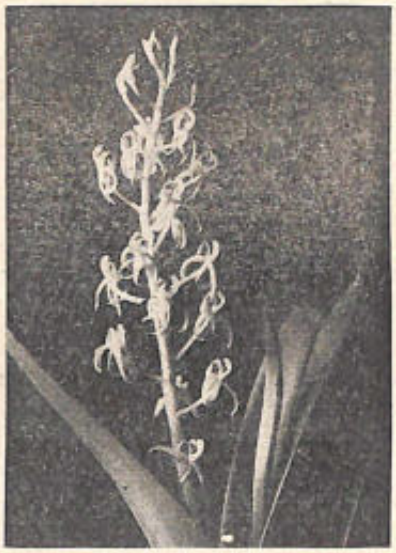
AUSTRALIAN ORCHIDS

The Iris Orchid

The Iris Orchid (*Oberonia iridifolia*, Ldl.) has iris-like leaves, about 6 inches to 9 inches in length. The numerous, grotesque flowers are very small and borne on long and slender spikes. They are of a very pale greenish color. The labellum, or tongue, is irregularly fringed. Flowering season: Spring Distribution: Queensland and N.S.W.



Yellow Rock Orchid



The Yellow Rock Orchid (*Liparis reflexa*, Ldl.) is a green, bulb-like plant, with long (up to 12 inches) somewhat lax, channelled leaves. The small, pale yellowish-green flowers are fairly numerous, on erect stems. When they first open, the narrow sepals and petals are widely spread; but quickly assume the reflexed position so characteristic of this species. Blooming in autumn and distributed throughout the coastal districts of Queensland and New South Wales, this orchid grows often in extensive colonies on cliff faces, rocks, etc. The flowers diffuse an unpleasant, sickly odor.

Soldier's Crest Orchid

The Soldier's Crest Orchid (*Oberonia titania*, Ldl.) is named after one of the Titans. It resembles (in miniature) the Iris Orchid, and has the same distribution; but blooms in the autumn. Its flowers are not fringed. Both forms grow, often, in compact masses on trees (palms chiefly). The generic name is derived from Oberon, king of the fairies.



The "Rock Lily" or King Orchid

The King Orchid, or so-called "Rock Lily" (*Dendrobium speciosum*, Sm.) is an extremely variable species. It is the largest tree-orchid (epiphyte) found in Australia. The typical form has very stout stems (pseudo, or false, bulbs). The fairly large flowers, with finger-like petals, etc., vary in color from pure white or cream, turning to a yellow shade in maturity. The tongue (labellum) is speckled with purple. The leaves (4 to 6) are large, dark glossy green, thick and leathery. The King Orchid grows plentifully on trees, cliff faces and rocks. Its flowers are strongly fragrant, especially on a warm day.



The best known varieties are: Var. *Hillii*, F.v.M., known to the Queensland aborigines as "Tarberi." A large, free-flowering form, with comparatively slender, much-ribbed stems, and long clusters of flowers. Var. *nitidun*, Bailey, has short dense clusters. Var. *gracillimum*, Rupp. is small and slender.

Flowering season: Spring. Distributed throughout Queensland and New South Wales. In Victoria, restricted to Eastern districts.

Fairy Tree Orchid



The Fairy Tree Orchid (*Liparis coelogynoides*, F.v.M.) is a smaller plant than *L. reflexa*, and its flowers are more dainty, in pale green shades, turning to orange in maturity. The tongue is very broad, and hatchet-shaped. The stems are somewhat flat in section, thus assuming a more or less drooping position when the flowers expand. Blooms during the spring and summer months. Distribution: Queensland and N.S.W.

White Feather Orchid



The White Feather Orchid (*Dendrobium aemulum*, R. Br.) is a small plant with flat and thick leaves—usually two. The fragrant, spidery flowers, in clusters, are white, with yellowish tips; tongue markings, pink. Grows on Ironbark Eucalypts and the Brush Box. *Aemulum* means a rival. Flowering season: Spring. Distribution: Queensland and N.S.W.

The Beech Orchid

As its name implies, the Beech Orchid (*Dendrobium falcorostrum*, Fitz.) grows chiefly on Beech trees (*Nothofagus Moorei*), but is sometimes found on tree-fern trunks. It is confined to fairly high altitudes. The flowers, borne in short dense or loose clusters, sometimes are two inches across; white or cream colored, with red and purplish markings on the inside; throat, orange. The specific name refers to the shape of the lip, which resembles a falcon's bill. In warm weather the flowers are strongly fragrant. Flowering season: Spring. Distribution: Queensland and N.S.W.



Delicate-flowered Dendrobium



The Delicate-flowered Dendrobium (*Dendrobium delicatum*, Bailey) is a small species, not unlike a robust *D. Kingianum*, but the dainty flowers are very delicately tinted. White or cream colored, often they are tinted pink or a pale mauve. Flowering season: Spring. Distribution: N.S.W and Queensland.

Tree Spider Orchid

The Tree Spider Orchid (*Dendrobium tetragonum*, Cunn.) is a unique species with long, 4-angled stems. The flowers are small in most forms, and appear in short clusters from among the leaves or at the joints along the stem. Color: yellowish-green, with



red-brown markings, or wholly cream. In some forms the spidery-like flowers, which are fragrant, have long "legs," sometimes beautifully mottled. Flowers in spring and summer. Distribution: Queensland and N.S.W.

The Yellow-speckled Orchid

In some districts, the Yellow-speckled Orchid (*Dendrobium gracilicaule*, F.v.M.) is called the Yellow "Tree-lily." It is a very abundant plant. The stems are long and slender, leaves dark green and large. The small flowers, borne in short clusters, are yellowish-green or yellow, with brick-red blotches on the outside. Variety *Howeanum* Maiden, which has cream-colored flowers, with pink tongue markings, is found only on Lord Howe Island. Flowering season: Spring. Distribution: Queensland and N.S.W.



Pink Rock Orchid

The Pink Rock Orchid (*Dendrobium Kingianum*, Bidw.) is a variable plant, often growing in extensive colonies on sandstone cliffs, etc. It is noted for the habit of developing young plants at the top of the parent stem; these drop off and start life independently. The color of the flowers varies from deep mauve pink or pale pink to cream or white—there are



many combinations of shades. Flowers in the spring. Distribution: Queensland and N.S.W (See color plate also).

The Pencil Orchid

A very pretty, fragrant species is the Pencil Orchid (*Dendrobium Beckleri*, F.v.M.). The yellowish-green flowers are often numerous on the plant, and



usually have red-brown lines. The tongue has rich mauve markings. Flowers in the spring. Distribution: Queensland and N.S.W.



"Lily of the Valley"

The "Lily of the Valley" Orchid (*Dendrobium monophyllum*, F.v.M.) is a creeping plant forming close patches on trees and rocks. The bell-like flowers are fragrant, and closely resemble those of the yellow-flowered Lily of the Valley. The solitary leaf (sometimes two occur) is lance-shaped. Flowers in the spring Distribution: Queensland and N.S.W

The Dagger Orchid



The popular name of this Orchid (*Dendrobium pugioniforme*, Cunn) refers to the peculiar dagger-shaped leaves. It is a wiry-stemmed, pendulous plant with many branches. The leaves are very sharply pointed and hard, and the fragrant flowers green, with brown lines; tongue white, marked with mauve. Flowering season: Spring and early summertime. Distribution: Queensland and N.S.W.

Clematis Orchid

A graceful plant in its full glory, the Clematis Orchid (*Dendrobium teretifolium*, R. Br.) has thin (or thick), smooth, cylindrical leaves which are like smooth tapers, and often a yard in length. The numerous flowers are white, cream-colored or yellowish, with brown spots or lines. The tongue has crisped margins and is finely tapered. This is an extremely variable orchid which grows on trees usually. Var. *Fairfaxii*, Fitz. and F.v.M., has



white or yellow-brown flowers, few in number, and usually boldly marked; very fragrant. Abundant in the coastal districts. Flowers late in wintertime and the spring. Distribution: Queensland and N.S.W.

Rock Tongue Orchid

The Rock Tongue Orchid (*Dendrobium linguiforme*, Swz) often forms large mats on sandstone rocks, basalt rocks and trees. It favors sunny positions. The flowers are similar to those in *D. aemulum*, but usually more abundant. The leaves are flat and tongue-like. Flowers in the spring. Distribution: Queensland and N.S.W.



Cucumber Orchid

The Cucumber Orchid (*Dendrobium cucumerinum*, Macleay) is a remarkable plant with numerous rough, cucumber-like leaves. It grows on rocks and trees; but is rare. The fragrant flowers are creamy-white, streaked with red-brown. Flowers in summer and autumn. Distribution: Queensland and N.S.W

Streaked Rock Orchid



The Streaked Rock Orchid (*Dendrobium striolatum*, Reichb.) is a small, extensively creeping plant, restricted to cliff faces and rock surfaces. The short, smooth leaves are cylindrical and abundant. The flowers (one to three) are pale green or yellow, with red-brown lines (*striae*). The white tongue has crisped margins. This is the only *Dendrobium* which has reached Tasmania, where it is more robust, with, usually, larger flowers. Flowers in spring and early summertime. Distribution: N.S.W., Victoria and Tasmania.

Mottled Bulbophyllum

The Mottled Bulbophyllum (*B. bracteatum*, Bailey) is very like *B. exiguum*, but more robust and with "bulbs" like those of *B. Elisae*. The little flowers, reversed on an erect stem, are pale yellowish green, mottled with deep purplish-red blotches; the tongue is orange-colored. This is, apparently, the *Adelopetalum bracteatum* of Fitzgerald. Flowers in spring and early summertime. Distribution: Q'ld. and N.S.W. (Fig. A).

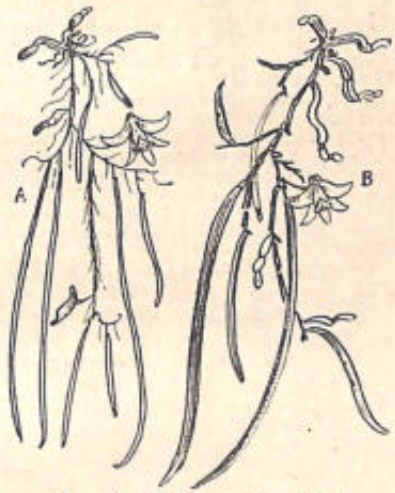


The Creeping Orchid

The Creeping Orchid (*Bulbophyllum exiguum*, F.v.M.) is also a diminutive form, often extensively creeping and forming compact patches on trees and rocks. The "bulbs" are more or less globe-shaped, with a single lance-shaped leaf. The fragrant flowers (one to three usually) are pale greenish-white, with yellow tongue. Blooming period very irregular. Distribution: Queensland and N.S.W. (Fig. B.)

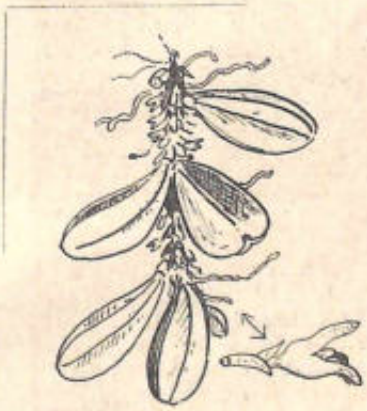
Wiry-stemmed Dendrobium

The Wiry-stemmed Dendrobium (*D. tenuissimum*, Rupp) is an extremely slender, pendulous plant with fine, wiry, shaggy, branching stems. The cylindrical leaves are short and thin. Flowers (one or two) small and of a yellow or greenish color, with brown lines. The tongue has rich mauve markings. Flowers in the spring. Distribution: Queensland and N.S.W. (Fig. A).



Slender Pencil Orchid

The Slender Pencil Orchid (*Dendrobium Mortii*, F.v.M.) is very similar to *D. Beckleri*, but much more slender; while the fragrant, pale-colored flowers are smaller and stouter. The tongue is pure white. Flowers late in summertime and in the autumn. Distribution: Queensland and N.S.W. (Fig. B.)



The Red-eye Orchid

The Red-eye Orchid (*Bulbophyllum aurantiacum*, F.v.M.) is a much larger plant than *B. Shepherdii*. The leaves are flat and very thick; flowers orange colored, with the margins of the tongue hairy. There is a variety in Queensland with slightly different leaves (var. *Wattsii*). Flowers in springtime and early summer. Distribution: Queensland and N.S.W.



Wheat-leaved Bulbophyllum

The wheat-leaved Bulbophyllum (*Bulbophyllum Shepherdii*, F.v.M.) is a small creeping plant which forms extensive mats on rocks, etc. The leaves are wheat-like, and the minute flowers whitish, with brick-red tongue. Var. *intermedia* (Fig. B) has shorter leaves. Flowers in springtime. Distribution: Queensland and N.S.W. (Fig. A.)



Large-flowered Bulbophyllum

This Bulbophyllum (*B. Weinthalii*, Rogers) is a new species (1933) found by F. A. Weinthal, in the Dorrigo District. It grows on the high branches of pines, and is a small, extensively creeping plant. It resembles *B. exiguum*, but the solitary flower is very much larger and more highly colored —pale greenish, with purplish blotches. Flowers in autumn. Distribution: N.S.W.



The Shield Orchid

The Shield Orchid (*Bulbophyllum minutissimum*, F.v.M.) is Australia's most diminutive species. The leaves are very minute, in the centre of a flat, shield-like "bulb," and the flowers are usually reddish-purple. The fruit is spindle-shaped. Flowers in springtime and frequently covers the faces of precipitous cliffs. Distribution: Queensland and N.S.W.

Woolly-lip Sarcochilus

An extremely rare orchid, the Woolly-lip Sarcochilus (*Sarcochilus eriochilus* Fitz) has small, white flowers; the mid-lobe of the tongue is like two inturned cups, which are very hairy inside. Flowering period is unknown. Distribution: N.S.W.



"Fairy Bells"

Its popular name fits this dainty orchid (*Sarcochilus Ceciliae*, F.v.M.), which has fragrant, pink, bell-shaped flowers, usually few. The tongue is densely hairy inside. The leaves are narrow and brown green in color. Found growing on trees and rocks and flowering in summertime and the autumn. Distribution: Queensland and N.S.W.

Tiny Sarcochilus

The Tiny Sarcochilus (*S. spathulatus*, Rogers) resembles *S. Hillii*, but the flowers are not unlike those of *S. parviflorus*. The side lobes of the tongue are large, erect and spathe-like. Flowers in the spring. Distribution: Queensland (Tambourine Mtn.) and N.S.W. (Barrington Tops).





Dark-tongued Bulbophyllum

The Dark-tongued Bulbophyllum (*B. Elisae*, F.v.M.) is a rather large form, with peculiar, rough-shaped "bulbs." The leaves are lance-shaped and solitary. The unique bell-like flowers, inverted and regularly spaced on an erect, drooping stem, are green, with the tongue deep prune-colored. Flowers in spring and early summertime. Distribution: Queensland and N.S.W.

The Raspy-root Orchid



"Yellow Spider" is another name for the Raspy-root Orchid (*Sarcochilus divitiflorus*, F.v.M.), which has very hard, coarse, dark green leaves, sometimes prominently fluted. It grows on trees and shrubs. The golden-green flowers are spider-like and often numerous; they are blotched with red-brown. The tongue is small and pure white. The flowers of this strange orchid wilt a day or two after opening. Flowering season: Spring. Distribution: Queensland and N.S.W.

The Ravine Orchid

The Ravine Orchid (*Sarcochilus FitzGeraldii*, F.v.M.) is named after R. D. FitzGerald, a famous orchidologist. Baron von Mueller once wrote of it as "the most beautiful orchid yet found in N.S.W." It grows, usually, on mossy rocks, etc., in deep ravines. The numerous white flowers are prettily marked with red blotches around an orange - colored tongue. Flowers in the spring. Distribution: Queensland and N.S.W.



The "Little Gem"

The "Little Gem" Sarcochilus (*S. Hillii*, F.v.M.) is like the "Fairy Bells" species, but much smaller. Its dainty, fragrant flowers are pink or white and widely expanding. The tongue is densely hairy inside, with prominent yellow glands. Flowers in spring and summertime. Distribution: Queensland and N.S.W.



The Snowy Sarcochilus



The Snowy Sarcochilus (*S. falcatus*, R. Br.) has sickle-shaped leaves and often is referred to as the "Orange-blossom Orchid." A very attractive species, inhabiting moist gullies, it is variable; sometimes the fragrant flowers are wholly cream-colored, but usually white with vari-colored markings, chiefly on the tongue. Var. *montanus* Bailey (*S. montanus* Fitz) has very short leaves, usually more prominently marked than in most forms. Flowers in springtime. Distribution: Queensland, N.S.W. and Victoria (E. Gippsland).

The Butterfly Orchid

Dainty and very fragrant is the Butterfly Orchid (*S. parviflorus*, Ldl.), which often has as many as 16 leaves, and flowers 7-8th inch across. The flowers are greenish-brown or pale yellowish-green; tongue large, with markings in various colors. Blooming in spring and summertime, it grows on trees (musk, hazel, etc.) in cool gullies. When removed from its habitat it soon dies. Distribution: Queensland, N.S.W., Victoria and Tasmania.





The Tangle Orchid

The Tangle Orchid (*Cleisostoma tridentatum*, Ldl.) is an air-plant, often forming tangled masses in the trees; sometimes it hangs by a single fibre. It loves moist conditions and is, therefore, found only near streams. The very small flowers are strongly fragrant and green or greenish, with deep red-brown markings. The tongue is large and trident-shaped—3-pronged. Flowers in the spring and summer months. Distribution: Queensland, N.S.W. and Victoria.

Golden Sarcochilus

The Golden Sarcochilus (*S. olivaceus*, Ldl.) has darker and broader leaves than those of *S. falcatus*, but its habit is similar. The pale olive or golden-green flowers are delightfully fragrant. Flowers in springtime. Distribution: Queensland and N.S.W. (Fig. A.)



The Waxy Sarcochilus

A very fine species, the Waxy Sarcochilus (*S. Hartmannii*, F.v.M.) is more robust than, though similar to, the Ravine Orchid, and the flowers are thicker and more waxy. Flowers white, with deep maroon or crimson spots; the tongue is like that in *S. Fitz-Geraldii*. Grows on trees or rocks, often in the most inaccessible places. Flowers in springtime. Distribution: Queensland and N.S.W. (Fig. B.)

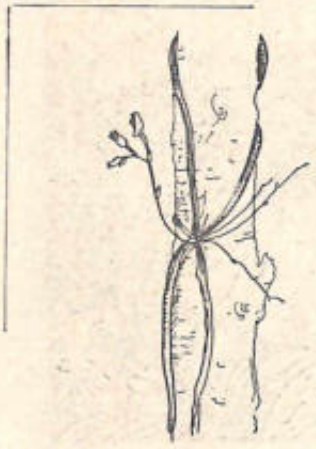
Beckler's Cleisostoma

This diminutive plant (*Cleisostoma Beckleri*, F.v.M.) usually grows on small twigs. The flowers are somewhat similar to those of the Tangle Orchid, and also are fragrant. Flowers in the spring. Distribution: N.S.W.



"Fairy's Slippers"

Very like a Sarcochilus in general appearance, "Fairy's Slippers" (*Ornithochilus Hillii*, Benth) is an orchid with numerous minute flowers, green, with darker spots. Flowers in springtime. Distribution: Queensland and N.S.W.



The Ribbon Orchid

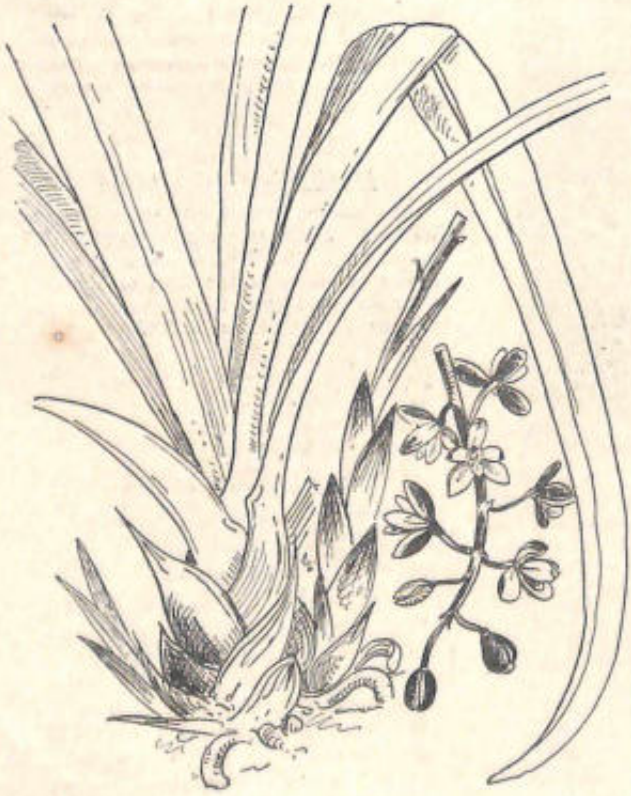
The Ribbon Orchid (*Taeniophyllum Muelleri*, Ldl.) is an insignificant, leafless epiphyte, with green, band-like roots, which serve the same purpose as leaves. Usually it has about 2-5 small flowers, which are brownish in color, the tongue is very narrow. Distribution: Queensland and N.S.W.

The Banana Orchid

A robust, short, bulbous - stemmed plant, the Banana Orchid (*Cymbidium canaliculatum*, R. Br.) has numerous grey-green and deeply channelled leaves. It bears numerous perfumed flowers, which vary in color from very pale green or yellow, with few markings, to almost purplish-black. The tongue is white and marked with purple or pink blotches. Often found in large clumps on trees. The fruit is edible. The blacks call this orchid "dampy ampy," and from bushmen it gets the name of "native arrowroot." Flowers in spring. Distribution: Queensland, N.S.W., Central Australia, Northern Australia and W.A.



The Northern Cymbidium



The Northern Cymbidium (*C. iridifolium*, Cunn.), is a very large species with long, iris-like leaves and golden-brown flowers, which are fragrant. It is better known under the name of *albuciflorum*. Flowers in the spring and early summertime. Distribution: Queensland and N.S.W.

The Painted Orchid

The Painted Orchid (*Geodorum pictum*, Ldl.) is a small plant, with a short, leafy stem, and rather broad leaves which are fluted above. It has numerous dingy-pink blooms. The tongue, bifid at the tip, is oval, with a sac-like base and dark veins. Flowering season: Spring. Distribution: N.S.W., Queensland, N. Aust., etc.

The "Snake Flower"

The "Snake Flower" (*Cymbidium suave*, R. Br.) is a plant of very slender habit, with narrow, grass-like leaves. The flowers closely resemble those of *C. iridifolium* in color and scent; also, occasionally, *suave* flowers are more brown than green, but usually of an old-gold shade. The sweet



fragrance is like that diffused by the well-known Chinese allspice (*Calycanthus praecox*). Flowers late in spring and in the summer months. Distribution: Queensland and N.S.W.



The "Swamp Lily"

One of the largest Terrestrial orchids in Australia, the "Swamp Lily" (*Phaius grandifolius*, Lour.) is easily cultivated and thrives best in loam, cow manure and leaf mould. It grows with "its feet in the water." The large leaves are prominently nerved and very ornamental. An evergreen plant, it has long, erect "clusters" of large flowers, which are chocolate-brown and speckled inside, white externally. The tongue is streaked with yellow and veined with crimson, etc. Flowers in winter and springtime. Distribution: Queensland and N.S.W., etc.



The "Scrub Lily"

The "Scrub Lily" (*Calanthe veratrifolia*, R. Br.) is sometimes called "Christmas Orchid" because it starts to flower just before the holiday season. The leaves are large and strongly ribbed, resembling closely those of a *Phaius*. The pure white flowers are numerous, on stout stems sometimes 4 feet in height. The tongue is prominently 3-lobed, the middle lobe being again divided. This orchid is very sensitive to the touch, the flowers turning blue-black very readily. Flowers in summer and autumn. Distribution: Queensland and N.S.W., etc.



Hyacinth Orchid

The Hyacinth Orchid (*Dipodium punctatum*, R. Br.) is a leafless plant, though often scaly at the base. It has an extensive system of thick, tuberous roots, and the numerous pink flowers are often spotted; sometimes brown, yellow or even white flowers are seen. The stem is usually dark brown, occasionally green. The roots are invaded by a minute fungus, and possibly are connected with those of gum trees by a fungus, in "a form of secondary parasitism." Flowering period: Summer to autumn (or even later, to June). Distribution: N. Aust., Queensland, Victoria, S.A. and Tasmania.

The Drooping Orchid

The Drooping Orchid (*Epipogum nutans*, Ldl.) is a strange, leafless plant, with a thick underground system and a scaly stem. The flowers are pale colored and fairly numerous, in a drooping or nodding position. The tongue is spotted. Flowers in the springtime. Distribution: Queensland and N.S.W.



Great Climbing Orchid



This species (*Galeola Ledgeriana*, F.v.M.) is a climbing, leafless epiphyte, which sometimes reaches a height of 45 feet. In New South Wales it occurs only in the north. It produces immense numbers of beautiful yellow flowers, with purple markings. Flowering season: Spring. Distribution: Queensland and N.S.W.

Climbing Orchid

Often 12 feet in height, the Climbing Orchid (*Galeola cassythoides*, Rchb.), which is sometimes abundant in at least a few of its habitats, climbs by means of sucker-like roots. It has dark, stout, vine-like stems which are leafless, and numerous brownish-yellow or yellow flowers. Grows on living trees as well as on old stumps, the roots often penetrating the bark for



moisture, or becoming deeply embedded in the decayed wood. Flowers in the springtime. Distribution: Queensland and N.S.W.

"Copper Beards"



The "Copper Beards" Orchid (*Calochilus cupreus*, Rogers) often is a robust plant, 2 feet in height. The leaf is fleshy and sometimes very short. Flowers rather small, often numerous, pale yellowish-green, with copper-shades, etc.; sometimes they are rufous tinted. The base of the tongue has metallic (blue) colored raised lines. Flowers in the spring and early summertime. Distribution: N.S.W., Victoria and South Australia.

"Red Beards"

The "Red Beards" Orchid (*Calochilus paludosus*, R. Br.) is a slender plant resembling *C. Robertsonii*, but has the tongue covered with very bristly reddish hairs, shorter towards the narrow base. The column wings have no glands. The first known specimens evidently were found in swampy places; but "Red Beards" occurs also in dry situations. Flowering season: Spring. Distribution: Queensland, N.S.W., Vic. and Tas.

The Potato Orchid



The Potato Orchid (*Gastrodia sesamoides*, R. Br.) is a leafless species with large tubers. In forest country, it grows to almost 3 feet in height. Its flowers and stem are brownish. The fore part of the flower is white, yellow inside. Flowers in spring and summertime. Distribution: Queensland, N.S.W., Vic., S.A., W.A., Tas. and New Zealand.



Tuberous Roots of Potato Orchid.

Rose-flowered Cheriostylis

This species (*Cheirostylis grandiflora*, Bl.) belongs to a small genus, and was first found in New Guinea. A saprophyte, with fleshy roots, it grows in decayed humus in dense forest country. It has about four small leaves. The large flowers are rose-colored, the tongue being white and fringed. Flowering season: Late autumn. Distribution: Queensland, N.S.W., etc.

Beardless Calochilus

The Beardless Calochilus (*C. imberbis*, Rogers) is a unique form, found near Rushworth (N.E. Vic.), also in the south (Ringwood and Gisborne). It is very similar in habit to other species, but the tongue is plain, like the other segments—green, with purplish veinings. The column wings have a purple gland inside. Flowers in the spring. Distribution: Victoria. (Fig. A).



Semi-bearded Calochilus

The Semi-bearded Calochilus (*C. Richae*, Nicholls) was discovered at Whroo (n.e. Vic.) in 1928. It is more red than green, and the tongue is very broad, with short purplish glands and a narrow tube-like tip. The column wings are small, and each has a large gland. Flowering season: Spring. Distribution: Victoria. (Fig. B.)

"Brown Beards"

This beautiful species (*Calochilus Robertsonii*, B'th) is a familiar wild flower with many nicknames, such as "Old Man," "Father Christmas," "Dad," etc. It usually is plentiful, even on dry hillslopes. The plant varies in height from 6 inches to 2 feet, and often has many flowers. The very hairy tongue varies in color from a deep purplish blue or brown to pale opalescent shades; sometimes greenish-white. The column has a prominent gland on each wing. Flowers in the spring and early summer. Distribution: Queensland, N.S.W., Vic., S.A., W.A., also Tas. & N. Zealand. (Fig. C.)

Peaked Beard Orchid

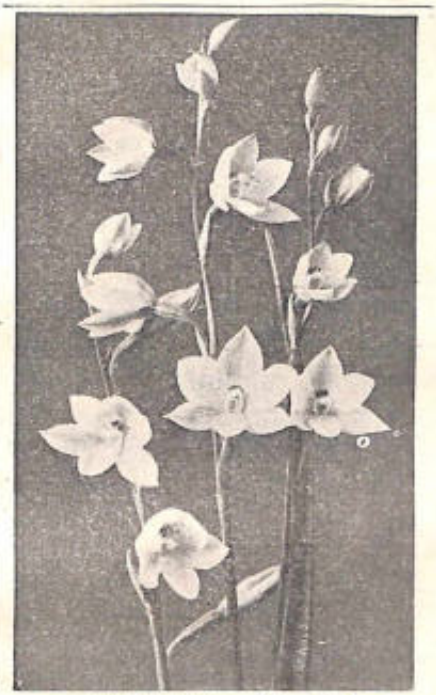
This rare orchid (*Calochilus campestris*, R. Br.) is similar to *C. paludosus*, but the hairy tongue has a smooth base, without any raised lines, as in *C. cupreus*. Each column wing has a gland inside. Flowers in springtime. Distribution (as reported): Queensland, N.S.W., Vic. and Tas.

Great Beard Orchid

The Great Beard Orchid (*Calochilus grandiflorus*, Rupp) is one of the finest species of the genus. It is a tall, slender plant with a very narrow leaf. The large flowers are usually yellowish-green, with crimson-purple and pale brown hairs on the tongue, the tip of which is long and strap-like. Flowers in late springtime. Distribution: Queensland and N.S.W. (see color plate).

Pale Calochilus

The Pale Calochilus (*C. saprophyticus*, Rogers) is known only from Cravensville, in the Tallangatta Valley (n.e. Vic.). It has a tuberous root system, like that in *Gastrodia*, and the stem is yellow. Flowers (3 to 10) rather large, pale saffron colored, with reddish and purplish markings. Flowers late in the spring. Distribution: Victoria.



Dotted Sun Orchid

The Dotted Sun Orchid (*Thelymitra ixioides*, Sw.) is a variable species, in habit, and many other particulars. Usually about 12 inches to 18 inches in height, it bears from two to 9 flowers, variable in size and color, blue, purple, lavender or whitish; upper part of flower usually dotted. The whole appearance is ixia-like. Flowers in the spring or early summertime. Distribution: All the States, also New Zealand.

Sky-blue Sun Orchid

The Sky-blue Sun Orchid (*Thelymitra azurea*, Rogers) is a slender species, sometimes 22 inches in height. It has from a few to 14 flowers of an intense *azure* blue color. The column is deeply-hued also, and very beautiful. The hair tufts are borne at the tips of unique-looking lobes. Though the column is somewhat like that in *Th. ixioides*, the plant is very distinct. Flowers in the spring. Distribution: S.A. and Vic. (Grampians) (See color plate).

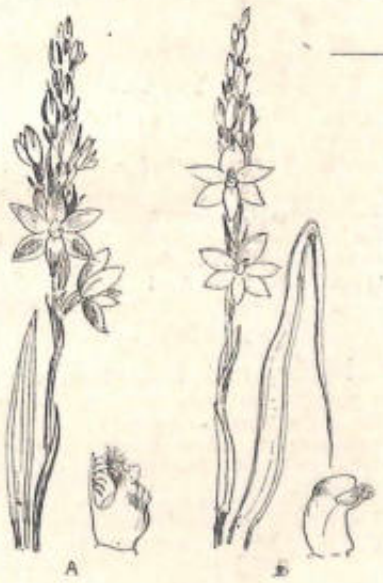
Salmon Sun Orchid

The Salmon Sun Orchid (*Thelymitra Macmillanii*, F.v.M.), by reason of its beautiful color, is a showy species. Usually there are one to six flowers, which are fragrant and vary in color from pale salmon-pink to deep rose pink, sometimes with yellowish shades on the margins. The large and prominent lobes are either dark red or yellow. Flowers in the springtime. Distribution: Vic. and S.A. (See color plate).

The Stout Sun Orchid

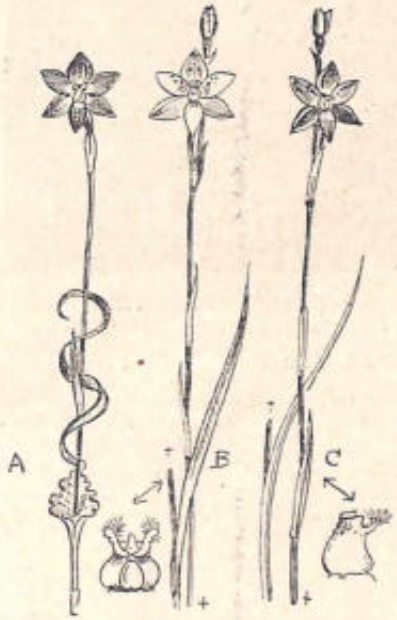


This Sun Orchid (*Thelymitra epipactoides*, F.v.M.) is a robust species with a large leaf and large stem-bracts, like those in *Th. grandiflora*. But the column is quite different, being very short, with an abrupt, jagged-looking middle lobe. Hair-tufts form a cross when seen from the front. The large and numerous flowers display many colors, often mixed as in shot-silk. Flowering season: Spring. Distribution: S.A. and Vic.



Spiral-leaf Sun Orchid

Found only in the Grampians area (near Pomonal and Ararat), this species (*Thelymitra D'Altonii*, Rogers) has a single violet-mauve flower and a spiral leaf. The side lobes of the column are fleshy and the anther is large. Flowers in the spring. Distribution: Vic. (Fig. A.)



Purple Sun Orchid

The Purple Sun Orchid (*Thelymitra Merranae*, Nicholls) is like *Th. ixioides*, but possesses a column with a large middle lobe. The flowers are small. (Fig. B.)

Short-hood Sun Orchid

This species (*Thelymitra truncata*, Rogers) is a slender plant about 12 inches in height, with two to six small, dark blue or pale mauve flowers, often with spotted upper segments The column has a short *truncate* cone between the tufted lobes. Flowers in the spring. Distribution: S.A. and Vic. (Fig. C.)

Blue Mountain Sun Orchid

The Blue Mountain Sun Orchid (*Thelymitra circumsepta*, Fitz) closely resembles *Th. ixioides*, but has an additional, often hairy, lobe in front of the stigma, which closes completely the entrance to the column by insects. The flowers are unspotted. Flowering season: Summer. Distribution: N.S.W. (Blue Mountains). (Fig. A.)

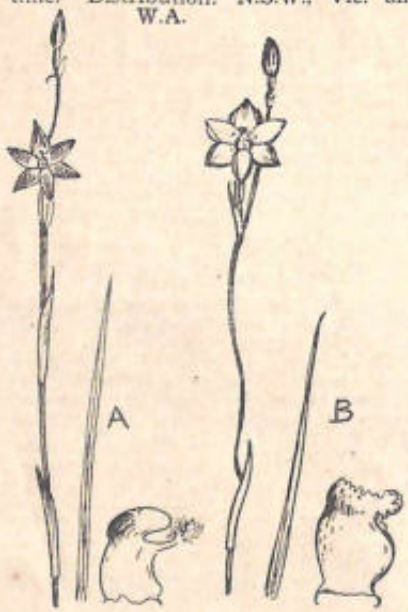
Pale Sun Orchid

The Pale Sun Orchid (*Thelymitra nuda*, R. Br.) has a naked mid-lobe which is narrower than in *Th. aristata*. The leaf is long and deeply channelled. Flowers, from a few to about 24, are pale blue and fairly large; the column is purplish-blue. Flowering season: Spring. Distribution: N.S.W., Vic. (Bannockburn) and Tas. (Fig. B.)



Tall Sun Orchid

This beautiful species (*Thelymitra media*, R. Br.) often is an exceedingly robust plant with a very leathery leaf and numerous large flowers, which vary in color from purple through blue to pure white. The very short column has a distinct, dark-colored collar-like band around the top. The column is almost quadrangular when viewed from the front. Flowers in springtime. Distribution: N.S.W., Vic. and W.A.



Star Sun Orchid

This very slender species (*Thelymitra Holmesii*, Nicholls) is known only from Gorae, near Portland. It has a narrow, deeply channelled, long leaf, and usually one to 3 small violet-blue flowers (rarely more). The column has a long, broad, deepiy cleft middle lobe and yellow hair tufts. Flowers in the spring and summertime. Distribution: Vic. (Fig. A.)

Mt. Lofty Sun Orchid

The Mount Lofty Sun Orchid (*Thelymitra urnalis*, Fitz.) grows to a height of about 12 inches. It has a long, narrow leaf and one or two very small, yellowish-brown flowers. The column is urn-shaped. Flowers in the spring. Distribution: South Australia. (Fig. B.)

Blotched Sun Orchid

The Blotched Sun Orchid (*Thelymitra fusco-lutea*, R. Br.) is a western form which has travelled eastwards to Victoria. It favors very poor soils and thrives on stony ground. The flowers, except in muggy weather, are rarely seen open. The large leaf is conspicuous and leathery, like those of some Australian species of *Dendrobium*. The flowers are *yellow*, with *brown* blotches. The column wings are fringed. Flowers in the spring and summertime. Distribution: Vic., S.A. and W.A. (Fig. A.)



Fringed Sun Orchid

The Fringed Sun Orchid (*Thelymitra luteo-ciliata*, Fitz) is a slender, almost wholly purplish-red plant, with pale pink flowers, which rarely open. The column has yellow hair tufts. Flowers in the spring. Distribution: Vic. and S.A. (Fig. B.)

Pink Sun Orchid

This species (*Thelymitra carnea*, R. Br.) is like *Thelymitra luteo-ciliata*, but its flowers are of a deeper flesh color and lack hair-tufts. The side lobes are thick and fleshy. Flowers in the spring and early summer months. Distribution: All the States except Q'land. and Nth. Aust.

Yellow-tufted Sun Orchid

Found only on the plains, the Yellow-tufted Sun Orchid (*Thelymitra chasmogama*, Rogers) is a slender plant with a very narrow leaf and, usually, two pink flowers of small size. The flowers resemble those of *Th. carnea*, but have yellow hair-tufts and a tube-like hood to the column. Flowers open freely. Flowers in the spring. Distribution: S.A.



Scented Sun Orchid

The Scented Sun Orchid (*Thelymitra aristata*, Ldl.) is not our only fragrant species, and "showy" or "sweet" are better names for it. The leaf is broad. The color of the flowers varies considerably, from blue, violet mauve and pink to very pale mauve. The mountain form is particularly fine, a robust plant with up to 35 large flowers—usually *aristata* has 3 to 9. The flowers have a large, dark-colored hood and brush-like hair-tufts. Flowering season: Spring and early summertime. Distribution: All the States except Queensland.



Slender Sun Orchid

The Slender Sun Orchid (*Thelymitra pauciflora*, R. Br.) is our most common species of Thelymitra. It grows to about 12 to 18 inches in height and has from one to nine rather small (often very small) pale blue, cream colored or whitish flowers, which rarely open. The middle lobe of the column is short. Flowers in the spring and early summertime. Distribution: All the States, also in New Zealand.

Veined Sun Orchid

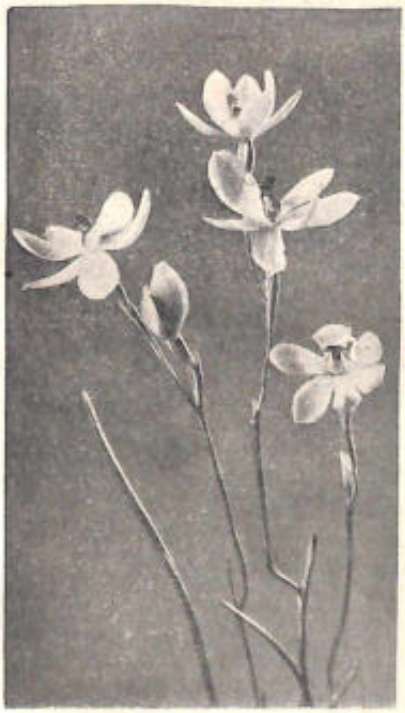
The Veined Sun Orchid (*Thelymitra venosa*, R. Br.) is chiefly an alpine species, which favors the morasses. It is variable in height (sometimes three feet); the leaf is narrow and thick, and the flowers (one to six) are pale blue, with prominent veins. The column has distinct appendages (or wings), somewhat spirally twisted. Flowers late in the spring and in summertime (the springtime in the Alps). Distribution: N.S.W., Vic., S.A., also Tas. and New Zealand. (See color plate).



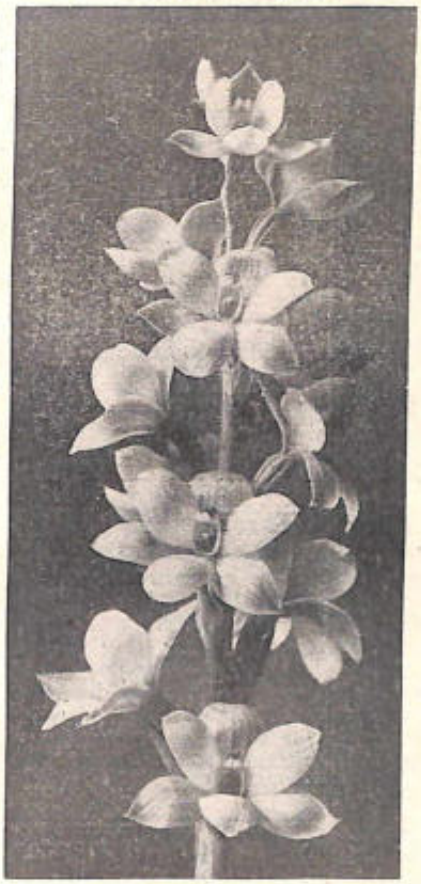
Column (enlarged) of Scented Sun Orchid

"Rabbit-ears"

A popular and very common species, "Rabbit-ears" (*Thelymitra antennifera*, Hk.f.) is seen at its best growing in sandy areas; though it does well on the ranges also. It has from one to three flowers of fair size; yellow inside and striped red-brown externally. They are fragrant in warm weather. The dark red "ears" are erect and prominent. Flowering season; Spring. Distribution: Vic., Tas., S.A. and W.A.



Great Sun Orchid



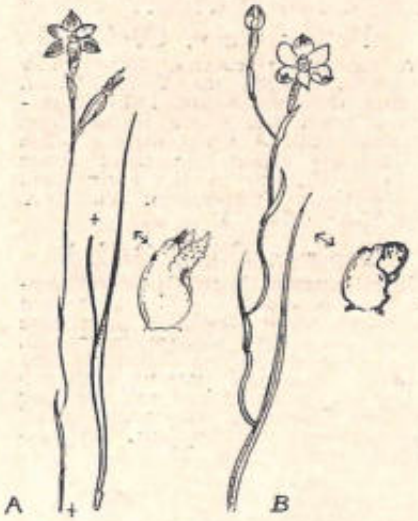
Our finest and most robust species, the Great Sun Orchid (*Thelymitra grandiflora*, Fitz.) in its typical form, has very numerous large flowers, either pale blue or deep purplish-blue. The column is exceedingly graceful. Small forms of this species, with deep blue flowers, sometimes are found, and one large-flowered form has a fine, very long, narrow-channelled leaf. Flowers in the spring and early summertime. Distribution: Vic. and S.A. (See color plate also).



Column (enlarged) of Great Sun Orchid

Tiny Sun Orchid

This Sun Orchid (*Thelymitra Elizabethae*, F.v.M.), though similar to *Thelymitra carnea*, is much more slender with smaller flowers which are either bright pink or cream-colored. Flowers in the spring. Distribution: N.S.W. and Vic. (Fig. A.)



Twisted Sun Orchid

The Twisted Sun Orchid (*Thelymitra flexuosa*, Endl.) has a slender zig-zag stem. It is a very small species, with small yellow flowers, which are fragrant. The column is very stout. Flowers in the spring and early summertime. Distribution: W.A., S.A., Vic. and Tas. (Fig. B.)

Combed-hood Sun Orchid



This fine species (*Thelymitra Murdochae*, Nicholls) has fairly numerous purplish-red flowers. The middle lobe of the column is deeply-cleft, and has fine-combed margins. The side lobes have but few crimson hairs at the apices; and the stigma is large and sac-like. Flowering period: Springtime. Distribution: Vic. (Wonthaggi).

Broad-tongued Onion Orchid

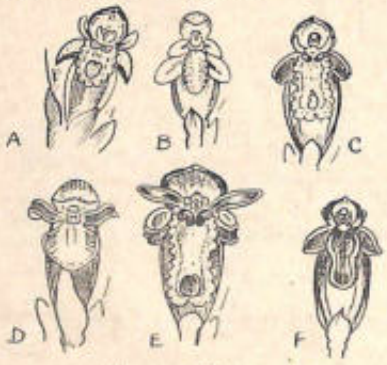
This Onion Orchid (*Microtis magnadenia*, Rogers) is a tall, slender species like *Microtis unifolia*, but the tongue is oblong, with crenulate margins, and has very large, much raised, glands on its surface. The green flowers are comparatively large. Flowers late in the springtime. Distribution: N.S.W. (Lake Wonboyn). (Fig. A.)

Yellow Onion Orchid

A diminutive species, but a few inches in height, the Yellow Onion Orchid (*Microtis atrata*, Ldl.) is yellowish-green, the whole of the plant turning blackish when dried. The flowers are minute, in short, dense spikes. Flowers in the spring and summertime. Distribution: Vic., S.A. and W.A. (Fig. B.)

Common Onion Orchid

The Common Onion Orchid (*Microtis unifolia*, Reichb. f., better known as *M. porrifolia*, Spgl.) is a variable plant, sometimes moderately robust, with numerous green flowers. The tongue has crisped margins, with two raised glands at the base and one near the tip. Flowering season: Spring and summertime. Distribution: Throughout Australia. (Fig. C.)



Flowers Enlarged.

Swamp Onion Orchid

This species (*Microtis orbicularis*, Rogers) was first discovered in South Australia; two years ago it was located at Wonthaggi, Victoria. Height varies from a few inches to about 12 inches. The flowers, sometimes numerous, are very small, green in color, and not crowded on the stem. Grows in moist places, often in the water, and usually is abundant. Flowering season: Spring. Distribution: S.A., Vic. and W.A. (Fig. D.)

Scented Onion Orchid

The Scented Onion Orchid (*Microtis oblonga*, Rogers) is a very slender plant with many green fragrant flowers in a loose spike. The hood is wide. Sometimes grows to a height of 2 feet or 3 feet. Blooms late in the spring and in summertime. Distribution: N.S.W., Vic. and S.A. (Fig. E.)

Small-tongue Onion Orchid

A slender or moderately stout plant, this species (*Microtis parviflora*, R. Br.) usually is about 10 to 15 inches in height, but in timbered country occasionally exceeds 3 feet. The very small flowers are green, sometimes fragrant, and often extremely numerous—even 100 or more. Flowers in spring and summertime. Distribution: Old., N.S.W., Vic., S.A., W.A., etc. (Fig. F.)

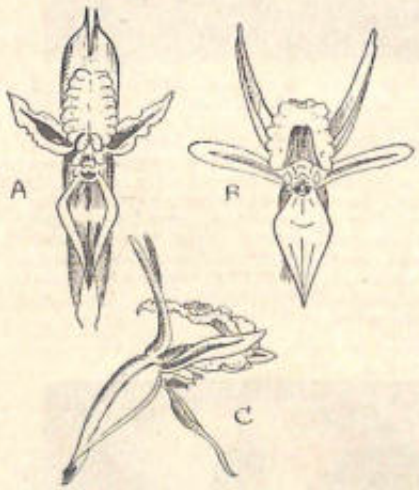
Austral Leek Orchid



The Austral Leek Orchid (*Prasophyllum australe*, R. Br.) often grows to a height of 3 feet. It has numerous green and white flowers, marked with brown; they are delicately fragrant. The upper segments are large and usually united. The tongue is large, white and much crisped, with a prominent elevated inner plate; the base much bulged. Flowers in the spring and early summertime. Distribution: All the States. (Flower, Fig. A.)

Broad-Lipped Leek Orchid

This Leek Orchid (*Prasophyllum patens*, R. Br.) is a slender or moderately robust plant, with fairly numerous yellowish-green flowers which have brown markings and are either crowded or in a loose spike. The tongue usually is white. Var. *pruinosum*, Rogers, has prune-colored flowers. Flowers in the spring and early summertime. Distribution: Q'land, N.S.W., Vic., S.A. and Tas. (Fig. B.)



Flowers Enlarged.

Sweet Leek Orchid

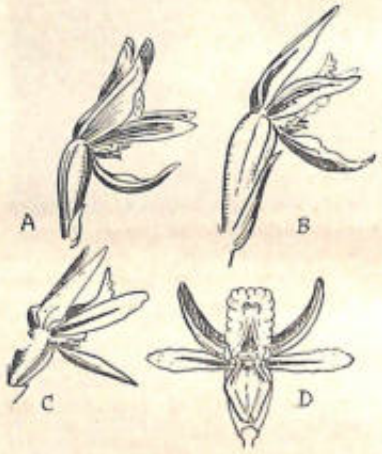
The Sweet Leek Orchid (*Prasophyllum odoratum*, Rogers), a very variable, often robust, plant, from 1 foot to 3 feet in height, bears numerous very fragrant flowers, green, or green with purple markings. The large white, much crisped tongue, is sharply bent near the middle. Var. *album*, Rogers, often is even more robust, with very stout flowers. Sometimes the tongue is pink, or even rose-pink. Flowering period: Spring and summertime. Distribution: N.S.W., Vic. and S.A. (Fig. C.)

Tall Leek Orchid

This tall, robust species (*Prasophyllum elatum*, R. Br.) has numerous flowers of fair size, in a dense spike, and varying in color from pale yellowish-green to purplish-black. The tongue is either greenish-white or pale pink, with the margins crisped. The upper sepals usually are united. In Western Australia this plant sometimes reaches 6 feet in height, the stem being one inch thick. In the other States the height of the plant varies from 18 inches to over 3 feet. Flowers in the spring and early summertime. Distribution: N.S.W., Vic., S.A. and Tas. (Fig. A.)

Yellow Leek Orchid

The Yellow Leek Orchid (*Prasophyllum flavum*, R. Br.) is somewhat similar to *P. elatum*, but the leaf is very short indeed. The flowers are either green, yellowish-green, or yellow, with brown markings. The tongue is white, with a small inner plate. The



Flowers Enlarged

roots are thick, fleshy and tuber-like, resembling those of *Gastrodia*. Flowering season: Spring and early summer months. Distribution: N.S.W., Vic. and Tas. (Fig. B.)

Lilac Leek Orchid

The Lilac Leek Orchid (*Prasophyllum Colemanae*, Rogers) resembles *P. patens*, but is larger, while the flowers have lavender or lilac tints. Flowers in early summertime. Distribution: Vic. (Bayswater only recorded locality). (Fig. C.)

Sutton's Leek Orchid

Sutton's Leek Orchid (*Prasophyllum Suttonii*, Rogers and Rees) is a rather sturdy alpine plant, about 12 inches in height. It has from 9 to 25 small greenish-white flowers, with dark-purple and mauve markings and tints. The flowers are broadly-fashioned and the tongue is white, with crenulate margins. The upper parts of the flower often are united. Flowering season: Summer to autumn. (The springtime at alpine stations.) Distribution: N.S.W., Vic. and Tas. (Fig. D.)

Sturdy Leek Orchid

The Sturdy Leek Orchid (*Prasophyllum validum*, Rogers) is a robust plant, like *P. elatum*, but with flowers closely resembling those of *P. constrictum*. The green flowers are comparatively large. The tongue is green with white margins. Flowering season: Spring. Distribution: S.A. (Melrose).

FitzGerald's Leek Orchid

This attractive species (*Prasophyllum FitzGeraldii*, Rogers and Maiden) has green and light prune-colored flowers, which are fragrant. It is fairly robust and about 9 inches to 15 inches in height. The light, prune-colored tongue is broadly triangular, with a downy surface. Flowers in the spring. Distribution: S. Aust. (Fig. A.).

French's Leek Orchid

One of the most graceful species in its more slender form, French's Leek Orchid (*Prasophyllum Frenchii*, F.v.M.) sometimes is robust, with very numerous flowers which are green, yellowish-green, or yellow, with pink, red, or purplish-red markings. The tongue very often is much constricted towards the tip. Flowers late in spring and in summertime. Distribution: N.S.W., Vic. and Tas. (Fig. B.)

Prasophyllum Flowers



(Enlarged.)

Striated Leek Orchid

The Striated Leek Orchid (*Prasophyllum striatum*, R. Br.) is an attractive little species, which grows to a height of 12 inches. The flowers are white or pink and very strongly lined (*striated*). The individual flowers resemble somewhat those of *P. australe*. Flowers in the autumn. Distribution: N.S.W. (Fig. C.)

Short-lipped Leek Orchid

The Short-lipped Leek Orchid (*Prasophyllum brevilabre*, Hk. f.) is either quite small and slender or fairly robust and from nine inches to 18 inches in height. Flowers, usually green, but sometimes almost wholly deep purplish-black, with a pure white or pinkish tongue which is very sharply bent back upon itself. The upper segments often are joined together. The leaf is short. Flowers in spring and early summertime. Distribution: Queensland, N.S.W., Vic. and Tas. (Fig. D.)

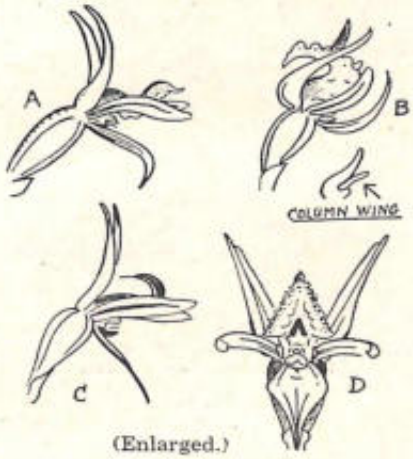
Green Leek Orchid

This Prasophyllum (*P. Brainei*, Rogers) is a slender green plant, with greenish-white flowers, sweetly scented. The tongue is S-shaped (sigmoid). Flowering season: Spring. Distribution: Vic. and Tas. (Fig. A.)

Round-flowered Leek Orchid

The Round-flowered Leek Orchid (*Prasophyllum rotundiflorum*, Rogers) is a slender plant about nine inches in height. The few, yellowish-white flowers have a globular appearance owing to the position of the sepals, etc. The column wings are three-lobed. A very rare species. Flowers in the spring. Distribution: S.A. (Cherry Gardens). (Fig. B.)

Prasophyllum Flowers



(Enlarged.)

Dusky Leek Orchid

The Dusky Leek Orchid (*Prasophyllum fuscum*, R. Br.) is a slender or moderately robust plant, from five inches to 12 inches in height. The flowers are green and brown, or wholly pale green, in a moderately loose spike. The tongue is oblong-wedge-shaped, with a raised inner plate. This is a very fragrant species. Flowers in the spring. Distribution: N.S.W., Vic. and Tas. (Fig. C.)

Pale Leek Orchid

Though the Pale Leek Orchid (*Prasophyllum pallidum*, Nicholls) is very like robust plants of *P. Brainei*, its pale flowers have a differently shaped tongue, which is white and minutely hairy on the margin. Flowers are fragrant in warm weather. Distribution: S.A. and Vic. (Pomonal). (Fig. D.)

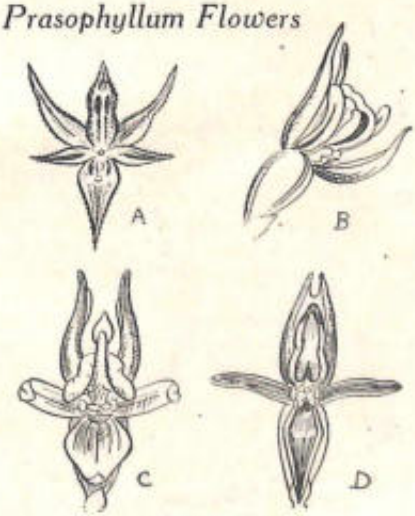
Nubling's Leek Orchid

Nubling's Leek Orchid (*Prasophyllum Nublingii*, Rogers), a slender or moderately robust little species, varies from a few inches to a foot in height. Its flowers somewhat resemble those in *P. despectans*, but the tongue is quite different, being much broader towards the tip, with the margins hairy. Flowers in the autumn. Distribution: N.S.W. (Fig. A.)

Western Leek Orchid

The rare Western Leek Orchid (*Prasophyllum occidentale*, Rogers), a plant about five inches to eight inches in height, bears 10 to 16 small green flowers, the upper segments (lateral sepals) of which are often joined for about two-thirds of their length. The tongue is oval-wedge-shaped, with crisped margins. Flowers in early springtime. Distribution: S.A. (Streaky Bay only known locality). (Fig. B.)

Prasophyllum Flowers



(Enlarged.)

Constricted Leek Orchid

The Constricted Leek Orchid (*Prasophyllum constrictum*, Rogers), a slender plant about 12 inches in height, has a crowded spike of prune-colored flowers. The tongue has smooth margins, with a marked constriction at the bend. A rare species. Flowers in springtime. Distribution: S.A. (Tailem Bend only recorded locality). (Fig. C.)

Alpine Leek Orchid

This robust, dwarf species (*Prasophyllum alpinum*, R. Br.) bears comparatively few flowers, which are pale yellowish-green, sometimes almost colorless, or green, with brown, bold chocolate-brown or purplish-red markings. The upper sepals are joined together to about the middle. Flowers are fragrant. Flowering period: Summer to autumn. Distribution: N.S.W., Vic. and Tas. (found only at high altitudes). (Fig. D.)

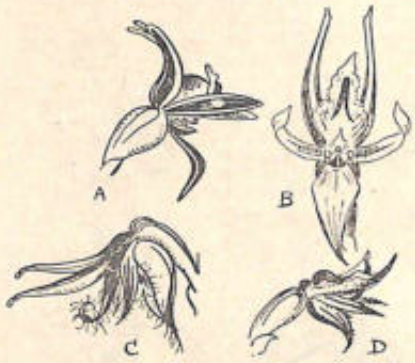
Maroon Leek Orchid

The Maroon Leek Orchid (*Prasophyllum Hartii*, Rogers), a robust species, sometimes two feet in height, has numerous green and brown, purplish-red, or prune-colored flowers. The extremely wide tongue has a raised inner plate. Var. *parviflorium*, Rogers, is a very slender form. Flowers in springtime. Distribution: Vic. (Fig. A.)

Elegant Leek Orchid

The Elegant Leek Orchid (*Prasophyllum gracile*, Rogers) is a slender, almost wholly pale green plant with, as a rule, numerous flowers, green, with brown, pink or purplish markings. Usually the whitish tongue has a marked constriction beyond the bend. Flowering period: Spring to early summertime. Distribution: N.S.W., Vic., S.A. and Tas. (Fig. B.)

Prasophyllum Flowers



(Enlarged)

Long-pointed Leek Orchid

This orchid (*Prasophyllum acuminatum*, Rogers) often is abundant in parts of New South Wales (Bullahdelah and Paterson). It is a dark prune-colored plant, six inches to 12 inches in height, with small, very pointed, hairy bordered flowers. The tongue is oval, with dark red, rather short, hairs. Flowering season: Summer to early autumn. (Fig. C.)

Bristly Leek Orchid

The Bristly Leek Orchid (*Prasophyllum Ruppii*, Rogers) is a smaller plant than *P. acuminatum*, and has green drooping flowers, with brown or deep-purplish markings. The oblong tongue has an acute point and the surface is covered by fine, gland-tipped hairs. Flowers in summer and autumn. Distribution: N.S.W. (Fig. D.)

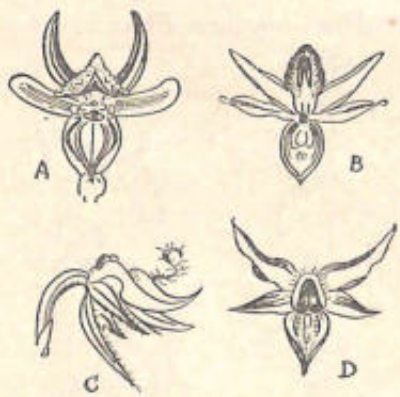
Dense Leek Orchid

The Dense Leek Orchid (*Prasophyllum Morganii*, Nicholls) often is a robust, many-flowered species. The flowers, green with purplish markings, are very small and fragrant. The tongue is short and broad. A sturdy specimen in bloom bears a close resemblance to a spike of the fragrant mignonette. Flowers in spring and early summertime. Distribution: Vic. (Cobungra). (Fig. A.)

Dusky Green Leek Orchid

A diminutive plant, the Dusky Green Leek Orchid (*Prasophyllum fusco-viride*, Reader) bears very small, green or yellowish-green flowers, with a contrasting dark purple or red-brown oblong tongue. Flowering season: Autumn. Distribution: Vic. and S.A. (Fig. B.)

Prasophyllum Flowers



(Enlarged.)

Fringed Leek Orchid

The Fringed Leek Orchid (*Prasophyllum fimbriatum*, R. Br.) is a slender, pale-colored plant, with fairly numerous, hairy-fringed flowers in a long spike; they are pale green, with bright red markings. The tongue is long and narrow and fringed with hairs; the petals and dorsal sepal also are fringed, and the column wings are hairy. Flowers in the autumn and winter months. Distribution: N.S.W. and Vic. (Fig. C.).

Archer's Leek Orchid

This species (*Prasophyllum Archeri*, Hk.f.) is similar to *P. Morrisii*, but not so hairy. It has two to 14 flowers in a squat spike. They are either pale yellow or green, with brown, red or purplish markings, sometimes wholly deep purplish. The tongue is oblong or oval in shape, and the margins have short hairs. The column wings have pink hairs on the margins. Flowers in summer and wintertime. Distribution: Queensland, N.S.W., Vic. and S.A. (Fig. D.)

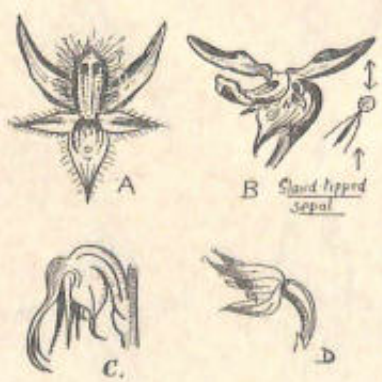
Hairy Leek Orchid

The Hairy Leek Orchid (*Prasophyllum Morrisii* Nicholls) is a small, slender species, about three inches to 15 inches in height, with from three to 24 almost wholly dark prune-colored or purplish flowers. Sometimes the flowers are green, with purple, or even light brown markings. The tongue is very hairy; the dorsal sepal and petals also have a fringe of hairs. Flowering season: Summertime to late autumn. Distribution: N.S.W. and Vic. (Fig. A.)

Dark Leek Orchid

The Dark Leek Orchid (*Prasophyllum nigricans*, R. Br.) grows to about six inches in height. The flowers are very small, dark prune-colored, or green with dark purple, pale brown or red markings. Sometimes the twin sepals are tipped with yellow glands. The tongue is oblong and wider towards the tip; margins usually are entire. Flowers in the autumn. Distribution: N.S.W., Vic., S.A. and Tas. (Fig. B.)

Prasophyllum Flowers



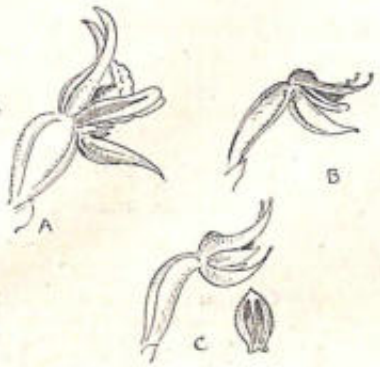
(Enlarged)

Golden Leek Orchid

This extremely rare species (*Prasophyllum Dixonii*, F.v.M.) is a very small plant, somewhat like *P. Archeri*, but the flowers are smaller and wholly yellowish-green in color. The tongue is oval and finely denticulate near the tip. Flowering season: Autumn. Distribution: Vic. (Oakleigh).

Tiny Leek Orchid

The Tiny Leek Orchid (*Prasophyllum despectans*, Hk.f.) is a very abundant species in many Victorian and Tasmanian districts. It rarely grows to more than seven inches in height. The fragrant flowers are diminutive and sometimes numerous; color greenish, with brown, purplish or red markings. The tongue is long and very narrow. Flowers in the autumn. Distribution: Vic. and Tas. (Fig. C.)



Flowers Enlarged

Marsh Leek Orchid

The Marsh Leek Orchid (*Prasophyllum Rogersii*, Rupp) is a slender plant, from 12 inches to 18 inches in height. The fragrant green flowers (12-20) are in a loose spike; the tongue is almost ovate, with smooth margins. Flowers in summertime. Distribution: N.S.W. (Barrington Tops, 5000 feet). (Fig. A).

Hopson's Leek Orchid

Hopson's Leek Orchid (*Prasophyllum Hopsonii*, Rupp), a slender plant, bears four to 12 minute flowers. The tongue is oval, with depressed margins having short hairs; very darkly colored. Flowers in summertime. Distribution: N.S.W. (Barrington Tops) (Fig. B).

Red Leek Orchid

The Red Leek Orchid (*Prasophyllum rufum*, R. Br.) is a diminutive species, four inches to eight inches in height, with small, reddish flowers. The tongue is oblong-oval, narrowing towards the tip; margins fringed with very short hairs. Flowers in the autumn and wintertime. Distribution: Queensland, N.S.W., Vic. (?) Tas., also New Zealand. (Fig. C).

Minute Leek Orchids

The following tiny species of *Prasophyllums* are all illustrated in color in FitzGerald's Australian Orchids.

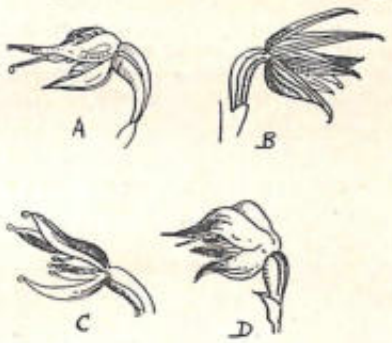
P. ansatum, Fitz. Flowers green with red markings; tips of the sepals and petals gland-tipped. The tongue has a peculiar formation on each side. Flowers in summertime. Distribution: N.S.W. (Mt. Wilson). (Flower: See Fig. D., bottom of Col. 2, Page 18).

P. transversum, Fitz. Flowers green and red; upper sepals are tipped with glands and cross each other. The tongue is very small. Flowers in summertime. Distribution: N.S.W. (Mt. Wilson). (Fig. A).

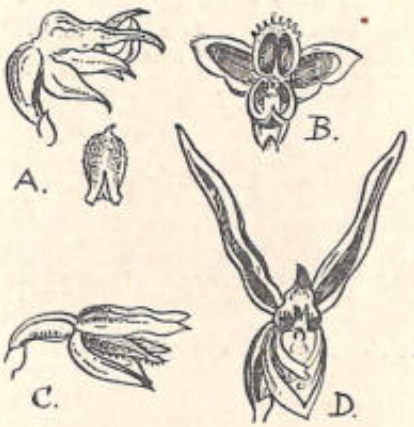
P. laminatum, Fitz. An attractively colored species; flowers are yellow with red stripes. The yellow tongue has a red central plate. Flowers in the autumn. Distribution: N.S.W. (Fig. B).

P. densum, Fitz. Flowers yellow and green; small, numerous and closely packed together. The sepals are gland-tipped; tongue narrow. The only tiny form with a distinct leaf. Flowers in summertime and autumn. Distribution: N.S.W..

P. eriochilum, Fitz. Has a loose spike of small, green, purple-tipped flowers. A hairy species; the tongue also thickly covered with hairs. Flowers late in springtime. Distribution: N.S.W. (Mt. Wilson). (Fig. D).



Flowers Enlarged



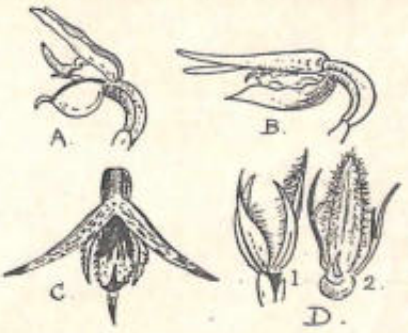
Flowers Enlarged

P. viride, Fitz. A pale, yellowish-green form, with a loose spike of minute flowers. The tongue is yellow and oval in shape. Flowers in the autumn. Distribution: N.S.W. (Blue Mountains, etc.). (Fig. A).

P. Woollsii, F.v.M. Flowers purplish, with stout sepals, etc.; margins of the petals hairy. Tongue is hairy towards the tip. Flowers in summertime. Distribution: N.S.W. (Blue Mountains, etc.). (Fig. B).

P. reflexum, Fitz. Flowers reddish-brown. The tongue has coarse hairs towards the tip; petals and column wings also hairy. Flowering season: Autumn. Distribution: N.S.W. (Fig. C).

P. Bauerii, Poir. A rare dwarf species, with few flowers; red tongue and notched petals. Flowering season: Autumn. Distribution: N.S.W. (Fig. D).



Flowers Enlarged

P. Deaneanum, Fitz. Fairly robust, with a reddish stem. Has from three to eight small flowers, with short petals. Flowering season: Autumn. Distribution: N.S.W. (Fig. A).

P. longisepalum, Fitz. Has few flowers in a crowded spike; color greenish-yellow, with red-brown, blunt tongue. Sepals are very long. Flowering season: Autumn. Distribution: N.S.W. (Fig. B).

P. filiforme, Fitz. A very slender plant, with greenish flowers, much mottled with red; petals hairy on the margins. Tongue lance-shaped, with tooth-like margins. The column has a remarkably long anther. Flowers in summertime and autumn. Distribution N.S.W (Fig. C).

Anticheirostylis apostasioides, Fitz. A small and very slender plant, which may be only a teratological form of a *Prasophyllum* species. Distribution: N S.W. (Berrima). (Fig. D).

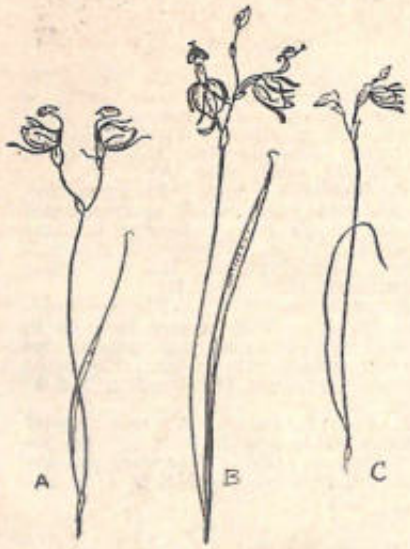


The Hammer Orchid

The Hammer Orchid (*Spiculaea irritabilis*, Ldl.) is a very slender plant, from six inches to 12 inches in height. It is usually leafless when in flower, or has a lateral growth of one or two small leaves, which are a few inches in length and lance-shaped. Flowers small, up to 20, on erect stems; color yellowish-green or green, with red or purplish markings. The tongue is hammer-shaped, with a tuft of hairs above (articulate, not irritable). Flowers in summer and the autumn. Distribution: Queensland and N.S.W. (doubtfully existing in Victoria).

The Elbow Orchid

The Elbow Orchid (*Spiculaea Huntiana*, F.v.M.) is a small, entirely leafless, plant (except for a few small stem bracts), rarely exceeding seven inches in height. Flowers (up to 10) are of insect-form and slightly larger than those of *S. irritabilis*; color usually yellowish-green, with reddish markings. The tongue is hairy, and of peculiar formation, articulated by a movable joint, as in the preceding species. Flowering season: Summer. Distribution: N.S.W. (Blue Mountains, etc.), Vic. (Cravensville, Harrietville, also Pyrete Rge., near Gisborne). (See color plate).



Blue Mountain Duck Orchid

This rare species (*Caleana Nublingii*, Nicholls) has been found, so far, only at Bell, in the Blue Mountains, New South Wales. The plant is about four inches in height; the flowers (one to two) are green with red and purple markings. The tongue is highly sensitive, somewhat pear-shaped, and covered with irregular glands. Flowering season: Summer. Distribution: N.S.W. (Fig. A).

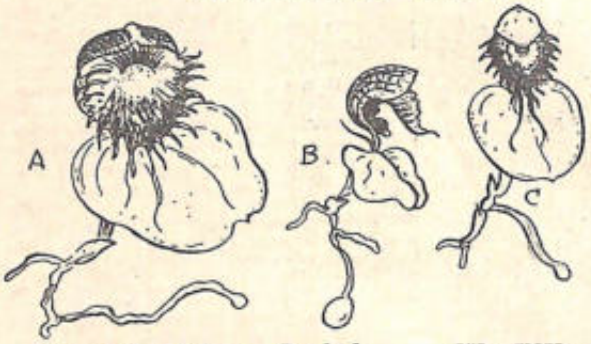
Small Duck Orchid

The Small Duck Orchid (*Caleana minor*, R. Br.) is a much more slender and smaller plant than *Caleana major*. The flowers (one to four usually) are green, with red-brown markings. The irritable tongue is very rough (glandular). Flowering season: Summer. Distribution: Queensland, N.S.W., Vic., S.A. and Tas.; also New Zealand. (Fig. B).

Spectral Duck Orchid

The Spectral Duck Orchid (*Caleana Sullivanii*, F.v.M.) is an extremely small and rare species, known only from the Grampians, Vic. It has one or two yellowish-green flowers, with red markings. The oval tongue has a short, narrow tip, and a few small glands on the lower surface. Flowering season: Summer. Distribution: Vic. (Fig. C).

THE HELMET ORCHIDS



Fringed Helmet Orchid

This species (*Corysanthes fimbriata*, R. Br.) is our largest Helmet Orchid. The flower often is very large and usually beautifully fringed, veined and marked. The ear-like openings at the base of the stout, short tube are conspicuous. Flowering season: Autumn and winter. Distribution: N.S.W., Vic. and Tas. (Fig. A).



Large Duck Orchid

The Large Duck Orchid (*Caleana major*, R. Br.) is the larger of the eastern species and a very curious plant, growing in densely vegetated country. The flower, when the tongue is extended, looks much like a flying duck in miniature. The tongue is highly sensitive, and an insect alighting upon the head of the "duck", is carried into the body—thus fertilisation is effected. Height up to 12 inches; leaf lance-shaped and usually red-brown. Flowers (one to three usually, though even six or eight are occasionally found) are dark cherry-red or yellow, with red and green markings. The column is the largest part of the flower and represents the body of the duck. Flowers in spring and summertime. Distribution: Queensland, N.S.W., Vic., S.A. and Tas.

Spurred Helmet Orchid

The Spurred Helmet Orchid (*Corysanthes aconitiflorus*, Salisb.) is named after another genus of plants, called *Aconite*. The flowers and the leaf of this species usually are dark-colored, the prevailing tint being purple. Sometimes it is rufous - colored, and rare white specimens have been found in New South Wales. The spurs of *aconitiflorus* are more conspicuous than they are in the majority of other species of Helmet Orchids. If the large, cradle-shaped hood is dissected off, the remaining portion of the flower presents an appearance which suggested the nick-name "Weary Willie" for this little plant. Flowers in the wintertime. Distribution: Queensland, N.S.W., Vic. and Tas., also New Zealand. (See color plate).

Tailed Helmet Orchid

The Tailed Helmet Orchid (*Corysanthes undulata*, Cunn) is the smallest member of the genus in Australia. After its discovery in New South Wales it was lost to science for nearly a century, when it was again found, at Bullahdelah. The flower is very small, prominently reticulate-veined and marked with purple-red or red. The wide-open tongue has a pronounced tail at its lowest extremity. The margins are crisped-undulate. On the tube-like part of the tongue, just below the lamina (or leaf of the tongue) there is a peculiar swelling; below this two small spurs are seen. Flowering season: Winter. Distribution: N.S.W. and Queensland (recently found at Moreton Bay). (Fig. B).

Small Fringed Helmet Orchid

The Small Fringed Helmet Orchid (*Corysanthes pruinosa*, Cunn) has pale grey-green flowers, with a pale paddle-shaped hood. The tongue is imperfectly veined and the small central boss dark-colored. The fringe is conspicuous. Flowers late in winter and in the springtime. Distribution: N.S.W. (Fig. C).



Purple Helmet Orchid

The Purple Helmet Orchid (*Corysanthes diemenica*, Ldl.) is smaller than the fringed species, and the flowers usually are more darkly-colored, with a pure white or cream central boss, which is indented in the centre. The tongue has the margins faintly serrated, not fringed. Flowers late in winter and in the spring. Distribution: N.S.W., Vic., S.A. and Tas.

The Small Helmet Orchid



The ovate leaf of the Small Helmet Orchid (*Corysanthes unguiculata*, R. Br.) is strongly ribbed, and of a purplish hue beneath. The flower is cherry-colored; the tongue tube-shaped, with a beautiful spray of glands inside. The petals and sepals are very small. Unguiculata means clawed—in reference to the base of the hood. Flowers in the winter and early part of spring. Distribution: N.S.W., Vic., S.A. and Tas.

The Stately Helmet Orchid



A familiar little object in some of the ranges, the Stately Helmet Orchid (*Corysanthes dilatata*, Rupp & Nicholls) grows, often abundantly, on sheltered mossy slopes; and also is found on tree-fern trunks in the gullies. The flower often is large. The red-veined, widely-expanded tongue is very conspicuous; it has coarse-toothed margins and a large whitish boss which possesses two ear-like developments. There are also two large openings at the base of the tube (which is the lower portion of the tongue); this encloses the small column, an essential part of the flower. Flowers from late wintertime to early part of spring. Distribution: Vic., S.A., W.A. and Tas.

The Ant Orchid

The Ant Orchid (*Chiloglottis formicifera*, Fitz.) is very similar to *C. reflexa*, but the large glands on the tongue are more ant-like. Flowering season: Spring. Distribution: N.S.W. (Fig. A).

Alpine Bird Orchid

The Alpine Bird Orchid (*Chiloglottis Pescottiana*, Rogers) is an extremely rare plant, found only at Cravensville, in north-eastern Victoria. Plant usually five inches to seven inches in height, with a solitary greenish-bronze or purplish-black flower. The tongue is oblong and canoe-shaped, with a few dark glands. Flowering season extends from spring to early summertime. Distribution: Vic. (Fig. B).



Three-tongued Chiloglottis

Though similar to *C. reflexa* in general appearance, this species (*Chiloglottis trilabra*, Fitz.) has three tongues, the additional ones taking the place of petals. Flowering season: Autumn. Distribution: N.S.W. (Blue Mountains). (Fig. C).

Large Bird Orchid

This Bird Orchid (*Chiloglottis Gunnii*, Ldl.) is a robust, large-flowered species. The flowers are dark-purplish or wholly green. The tongue is broadly oval in shape, with a large, stalked gland towards the base and a large, stout one in the centre. Usually grows in colonies, in sheltered places. Flowers in spring and early summer months. Distribution: New South Wales, Victoria and Tasmania.





Broad-lipped Bird Orchid

A very slender plant, this species (*Chiloglottis trapeziformis*, Fitz.) is green and purplish, with a solitary small flower. The tongue is wedge-shaped, and has a group of short glands towards the base. Flowering season: Spring and early summertime. Distribution: N.S.W. and Vic.



Autumn Bird Orchid

The Autumn Bird Orchid (*Chiloglottis reflexa*, Druce) is a slender plant, often growing in extensive colonies. The small flower is greenish, with purplish-red or pinkish markings. The small petals are reflexed and the tongue is very narrow, with a broad tip and large central glands. Flowers in autumn and spring. Distribution: Queensland, N.S.W., Vic. and Tas.

The Green Bird Orchid

This species (*Chiloglottis Muelleri*, Fitz.) was named in honor of Baron von Mueller. The plant, which sometimes grows on tree - fern trunks, is wholly light green, with narrow lance-shaped leaves. The solitary flower is green, with purplish - brown markings only on the tongue, which is rather narrow, with very short glands. Flowering season: Spring and early summertime. Distribution: Vic. and Tas.



"Pixie Caps"

The orchid known as "Pixie Caps" (*Acianthus fornicatus*, R. Br.) is a fairly robust plant, growing up to 12 inches in height. It occurs in almost any class of country, but is at its best under shrubs. The leaf is purplish on the lower surface. The flowers (two to 14) are green, with red or purplish-brown markings. The hood (dorsal sepal) is very conspicuous. The tongue is somewhat oblong, with two glands at the base and minute ones near the tip. Flowering season: Winter. Distribution: N.S.W. (Fig. A).



Creeping Beech Orchid

A small, slender, dainty plant, this Creeping Orchid (*Townsonia viridis*, Hk.) is almost wholly greenish colored and has a creeping root and small tubers. The small flowers are green, with red markings. The leaf is small and fairly thick about the middle of the stem. Radical leaf on a slender stalk arising from the root. Flowers late in the springtime and in the summer months. Distribution: Tas and N.Z. (Fig. B).

Mosquito Orchid

The Mosquito Orchid (*Acianthus exsertus*, R. Br.) is a more slender plant than *A. fornicatus*. Its very small insect-like flowers are reddish



or verdant green, occasionally deep purplish-green. The specific name refers to the exserted column. Flowers in the autumn and wintertime. Distribution: All the States.

Mayfly Orchid

The Mayfly Orchid (*Acianthus caudatus*, R. Br.) is a slender plant, almost wholly dark-crimson in color. It grows in shady spots, beneath forest trees, etc. The leaf is heart shaped, green above and de - purplish beneath. Plant rarely above seven inches in height, with one to five flowers usually. The sepals are extended into long tail-like filaments



The plant has an offensive smell, and sometimes is referred to as "dead horse" or "doggy." Flowers in the spring. Distribution: N.S.W., Vic., S.A. and Tas.



Gnat Orchid

The Gnat Orchid (*Acianthus reniformis*, Schltr.) is a slender species, with a kidney-shaped, wholly pale green leaf, and from one to eight flowers, which are pale red-brown or wholly green. Tongue large and rather flat, with two conspicuous raised lines. Usually grows in large masses. Flowers in the winter and early springtime. Distribution: All the States except Western Australia



"Brown Beaks"

This orchid (*Lyperanthus suaveolens*, R. Br.) is fragrant in "muggy" weather. A very slender plant, often over 12 inches in height, it has a long and narrow leaf with curled margins. The slender flowers (two to eight) are either pale yellow, with red-brown or dull brown markings, or wholly green. The tongue is small and blunt. Flowering season: Spring. Distribution: N.S.W., Vic. and Tas.

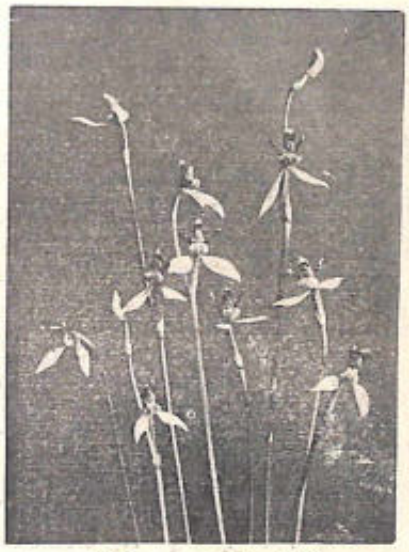


"Red Beaks"

The "Red Beaks" Orchid (*Lyperanthus nigricans*, R. Br.) is a stout, usually dwarf species, about four inches to eight inches in height, occasionally reaching 12 inches. Leaf large, dark green, often mottled, usually oblong or oval in shape, sometimes attaining a length of six inches. The flowers (two to nine) are fairly large and dark purplish red, with pronounced veins. Tongue white, with the margins fringed and side lobes red-veined. The leaves are seen more often than the flowers, for this species flowers abundantly only after a fire has passed over the ground where it grows. Often referred to as "flowers of sadness," "undertaker," etc., as the whole of the plant turns ebony-black when dried. Flowering season: Spring. Distribution: N.S.W., Vic., S.A., W.A. and Tas.

The Lizard Orchid

Sometimes called "Bog Orchid," this species (*Burnettia cuneata*, Ldl.) is a dwarf plant, leafless except for a wedge-shaped leaf on the stem. Plant almost wholly purplish - brown; flowers (one to four) of thick texture, and darkly colored outside and marked with veins, white inside or diffused on the margins with purple. The tongue has very small glands. Grows singly or in small colonies. Flowers are rarely seen open. Flowering season: Spring to early summertime. Distribution: N.S.W., Vic. and Tas. (See color plate).



"Parsons Bands"

"Autumn wings" and "dancing sailor" are the nicknames for this orchid (*Eriochilus cucullatus*, Reichb.f.). It is a small, slender plant with a green, often slightly hairy, leaf, and has from one to five flowers, with prominent white sepals. The tongue has a woolly tip with red or white glands. Flowers in the autumn. Distribution Queensland, N.S.W., Vic., S.A. and Tas.

Norton's Adenochilus

This small orchid (*Adenochilus Nortonii*, Fitz.) is a slender plant, four inches to eight inches in height, with a single broad leaf near the base. The solitary flower is white, with purplish-red markings on the tongue and column. Tongue with many yellow glands. Flowering season: Summer. Distribution: N.S.W.



Fringed Hare Orchid

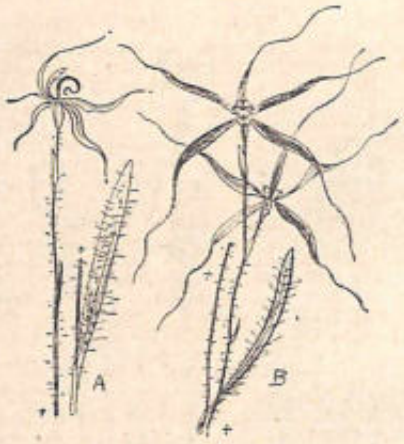
The Fringed Hare Orchid (*Leptoceras fimbriatum*, Ldl.) is a slender, wiry-stemmed plant, favoring sandy areas. In some localities the plants are very abundant, but the leaves are more often seen than the flowers. Plant about eight inches to 12 inches in height; leaf (one or two) usually broad and lance-shaped; occasionally very small, green, with prominent red ribs. The flowers (one to three) are yellowish brown, with green or purplish markings. The tongue is beautifully mottled and fringed. Flowering season, Autumn (April and early May the best time). Distribution: Vic., S.A. and W.A



Green Rock Orchid

The graceful Green Rock Orchid (*Lyperanthus ellipticus*, R. Br.) favors sandstone cliffs where it lodges in the horizontal fissures with the Coral Fern (*Gleichenia circinata*). It has very brittle, rasp - like roots and large elliptical leaves. The flowers, fairly numerous on slender, drooping stems, are yellowish - green, with brown markings. Flowers late in the spring and in summertime. Distribution: N.S.W

The "Spiders"



Narrow-lipped Caladenia

The Narrow-lipped Caladenia (*C. leptochila*, Fitz.) is a slender, hairy plant, which grows to 14 inches in height. It has a narrow or oblong, lance-shaped leaf and one or two yellowish-green flowers, with red markings. The dark, red-brown tongue is extremely thin, and almost flat, with the tip much curled; it has two to four rows of glands. Flowering season: Spring. Distribution: S.A. and Vic. (very rare in Victoria). (Fig. A).

Tailed Caladenia

The Tailed Caladenia (*C. filamentosa*, R. Br.) is a slender, hairy plant, about 12 inches in height, with one to three flowers, deep-crimson, or greenish, with red markings in variety *tentaculata*, Tate. The "legs" of this "Spider" are very long and thread-like, and the small tongue is beautifully marked with stout glands and red lines. Flowering season: Spring. Distribution: N.S.W., Vic., Tas., S.A. and W.A. (Fig. B).

Musky Caladenia

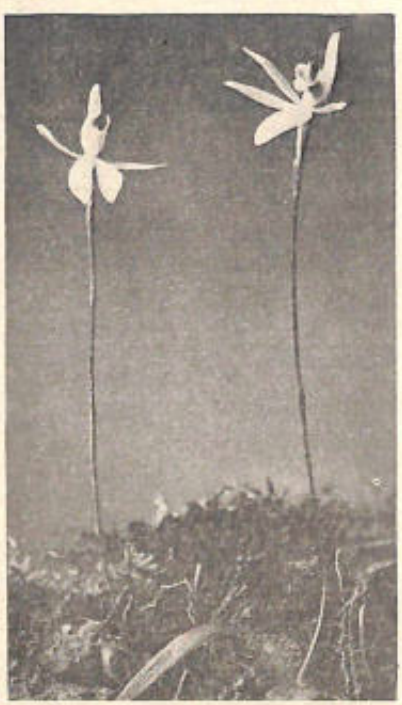
The Musky Caladenia (*C. angustata*, Ldl.) is a very slender or moderately stout species, with one to eight white flowers which have either pink or green markings, the underside often is intense chocolate-brown. One of our most prolific species, it favors chiefly



timbered country. The flowers diffuse a powerful musky fragrance, and in certain localities the plant is known as "polecat." Flowers in spring and early summertime. Distribution: N.S.W. Vic., S.A. and Tas.

The Blue Caladenia

This wiry, red-stemmed dwarf species (*Caladenia caerulea*, R. Br.) rarely exceeds nine inches in height. It has either a narrow or a broad leaf, which often is flat on the ground. The solitary flower (very rarely two) is bright lilac-blue, violet, mauve or white. The tongue is beautifully marked; along its centre are two rows of stalked, yellow-tipped glands. Grows



in scattered colonies, often in open places on dry rocky ridges. Flowers late in winter and in the spring. Distribution: Queensland, N.S.W., Vic., S.A., Tas. and in W.A. (at Geraldton).

Black-tongued Caladenia

The Black-tongued Caladenia (*C. congesta*, R. Br.), usually found on timbered hillslopes, is a slender plant, up to two feet in height, with one to three pink, rarely white, flowers. A compact mass of stout glands on the tongue (the scientific name is in reference to these glands) extend almost to the tip. Blooms in spring and summer. Distribution: N.S.W., Vic., S.A. and Tas. (See color plate).



"Blue Fairies"

"Blue Fairies" (*Caladenia deformis*, R. Br.) is a dwarf, green-stemmed plant, up to seven inches in height. The leaf is somewhat broad, and the solitary flower is deep violet-blue or mauve, occasionally pink, pink and white, white, or even pale yellow. It favors moist conditions, and grows either in small scattered colonies, small tufts, or singly. Flowers in winter and spring. Distribution: N.S.W., Vic., S.A., W.A. and Tas.

"Pink Fairies"

"Pink Fairies" (*Caladenia latifolia*, R. Br.) is a hairy plant, with a wide leaf and one to four flowers, pink or white, or both pink and white. The



tongue has beautiful calli (or glands) towards the base. Usually found in large, scattered colonies, or solitary, this species is abundant in many coastal districts. Flowers in springtime. Distribution: Queensland, N.S.W., Vic., S.A., W.A. and Tas.



Hooded Caladenia

Slender and wiry-stemmed, the Hooded Caladenia (*C. cucullata*, Fitz.) sometimes is a moderately stout species, from five inches to 10 inches in height. It has one to five flowers, with greenish-brown markings on the underside. The upper sepal, which shelters the column, is distinctly hood-shaped. The tongue is flat, with stout, variously-colored glands; tip and margins are rich mauve. Flowering season; Spring or early summertime. Distribution: N.S.W., Vic. and (probably) Tas.

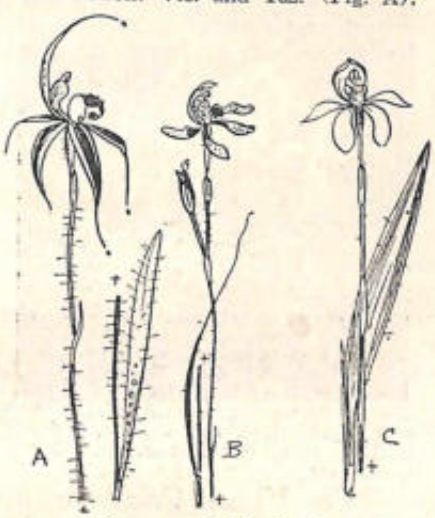


Dwarf Spider Orchid

The Dwarf Caladenia (*C. pumila*, Rogers) was discovered in 1922, and is known only from the rush-flats near Bannockburn, Vic. The plant is hairy and rarely exceeds six inches in height; while the large and solitary flower is white, with pink or pale yellow markings. The "legs" of the "spider" are sometimes clubbed. The tongue has smooth or serrate margins. Flowers in the spring. Distribution: Vic.

Small Spider Orchid

This species (*Caladenia cordiformis*, Rogers) is a good type of our smaller Spider Orchids. A hairy plant, up to 12 inches in height, with a lance-shaped leaf, it has one or two flowers, deeply colored, in shades of green and yellow, with red-brown markings. The tongue is heart-shaped, and the "legs" are often minutely clubbed at the tips. Favors chiefly timbered country and marshy flats. Flowers in the spring and early summertime. Distribution: Vic. and Tas. (Fig. A).



Bronzy Caladenia

The Bronzy Caladenia (*C. iridescens*, Rogers) is a slender species, rarely exceeding 12 inches in height. The leaf is very narrow and often long. The flowers (one to four) are small and vary in color from deep vermilion-red, with iridescent gold spots, through light purple to white. The flower is covered liberally with minute glands, and the tongue has densely packed glands on the tip. Flowers in the spring and summertime Distribution: Vic. (Grampians, Athlone, Healesville, Steiglitz, etc.). (Fig. B).

Mountain Caladenia

This Caladenia (*C. alpina*, Rogers) occurs in nearly all Alpine fastnesses. It is a charming little lover of high places, and at one time was believed to occur only at and above the 5000 feet level. But it has been met with in abundance at much lower altitudes. The flowers (usually one to three) are not always high-colored (deep pink and mauve), but may be pale, with green or light-pink markings. Grows either in tufts or in scattered colonies. Flowering in spring-summer. Distribution: N.S.W., Vic. and Tas. (Fig. C).

Fringed Spider Orchid

One of the most abundant "Spiders," the Fringed Caladenia (*C. dilatata*, R. Br.) varies from a few inches to 18 inches in height, and has one or two flowers, often large. The deeply-combed, wide tongue is attractive in shades of green, yellow, maroon and white. The longer segments (sepals) are adorned at the tips with yellow clubs. Light-colored forms are not uncommon. Flowers in the spring and early summertime. Distribution: All the States except Queensland. (Fig. A).

(This Caladenia hybridises freely with *C. Patersonii*. The intermediate form is large.)

Fleshy-lipped Caladenia

A slender, hairy plant, the Fleshy-lipped Caladenia (*C. cardiochila*, Tate) resembles *C. cordiformis*, but the flowers are usually larger. It rarely has more than a single flower, yellowish, with bold red-brown markings. The sepals are short and very broad about the middle, and the broad, heart-shaped tongue has a distinct fleshy tip. Flowering season: Spring. Distribution: Vic. (very abundant near Airey's Inlet) and S.A. (Fig. B).

Clubbed Spider Orchid

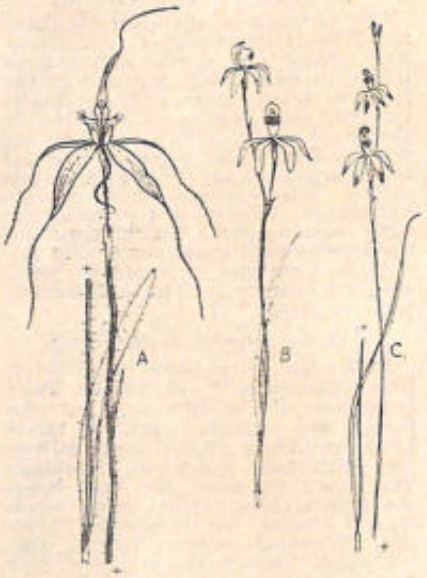
The Clubbed Spider Orchid (*Caladenia clavigera*, Cunn) is sometimes robust and bears one or two flowers. The plant is very hairy and about 12 inches in height. The blooms closely resemble those of *C. reticulata*, but are more vigorous in general appearance and the clubs are sometimes large. The tongue is much broader, with shortly-toothed margins, and has four to six rows of glands. Flowering season: Spring. Distribution: N.S.W., Vic. and S.A. (Fig. C).



The "Pink Fingers" Orchid

Some varieties of this orchid (*Caladenia carnea*, R. Br.) emit a strong musky odor. It is an abundant species. The common form is variable in height, color, size of flowers, etc. Plant, from a few inches to about 14 inches in height; leaf, narrow, often very long; flowers (one to three), pink shades, white, or greenish-white, or even deep rose-pink. Flowering season: Spring. Distribution: All the States and extending northwards to the Malay Archipelago.

Among the named varieties are: Var. *gigantea*, Rogers, tall, with large pink or white flowers; tip of the tongue is deep orange and sometimes the flowers attain to a width of two inches. Var. *pygmaea*, Rogers, a very slender plant, rarely above five inches in height; flowers very small, usually half open, deeply colored, often grows matted together. This form occurs abundantly on King Island, Bass Strait. Var. *aurantiaca* (orange-colored), Rogers, a diminutive form, with delicate white flowers; tip of tongue and glands deep orange. (See color plate).



Long-tongued Caladenia

This Caladenia (*C. echidnachila*, Nicholls), one of our unique species, resembles *C. Patersonii*, but differs in having a long, worm-like tongue. The flowers are large and yellowish, with crimson markings. Flowering season: Spring. Distribution: Tas. (Lenah Valley). (Fig. A).

The Golden Caladenia

The Golden Caladenia (*C. Hildae*, Pescott and Nicholls) is an alpine plant, small, slightly hairy, and about six inches in height. The flowers (one or two usually) are yellowish-brown, or golden bronze, with pink shades. The tongue is white and deeply fringed with a dark-purplish tip; glands are pure white and very stout. Flowering season: Late spring and the summer months. Distribution: Vic. (Cobungra). (Fig. B).

The "Greenie-Brownie"

The "Greenie-Brownie" (*Caladenia testacea*, R. Br.) is an extremely attenuated species, from four inches to nine inches in height. The diminutive flowers (one to six) are greenish-white, with brick-red tips and the underside of the same color. The tongue is stoutly fringed with well-formed glands. Flowering season: Spring. Distribution: N.S.W. (abundant in certain districts). (Fig. C).

Common Spider Orchid

The Common Spider Orchid (*Caladenia Patersonii*, R. Br.) is a variable species which grows to 15 inches in height. The stem and leaf are hairy. The large flowers (one to three) are white or cream colored, with dark crimson markings; sometimes they are pink, yellowish, or yellowish-green. The points are long, but not clubbed, and the tongue is distinctly fringed along the margins—sometimes the tip is crimson. Flowers in the spring. Distribution: All the States. (See color plate).

"White Dove" Orchid

Common in many localities, this Caladenia (*C. praecox*, Nicholls) is a dwarf plant (three inches to six inches, rarely taller). It has one to three flowers usually, but in good seasons up to four. Comparatively large, they are white, with pink or green markings; sometimes deep rose-pink. The tongue is finely fringed and the tip has a purplish blotch in the centre. It is Victoria's earliest Caladenia. Flowering season: Winter and early springtime, rarely later. Distribution: Vic. (Greensborough, Bayswater, etc.).



The Veined Caladenia

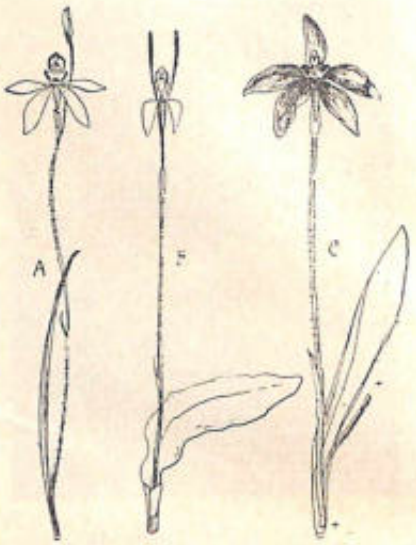


The Veined Caladenia (*C. reticulata*, Fitz.), which is a variable species, closely resembles *C. clavigera*, but often is without clubbed tips, while the tongue is narrower, with a longer fringe. The flowers display nearly every shade between pale yellow or green and wholly deep-purple. Flowers in the spring and summertime. Distribution: Vic. S.A. and Tas. (See color plate also).

The White Caladenia



The White Caladenia (*C. alba*, R. Br.) grows from five inches to almost one foot in height. It has a very slender stem and usually one or two large white flowers, sometimes with pink markings. The tongue is slender, with an orange-colored tip. One variety, called *picta*, has a three-colored column; the flower is smaller than the type form. Flowering season: Late in autumn to springtime. Distribution: N.S.W. and Vic. (rare), also New Caledonia.



Beaded-tongued Caladenia

This Caladenia (*C. dimorpha*, Fitz.) is one of our sturdy forms, usually about 12 inches in height. The flowers (one to three) are either pure white or white with pink markings. Tongue very broad, with a bead-like fringe. Two forms occur. Flowers during the spring. Distribution: N.S.W. (Fig. A).

The Hare Orchid

The finest example of the Hare Orchid (*C. Menziesii*, R. Br.), a slender plant about nine inches in height, is to be found in damp, well-sheltered gullies, etc. The leaf varies in shape from broad-oval to oblong-linear. The small flowers (one to three) are pink and white, or albino. The tongue is broad-oval, with a white tip, and adorned with two rows of small glands and dark-colored bands. The narrow, gland-covered petals, being erect, have some resemblance to the ears of the hare, hence the common name. Flowers in the spring. Distribution: W.A., S.A., Vic. and Tas. (Fig. B).

Dark-blue Caladenia

This exceedingly rare Caladenia (*C. tutelata*, Rogers) was discovered in South Australia, then in New South Wales and, finally, in Victoria (at Point Lonsdale, growing among countless specimens of *C. deformis*). It is a slender species, closely resembling a small *Glossodia*. About nine inches in height, it has a broad, lance-shaped leaf. The solitary flower is dark-blue, being much paler on the underside. The oval tongue bears two rows of "golf-stick" glands, but those at the base are tall and sentinel (or guardian-like). Flowers late in winter and in the spring. Distribution: S.A., Vic. and N.S.W. (Fig. C).

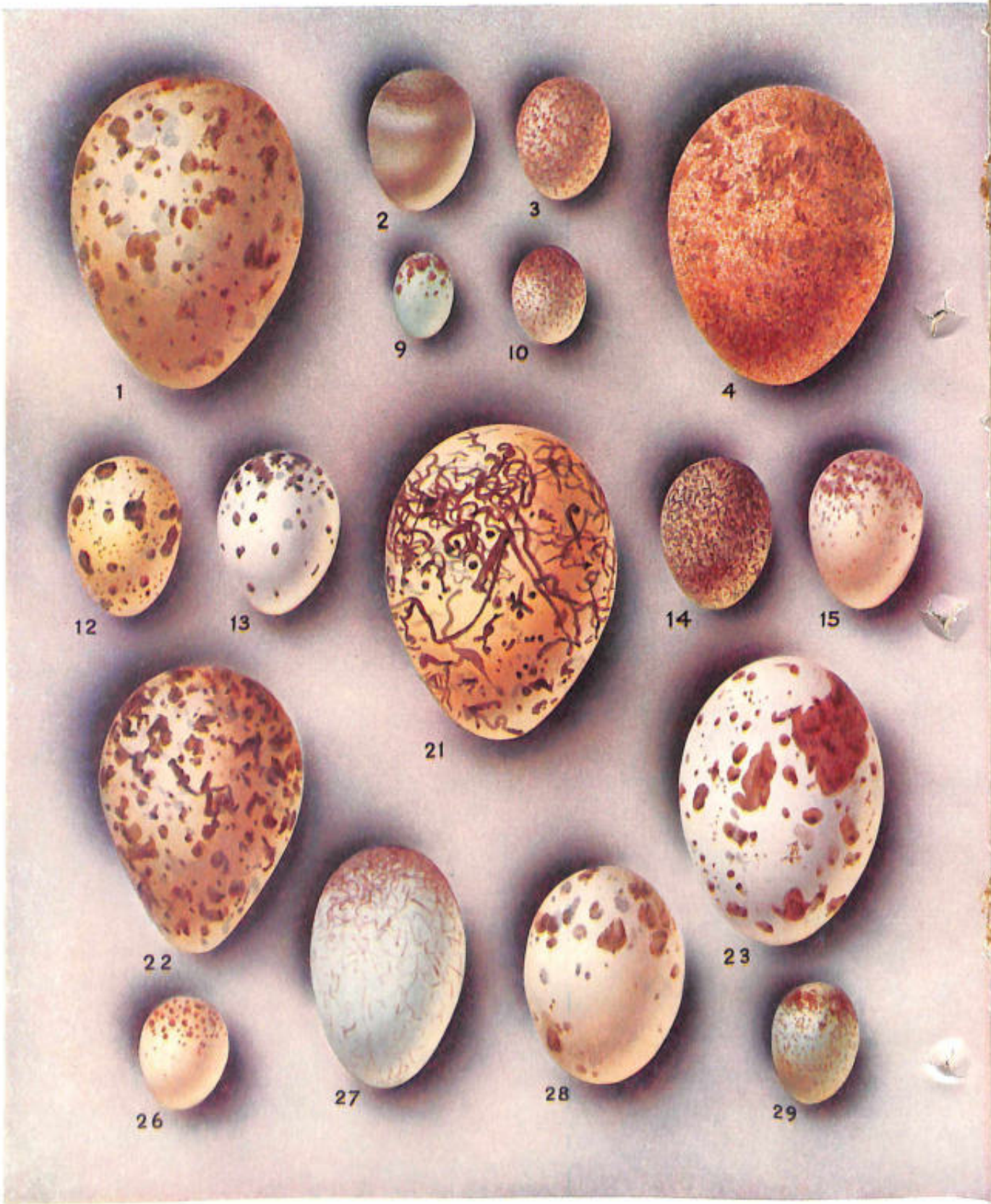
Broad-lipped Caladenia

The Broad-lipped Caladenia (*C. Longii*, Rogers) is a dwarf, very slender species from three inches to six inches in height, and has from three to six pink or white flowers, tinged with red. It is similar in general appearance to *C. Atkinsonii* and, like that species, has large side lobes to the tongue, which, however, in *Longii* is barred with red, as in *C. carnea*, and bears four rows of fairly long, bent, plain glands. Flowering season: Spring. Distribution: Tas. (Railton Hills).



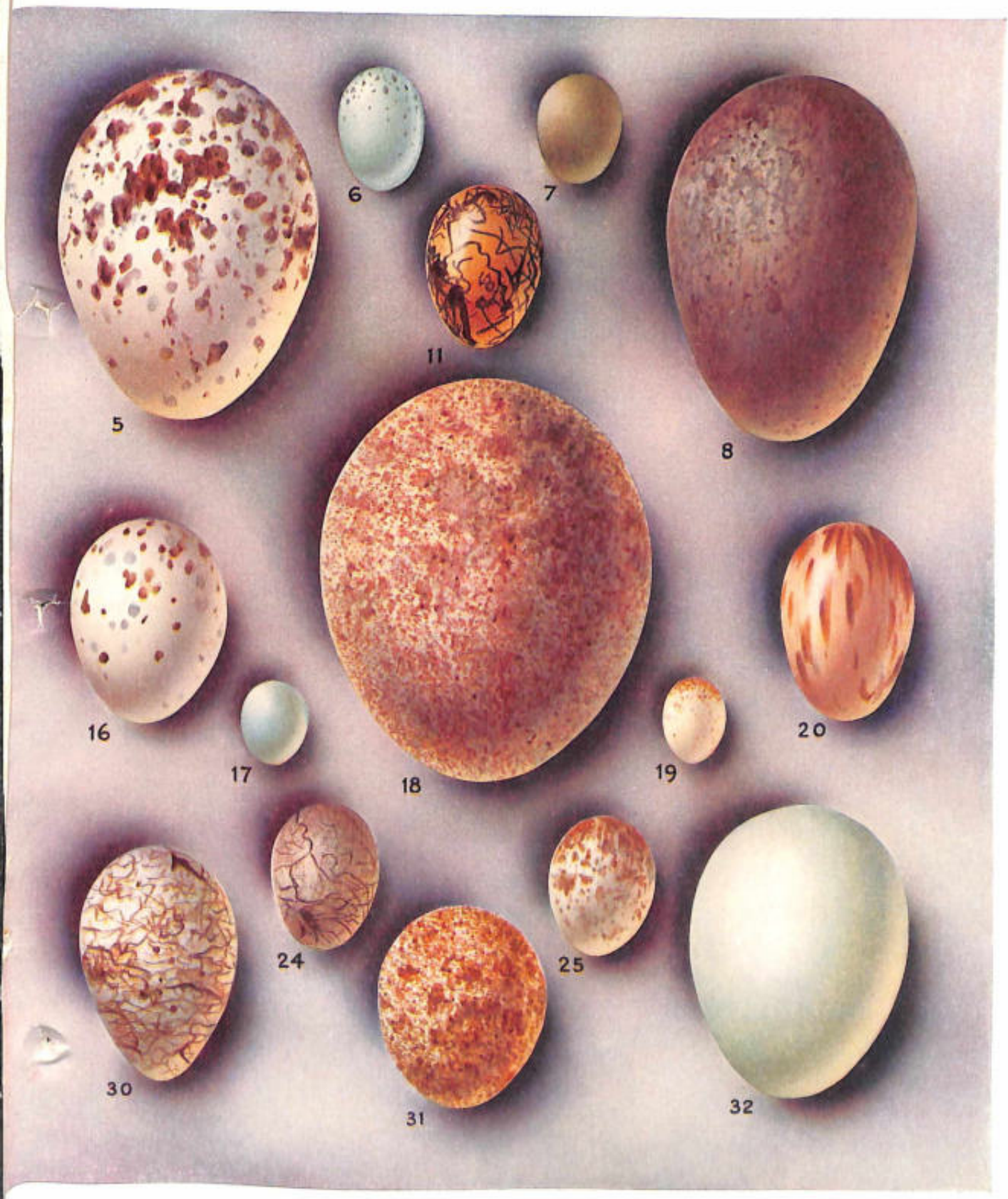
AUSTRALIAN ORCHIDS

A. Spiranthes sinensis
B. Diuris alba
C. Diuris sulphurea (apetaloid form)
D. Caladenia carnea (var gigantea)
E. Diuris brevifolia
F. Burnettia cuneata
G. Thelymitra Macmillanii
H. Diuris pedunculata
I. Dendrobium Kingianum
J. Caladenia congesta
K. Calochilus grandiflorus
L. Spiculaea Huntiana
M. Cryptostylis erecta
N. Caladenia Patersonii
O. Thelymitra azurea
P. Thelymitra venosa
Q. Caladenia reticulata (purple form)
R. Corysanthes aconitiflorus



1. Silver Gull
2. Yellow-throated Scrub-wren
3. Brown Tree-creeper
4. Brown Hawk
5. Osprey
6. Wedgebill
7. Hooded Robin
8. Lyre-bird
9. Cisticola
10. Little Grass Bird
11. Lotus Bird
12. Brown Quail
13. Grey Thrush
14. Black-fronted Dotterel
15. Peewee or Magpie-lark
16. Banded Rail

AUSTRALIAN



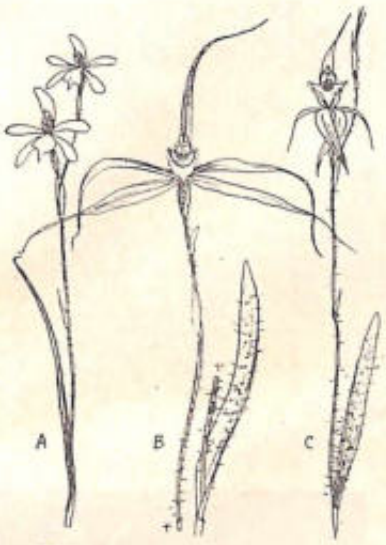
BIRDS' EGGS

17. Silvereye
18. Wedge-tailed Eagle
19. Blue Wren
20. Victoria Rifle-bird
21. Crested Tern
22. Spurwing Plover
23. Sooty Tern
24. Grey-crowned Babbler
25. Noisy Miner
26. Bearded (New Holland) Honeyeater
27. Black-backed Magpie
28. White-winged Chough
29. Yellow Robin
30. Spotted Bower-bird
31. Nankeen Kestrel
32. Nankeen Night Heron



GREENHOODS

A. Pt. Baptistii
B. Pt. grandiflora
C. Pt. falcata
D. Pt. Woollsii
E. Pt. truncata
F. Pt. Vereenae
G. Pt. obtusa
H. Pt. ophioglossa
I. Pt. revoluta
J. Pt. nana.



White-lipped Caladenia

The White-lipped Caladenia (*C. Atkinsonii*, Rodway), an extremely rare plant, is known only from one locality in Tasmania. It grows to a height of six inches, and has one or two white flowers, with green and purplish-red markings. The tongue is white, almost flat, and devoid of glands. Flowering season: Spring. Distribution: Tas. (Lindisfarne). (Fig. A)

Tooth-lipped Caladenia

This Caladenia (*C. arenaria*, Fitz.) is similar in appearance to *C. Patersonii*. The large flowers are light-colored, greyish-white with darker markings. The tongue is beautifully marked and bordered by blunt teeth. Flowers in the spring. Distribution: N.S.W. (Fig. B).

Tawny Spider Orchid

The Tawny Spider Orchid (*Caladenia tessellata*, Fitz.) is similar in appearance to *C. cardiochila*, but the flowers are more yellowish in color. The tongue is large, with the tip protruding forward; margins are shortly combed (serrate), and the conspicuous mass of glands is somewhat tessellated. Flowering season: Spring. Distribution: N.S.W. and Vic. (Wonthaggi) (Fig. C).

Bow-lipped Caladenia

A small hairy plant, this Caladenia (*C. toxochila*, Tate) grows to 12 inches in height, and has oblong, slightly hairy leaves. Usually there is only one flower, which is yellowish-green, with maroon markings. The sepals are minutely clubbed, while the tongue is crescent-shaped and veined with red, the margins having short denticulations. Flowering season: Spring. Distribution: S.A.

Combed Spider Orchid

The Combed Spider Orchid (*Caladenia rigida*, Rogers) is a slender hairy species, about 9 inches in height, with a rigid stem. The solitary flower, fairly large, is white with red-brown lines. The tips of the sepals are clubbed, and the tongue is oblong lance-shaped, with combed margins. Flowers in the spring. Distribution: S.A.

Purple Spider Orchid

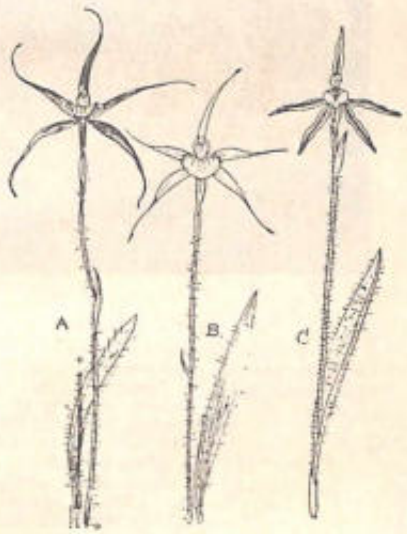
This "Spider" (*Caladenia concolor*, Fitz.) resembles very closely *C. Patersonii*, but is wholly purplish or prune-colored. The tongue has combed margins and four to six rows of golf-stick-like glands. Flowering season: Spring. Distribution: N.S.W. (Fig. A).

Oval-tongued Caladenia

This Spider Orchid (*C. ovata*, Rogers) is much like *C. leptochila*, but has a more oval tongue, while the "legs," sepals only, have small clubs at the tips. Flowers in the springtime. Distribution: S.A. (Kangaroo Island). (Fig. B).

Pointed Spider Orchid

The Pointed Spider Orchid (*Caladenia gladiolata*, Rogers) is a short-stemmed plant, with, usually, one



flower, which is greenish-yellow, with red markings. The tongue is oval, with a pointed, red-brown tip and four rows of very crowded glands along the centre. The sepals and the petals, the "legs" of the flower, are bayonet-shaped, hence the specific name. Blooms in the spring. Distribution: S.A. (Fig. C).

The McIvor Caladenia

The rare McIvor Caladenia (*C. Audasii*, Rogers) has a large, solitary, yellowish flower, somewhat resembling that of *C. Patersonii*, but the tongue is oval, with smooth margins. The glands are in six rows. Flowering season: Spring. Distribution: Vic.

Cream-colored Caladenia

The Cream-colored Spider Orchid (*Caladenia bicalliata*, Rogers) is a hairy plant about 4 inches in height, and has a solitary flower, which is cream-colored, with red markings. The oval-tongue is also cream colored, with fine-toothed margins and two rows of glands. The "legs" are broad, with coarse hairy tips. Flowers in the spring. Distribution: S.A. (Kingscote).



Large Waxlip Orchid

The Large Waxlip (*Glossodia major*, R. Br.) is an attractive ground orchid, often exceedingly abundant. It is widely distributed. Plant, about 4 inches to over 12 inches in height, and hairy; leaf, oblong or very narrow, lance-shaped. The flowers (one or two usually) vary in color from a rich purple-mauve or mauve to pale mauve-pink, pink, or white. White flowers diffused with purple have been found, also flowers with their margins rolled back. Often the petals are beautifully mottled towards the centre of the flower. The tongue has a yellow v-tipped sigmoid (s-shaped) appendage at the base. The leaf of this Orchid is aromatic. Flowers in the spring. Distribution: Q'ld., N.S.W., Vic., S.A., & Tas



Small Waxlip Orchid

The Small Waxlip Orchid (*Glossodia minor*, R.Br.) is a small, dwarf, hairy species in general appearance similar to *G. major*. The flowers (one or two) are purple-mauve or mauve. The tongue has two clavate appendages at the base. This little orchid is plentiful in many districts in New South Wales; but doubtfully exists in Victoria. Flowering season: Spring. Distribution: Q'ld., N.S.W. (Vic.?).

The "Double-tails"



White Diuris

In the long grass on the Keilor plains, and near Sunshine (Vic.) this very fragrant species (*Diuris alba*, R.Br.) was at one time exceedingly plentiful, but is now becoming scarce. Some plants are robust, with up to 15 flowers, usually white, with varying shades of mauve; occasionally pure white. This orchid has large, palm-shaped tubers. Flowers late in the spring and early summertime. Distribution. Q'ld., N.S.W., and Vic. (See color plate also).

Leopard Diuris

The Leopard Diuris (*D. maculata*, Sm.) is abundant in many parts of its range. The yellow flowers (two to 10) often are much blotched with dark-brown; occasionally they are white, with bluish markings, or wholly pale yellow. The small tongue has a very blunt tip. Flowering season: Spring. Distribution: All the States, excepting W.A.



The Purple Diuris

The Purple Diuris (*Diuris punctata*, Sm.) is perhaps the finest of all the "Double-tails." Plentiful in the majority of its haunts, it enjoys a wide range, from Queensland to South Australia. The flowers vary in color from pale mauve to the deepest purple-mauve; sometimes cream-colored blooms are seen. At its best, the Purple Diuris is tall, and the large flowers are fragrant. Rows of minute dots usually are observable along the plate of the tongue. Excepting the north-west, it is found throughout Victoria, and in New South Wales extends its range to the Western slopes of the mountain. Flowering season: Spring. Distribution: Q'ld., N.S.W., Vic. and S.A. (Fig. A).



Swamp Diuris

The Swamp Diuris (*D. palustris*, Ldl.) is found in small tufts, in swampy situations chiefly. It has numerous, very narrow, spirally-twisted grass-like leaves, which are purplish at the base. The small and fragrant flowers are dingy yellow, with bold, dark red-brown blotches. Flowering season: Spring. Distribution: S.A., Vic. and Tas. (Fig. B).

Sulphur Diuris

The Sulphur Diuris (*D. sulphurea* R. Br.), often a stout and tall species, favors river flats, well-timbered hill slopes, etc. The leaves (two or three) are long and lax. The flowers (3 to 8) are large and sulphur-yellow in color, with prominent red-brown markings and eye-like spots on the dorsal hood. Occasionally the flowers are more red-brown than yellow, and sometimes assume a petaloid form. (See color plate). Flowering season: Summer. Distribution: All the States, excepting W.A.

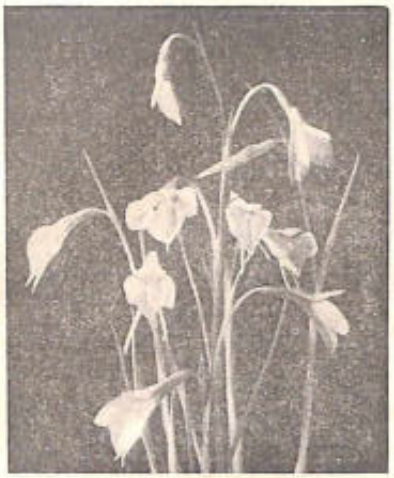
Proud Diuris



The Proud Diuris (*D. fastidiosa*, Rogers) is one of the rarest forms, found only in the most favorable seasons. A dwarf plant, it has fairly numerous, grass-like leaves and one to three flowers, which are pale yellow, with dark-brown markings. The tongue is broad and spathe-like. Flowers late in winter and in the springtime. Distribution: Vic. (Tottenham).

Spade-lipped Diuris

A distinctly spade-shaped tongue gives its specific name to this Diuris (*D. palachila*, Rogers), which otherwise resembles *D. maculata*. The flowers are yellow or yellowish-green, with, usually, a few brown markings. In robust plants, the leaves are sometimes numerous (seven or eight) and short, but usually it has two to five long leaves. Flowers in the spring and early summertime. Distribution: N.S.W., Vic., & S.A.



The Snake Orchid

"Golden Moth" and "Cowslip" are other names for the Snake Orchid (*Diuris pedunculata*, R.Br.), an exceedingly variable species, so attractive in the mass that often big bunches are gathered. It has very narrow, grass-like leaves and yellow flowers. Rich orange-colored flowers are sometimes seen, and the most attractive form has bright yellow flowers, with the throat a vivid orange hue. Variety *gigantea*, Nicholls, has large blooms, sometimes 2¼ inches across. Flowers in the spring and early summertime. Distribution: Q'ld., N.S.W., Vic., S.A., & Tas.



Butterfly Diuris

The Butterfly Diuris (*D. dendrobioides*, Fitz.) is a rare form, with large red-brown flowers. Probably it is a teratological form of another species. Flowering season: Spring. Distribution: N.S.W. (Fig. A).

One-sided Diuris

This species (*Diuris secundiflora*, Fitz.) is an extremely slender plant, with the flowers (usually two to eight) all turned to one side, hence the specific name. They are yellow, with brown stalks to the petals; the lower sepals are very long and narrow. The tongue is fan-shaped. Flowers in the spring. Distribution: N.S.W. (Fig. B).

The Veined Diuris

The Veined Diuris (*D. venosa*, Rupp) is a dainty and fragrant species, bearing from one to four lilac or blue-grey flowers. The tongue is darkly veined, and the broad spade-shaped middle-lobe colored dark purplish-brown. Flowering season: Summer. Distribution: N.S.W. (Barrington Tops). (Fig. A).



The Golden Diuris

The Golden Diuris (*D. aurea*, Sm.), an attractive species, like *D. brevifolia*, grows to a height of 8 inches to 2 feet. It has two to six, often large, yellow flowers, with few brown markings. The middle-lobe of the tongue is oval. Flowering season: Spring. Distribution: Q'ld. and N.S.W. (supposed to occur in Victoria, near the Murray River). (Fig. B).

Short-leaf Diuris

The Short-leaf Diuris (*D. brevifolia*, Rogers) has flowers of a rich yellow color, with a few brown markings. The leaves are very short, and not twisted. The tongue is somewhat wedge-shaped. Flowering season: Late in the spring and summer months. Distribution: N.S.W. & S.A. (not yet reported in Victoria). (See color plate).

Austral Lady's Tresses

Austral Lady's Tresses (*Spiranthes sinensis*, Ames) is a slender, downy plant of the marshy places, and from 8 inches to 18 inches in height. The leaves, few in number, are like those of the common plantain. Flowers numerous, small and pink or white, or pink and white, usually in a spirally-twisted spike. The tongue is white, with fringed or toothed margins. Flowering season: Summer and autumn. Distribution: All the States, excepting W.A.; also in New Zealand, Asia and Europe. (See color plate).



Small Purple Diuris

The Small Purple Diuris (*D. cuneata*, Fitz.) is somewhat similar to *D. punctata*. It has from a few to nine pale lilac-colored flowers, with dark veins, etc. The name *cuneata* refers to the wedge-shaped petals. Flowering season: Summer. Distribution: N.S.W. (Fig. A).

The Lilac Diuris

This Diuris (*D. spathulata*, Fitz.) has pale lilac or blue-grey flowers, with lark lines on the tongue, which is spade-shaped. It is a rare species. Blooms late in the spring. Distribution: N.S.W. (Fig. B).



Wallflower Diuris

The Wallflower Diuris (*D. longifolia*, R. Br.) often is a stout plant, and grows to about 18 inches in height. The flowers are large, but generally few (two to five); yellow, with brown markings, similar to those of the wallflower or wholly yellow. The tongue is comparatively small and oblong-wedge-shaped. The leaves (two or three) are deeply channelled and long. Flowering season: Spring. Distribution: All the States, excepting Q'ld.



Tri-colored Diuris

This Diuris (*D. tricolor*, Fitz.) is variable in habit and has yellow, purple and green flowers, with a white purple-spotted centre. The middle lobe of the tongue varies considerably in shape, from oblong to oblong-cuneate. Flowering season: Spring. Distribution: N.S.W. (Fig. A).

Slender Diuris

The Slender Diuris (*D. sheaffiana*, Fitz.) bears numerous slender flowers, which are orange-yellow, with brown spots on the hood. The middle lobe of the tongue is very broad. Flowering season: Spring. Distribution: N.S.W. (Fig. B).

The Neat Diuris

The Neat Diuris (*D. aequalis*, F.v.M.) is similar to the yellow forms of *D. longifolia*, to which it bears a close resemblance. It has orange-yellow flowers, not blotched or spotted. The lobes of the tongue are very large. Flowering season: Spring. Distribution: N.S.W. (Fig. A).

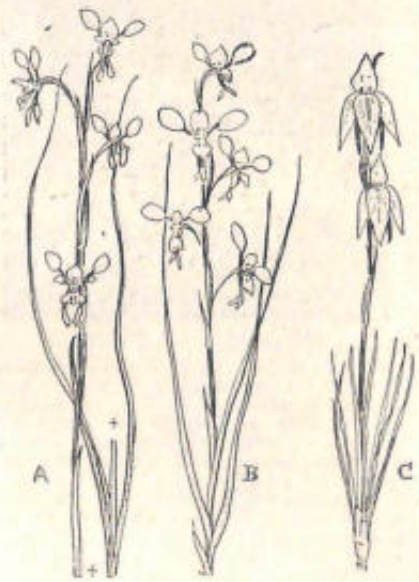


The Scaly Diuris

The stem-bracts of this Diuris (*D. bracteata*, Fitz.) are very prominent. The flowers (3 to 10) are small and like those of *D. maculata*, but with few blotches. Flowering season: Spring. Distribution: N.S.W. (Fig. B).

The Bonnet Orchid

The Bonnet Orchid (*Cryptostylis erecta*, R. Br.) is similar in habit to *C. subulata*, but its flowers are quite distinct; the large tongue is erect and conspicuously net-veined. Flowering season: Summer. Distribution: N.S.W. (See color plate).



Broad-lipped Diuris

The Broad-lipped Diuris (*D. platichilus*, Fitz.) is a tall, slender species, with two long leaves and three to eight pale yellow flowers. The very broad and large tongue is yellow-spotted with brown. Flowers in the spring. Distribution: N.S.W. (Blue Mountains). (Fig. A).

Short-tailed Diuris

A tall, slender species, the Short-tailed Diuris (*D. abbreviata*, F.v.M.) has up to eight small, yellowish flowers. The hood (dorsal) has two small eye-like spots towards the base, and the paddle-like tongue is marked with a number of spots on the under side. Flowers in the spring. Distribution: N.S.W. (Fig. B).

The Pale Diuris

This Diuris (*D. pallens*, Benth.) is similar to the small pale forms of *D. pedunculata*. The flowers are pale yellow, the lower sepals being green. Flowering season: Spring. Distribution: N.S.W. (Fig. C).



The Horned Orchid

The Horned Orchid (*Orthoceras strictum*, R.Br.), often called "Crow Orchid," has grass-like leaves which are difficult to detect unless the plant is in bloom. Sometimes the flowers are pale green, with a yellow tongue, but more often green, with purplish-brown markings, or almost purplish-black. Long, thread-like "horns" give this orchid its unusual appearance. Usually grows in grassland, often in damp places. Flowers in the spring and summertime. Distribution: Q'ld., N.S.W., Vic., S.A. & Tas., also New Zealand.



Small Tongue Orchid

The Small Tongue Orchid (*Cryptostylis leptochila*, F.v.M.) has rather broad, purplish-backed leaves and small flowers, which are sometimes numerous. It favors situations similar to those where *C. subulata* grows, and is difficult to locate among other and taller plants of its habitat. The tongue assumes many shapes after the expansion of the buds. Flowers in summer and early part of autumn. Distribution: N.S.W. and Vic.

The Greenhoods

The Brittle Greenhood

This quaint-looking plant (*Pterostylis truncata*, Fitz.) has been nicknamed "Little Dumpy," and some say that it has "a swollen head." It grows to but a few inches in height, and the flower (sometimes it is two-flowered) is very large for such a dwarf plant. Favors sheltered places, and grows chiefly among Rock Fern, Mint Bush thickets, etc., but in some localities flourishes exposed to every wind that blows. For many years the Brittle Greenhood was "lost to science"; it was re-discovered in Victoria (on the You Yangs Range) in 1924. The flower is beautifully marked with bold and fine red-brown and green lines on a translucent white ground. The upper sepal is not always *truncate* (cut short), but sometimes acuminate. The hood, however, always has a truncate appearance. Flowering season: Autumn. Distribution: N.S.W. and Vic. (See color plate).



Large Tongue Orchid

The Large Tongue Orchid (*Cryptostylis subulata*, Reichb.) is sometimes found in large colonies, chiefly in scrub-lands, where it favors the hill-crests and basins amid the hills. Flowers, usually three to eight. The large yellow and red-brown tongue has three dark raised lines along the centre, these ending in a pronounced knob, near the tip. The pin-head glands, which cover the whole surface of the tongue, should be examined with a lens. Plant rarely exceeds 18 inches in height, but in tall grass grows up to 3 feet. The leaves (one to three) are oblong-lance-shaped, dark green, the under side pale green. Flowering season: Summer. Distribution: Q'ld., N.S.W., Vic., S.A., and Tas.



Summer Greenhood

This graceful Greenhood (*Pterostylis decurva*, Rogers) sometimes is confused with *P. obtusa*, which it much resembles; but in *decurva*, the tongue of the flower protrudes conspicuously through the lower lip. There are much longer extensions of all five segments and that of the upper one is much decurved. Flowers late in spring and in the summer months. Distribution: N.S.W., Vic., and Tas. (In Tasmania it has long passed for *P. obtusa*). (Fig. A).

Mitchell's Greenhood

First discovered by Sir Thomas Mitchell, on Mount Kennedy, in 1846, this Greenhood (*Pterostylis Mitchellii*, Ldl.) is a slender species, with up to eight flowers. It rarely exceeds 10 inches in height and bears a close resemblance to *P. rufa*; but is easily distinguished by the tails of the lower sepals, which are strangely divergent. It is often referred to as the "Moustache" or "Sikh" orchid. The tongue is narrow and slipper-shaped, with few hairs. Flowers late in winter and in the springtime. Distribution: Q'ld., N.S.W., Vic., S.A., and Tas. (Fig. B).

Blunt Greenhood

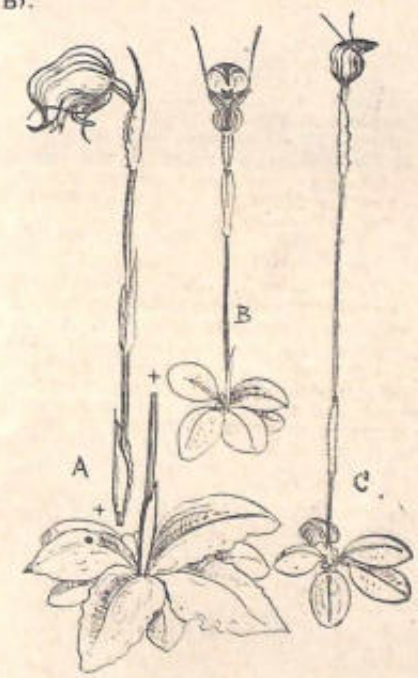
The Blunt or Twisted-tongue Greenhood (*Pterostylis curta*, R. Br.) is a common plant in most of its habitats. It grows from about 4 inches to 12 inches in height, from a basal rosette of leaves, which vary in shape from oval to oblong. The greenish flower has a blunt appearance, due to the very short sepals. The tongue is large, with a peculiar twist towards the tip. This orchid favors well-sheltered places, under trees, etc. Flowers from spring to early summertime. Distribution: All the eastern States, also New Caledonia. (Fig. C).

Nodding Greenhood

The Nodding Greenhood (*Pterostylis nutans*, R.Br.) is named from its drooping or nodding habit. Throughout three States the "Parrot-head Orchid," as it sometimes is called, grows abundantly, often forming large colonies in moist places. In Queensland and South Australia is occurs sparingly. It is perhaps the best-known of all the Greenhoods, and a general favorite, too. It favors well-sheltered situations and grows from one inch to about 15 inches in height. Variety *hispidula* Fitz. is covered—the whole of the plant—with similar glands. This form is rare, and is known only from New South Wales. Flowers in the winter and springtime. Distribution: Q'ld., N.S.W., Vic., S.A., Tas., also N.Z. (Fig. A).

Trim Greenhood

The Trim Greenhood (*Pterostylis concinna*, R.Br.) is a common plant under the Tea-tree in the coastal districts, it is abundant also far inland. The whole appearance of this orchid is suggestive of neatness. The tongue is broad and short, with the tip v-notched. Like *P. ophioglossa*, this species has a neat rosette of leaves. The flower (usually there is one only) is green with brown markings. Flowers in the winter and early part of spring. Distribution: All eastern States, including Tasmania; rare in S.A. (Fig. B).



The Maroon Hood

This species (*Pterostylis pedunculata*, R.Br.) blooms at the same time as *P. nutans*, with which often it is found growing. It has an exceedingly slender stalked stem, and the basal leaves are, in some cases, rather large. The solitary flower (sometimes two, or even three, occur) is small, and the prevailing color, dark-brown, red or even light brown, is restricted to the upper half of the flower. The tongue is bluntly-oval in shape. Fairly abundant in sheltered gullies, or even on dry hillslopes under the timber. Flowering period: Spring and early summertime. Distribution: N.S.W., Vic., and Tas. (Fig. C).

Leafy Greenhood

The Leafy Greenhood (*Pterostylis cucullata*, R. Br.), often called the Hooded Greenhood, though not a particularly common plant, in sheltered places along the shores of Port Phillip Bay sometimes is fairly abundant. It occasionally grows to a height of 14 inches, though usually much shorter—often only 2 inches or 3 inches. The solitary flower is fairly large and marked with bold green and brown (often light cayenne) bands, etc. The large leaves, either strictly basal or ascending the stout stem, are beautifully glazed on the underside. The



large uppermost bract often covers part of the flower, like a monk's hood. Flowering season: Spring. Distribution: Vic., S.A., and Tas. (doubtfully exists in N.S.W.).

Sharp-leaf Greenhood

This large-flowered species (*Pterostylis robusta*, Rogers) grows from about 2 inches to 14 inches in height. The stem-leaves are narrow lance-shaped, and the solitary, robust flower is white, with green or brown stripes. The tongue is lance-shaped and rather short. Flowers in autumn and spring. Distribution: Vic., S.A., and W.A.

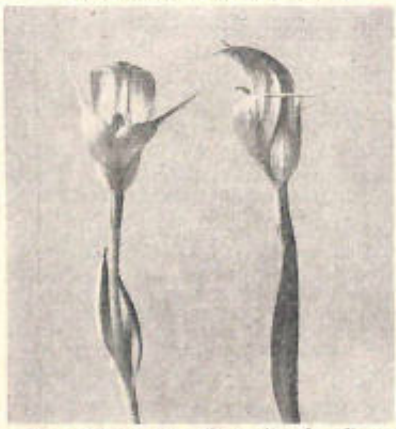


The Tall Greenhood



The Tall Greenhood (*Pterostylis longifolia*, R. Br.) is restricted to sheltered gullies and shady places. It is easily recognised by its long, lance-shaped stem-leaves and small green flowers, which are sometimes yellow or red-tipped. Height of plant, 6 inches to 18 inches, in exceptional cases up to 2 feet or more. Stem-leaves are longest near the middle; flowers (usually four to 12) with the lower (united) sepals in a pendant position; on this rests the thick gland-covered tongue, which is very irritable. Blooms in winter and spring. Distribution: Q'ld., N.S.W., Vic., S.A. and Tas.

Mountain Greenhood



The Mountain Greenhood (*Pterostylis alpina*, Rogers) is a slender plant, from 5 inches to 20 inches in height. It has scattered stem leaves, usually four or five, and the single flower is softly colored in green and white. Grows in scattered colonies, or singly, in timbered country, more often along the banks of streams, etc. The noticeable features of *P. alpina* are the soft blending of green and white and the pronounced backward sweep of the finely-pointed sepals. Despite its name, it is not strictly an alpine plant; it occurs also on the lowlands, though usually in the vicinity of the hills. Flowering season: Spring; in alpine regions until February. Distribution: N.S.W., Vic., and Tas.

Autumn Greenhood

The Autumn Greenhood (*Pterostylis revoluta*, R.Br.), a graceful species, more often than not is found growing in a solitary state. The large flower is white, with green stripes and some light-brown markings. The slender stem is comparatively leafless and usually under 12 inches in height. Usually abundant after good, late summer rains; occurring then in scattered colonies, chiefly on rocky ridges. Often it is seen with the hood-segments disunited. Flowering season: Autumn. Distribution: N.S.W. and Vic. (See color plate).

Bearded Greenhood

The Bearded Greenhood (*Pterostylis barbata*, Ldl.) attains a height of from 6 inches to 12 inches and is almost wholly green. The thin, yellow, beard-like tongue depends directly from the front of the flower; its tip is adorned with a knob, which may be red, grey or green. This species has a very leafy stem and the leaves are richly veined. Found abundantly on grassy hillslopes and under shrubs, trees, etc. Flowering season: Spring. Distribution: All States, excluding Q'ld.





Mentone Greenhood

The Mentone Greenhood (*Pterostylis Toveyana*, Ewart & Sharman) is 5 inches to 8 inches in height, and somewhat resembles *P. concinna*, but has stem-leaves. The solitary, copper-colored flower has the tongue slightly notched at the top. First located at Mentone (Vic.). Blooms in the autumn and wintertime. Distribution: Vic. (Greensborough and coastal districts Port Phillip Bay), and Tas.



The Rusty Hood

The Rusty Hood (*Pterostylis rufa*, R. Br.) is a hardy plant with large tubers, which enable it to flourish in extremely dry areas, though it is not confined to them. It is the largest of the "Rufa" group, other species being somewhat similar in habit and coloration. Height, from 3 inches to 12 inches. The basal leaves are in a more or less withered state at flowering time. The Rusty Hood has loose stem-bracts and two to five flowers of fairly large size, green, with red-brown markings, or white with prominent lines. The tips of the lower sepals vary in length. The sensitive tongue has the tip upturned and margins fringed with short hairs; arising from the thickened base are two long, upright hairs. Flowering season: Summer. Distribution: All the States.



Banded Greenhood

This species (*Pterostylis vittata*, Ldl.) is similar in appearance to *P. longifolia*, but the habit is stouter, while the lance-shaped stem leaves are broader and those within the floral cluster much longer. Plant, from 5 inches to 15 inches in height, with one to eight, usually drooping, flowers which are reddish-brown, greyish, or green with brown bands, etc. The sensitive tongue has a single spike at the base. Fairly abundant in many coastal areas, and in forest country inland. Flowers late in autumn and in wintertime. Distribution: Tas., Vic., S.A., and W.A. (In W.A. two distinct forms occur.)

The Swan Greenhood

This species (*Pterostylis cycnocephala*, Fitz.) is similar to the Midget Greenhood, but is usually more slender and of a richer green color (at least in Victoria). Recognised also by the tongue appendage, which resembles a swan's head (hence the name) and points southwards. Found, like *P. mutica*, on open grassland, or in open forest country. Flowering season: Spring (in alpine regions, later). Distribution: N.S.W., Vic., S.A., and Tas.



Sickle Greenhood

The Sickle Greenhood (*Pterostylis falcata*, Rogers) sometimes approaches closely *P. Baptistii* in size. All the segments of the flower are sickle-shaped. The plant varies from 5 inches to 22 inches in height, and has neat basal leaves, which often ascend the stem. The flower is green and white, with few brown markings; tongue narrow and often long. In some specimens the tips of the long sepals are deeply forked. Flowers in the spring and summertime. Distribution: N.S.W., Vic. and Tas. (See color plate).

Superb Greenhood

This comparatively rare, long-tongued species (*Pterostylis grandiflora*, R. Br.) has a fairly large flower. It is the handsomest of all the Greenhoods, and grows to a height of from 6 inches to over 1 foot. It has long, narrow stem leaves. The tongue is distinctive in shape, with a long, clubbed tip. The rich green and red-brown color scheme combined with the beautiful veining of the widely-dilated petals, give the single flower a peculiar grace. Restricted to moist mountain gullies and other well-protected places. Flowers in winter and spring. Distribution: Q'ld., N.S.W., and Vic. (See color plate).



Midget Greenhood

The Midget Greenhood (*Pterostylis mutica*, R.Br.) is a species of variable habit; short and robust, quite tall and slender, or a slender dwarf plant. It is wholly green, with from seven to 14 small flowers. The basal rosette of leaves usually is somewhat withered at the time of flowering. This species is at once recognised by the tongue appendage, which points inwards. Flowering period: Late in winter to late in spring. Distribution: All the eastern States, including S.A. and Tas.; also in N. Zealand.



The Ruddy Hood

The Ruddy Hood (*Pterostylis pusilla*, Rogers) varies in height from a few inches to 20 inches, but usually does not exceed 9 inches. It is always a slender plant, with small flowers, which are green, with brown or grey markings, or pale red-brown. The tips of the sepals nearly always are very short, and the sensitive tongue is oval or oblong, with a straight tip and hairy margins. This species sometimes is very plentiful. Var. *prominens*, Rupp. is a deep-red form with the flowers on long extended stalklets which incline to the horizontal. Flowers in spring and early summertime. Distribution: N.S.W., Vic., Tas., S.A., and W.A.



Tiny Greenhood

Of the Tiny Greenhood (*Pterostylis parviflora*, R.Br.) there are three forms: the coastal or dry area form, the forest form, and the alpine. The coastal form (also found abundantly on the drier ranges) is slender, rarely exceeding 7 inches in height, and the flowers are few and pale colored. The forest form often is tall, up to 2 feet, with many flowers (up to 13), which have bold, dark-green lines and yellowish-brown or rich red markings. The alpine form, known as *aphylla*, is a leafless, rather stout form, with one or two flowers. It is found also at sea-level. Flowers late in spring, and in summer, autumn and winter. Distribution: All the States excepting W.A.

The Giant Greenhood

This species (*Pterostylis Baptistii*, Fitz.) is our largest Greenhood, often growing to a height of 2 feet, and has a basal rosette of oblong leaves. The flower is white, with green bands and light-brown markings, especially on the petals; sometimes the hood is 3 inches in length. Tongue oblong with a fine point. Flowering season: Spring. Distribution: Q'ld. and N.S.W. (See color plate).

Long-tailed Greenhood

The Long-tailed Greenhood (*Pterostylis Woollsii*, Fitz.) belongs to the "Rufa" group also, and bears a close resemblance to *rufa* itself. Its salient characteristics are the exceedingly long "tendrils," or tails, to the conjoined sepals (up to 3½ inches), and the uniquely-shaped tongue, which is highly sensitive. The flowers are green, with yellowish-brown markings, or wholly red-brown. Flowers in the spring and summer months. Distribution: N.S.W. and Vic. (See color plate).

The Tailed Greenhood

The Tailed Greenhood (*Pterostylis pedoglossa*, Fitz.), a small, fragile and exceedingly dainty species, up to 6 inches in height, has a solitary flower, almost wholly green in color. The delicate prolongations of the paired sepals, being erect, give height to the plant and add to its attractiveness. Sometimes fairly large colonies are seen in well-sheltered nooks under shrubs. Flowering season: Autumn. Distribution: N.S.W., Vic. and Tas. (Fig. A).

Blunt-tongued Greenhood

A neatly-fashioned plant, the Blunt-tongued Greenhood (*Pterostylis obtusa*, R. Br) grows usually in scattered colonies, or singly, on rocky hillslopes. The stem-bracts vary in size and often are well developed. The flower (rarely two occur) is small, with brown or green markings or wholly green. In some localities in New South Wales this species is very graceful in outline with the lower-lip and the segment tips of the flower well developed. Flowering season: Autumn. Distribution: Q'ld., N.S.W., Vic., and S.A. (Fig. B). (See color plate also).



Striated Greenhood

The Striated Greenhood (*Pterostylis alata*, Reichb.) often is referred to as "The Purplish Greenhood," but the markings are brown. It is one of our daintiest forms, and is abundant in many places in the hills, growing within the shelter of shrubs, etc. Height, from 4 inches to 10 inches. It has narrow, lance-shaped stem-leaves, but no basal rosette at flowering time. The flower is white or greyish, with brownish or brown-green lines. The tongue is brown, rather short, with an acute point. The column—like that of other greenhoods—is winged. Flowers late in autumn and during the winter. Distribution: N.S.W., S.A. and Tas. (Fig. C).



Forked Greenhood

The Forked Greenhood (*Pterostylis furcata*, Ldl.), a very rare plant in Victoria and South Australia, in Tasmania is more numerous. It resembles, in some degree, sturdy specimens of *P. alpina*, but has a differently-shaped hood, green, with brown markings; the tip is inclined upwards. The lower lip is wedge-shaped with finely forked tips, and the tongue is narrow and slightly curved. Flowers late in the spring and summertime. Distribution: Vic., S.A. and Tas. (Fig. A).

Pointed Greenhood

The type form of the Pointed Greenhood (*Pterostylis acuminata*, R.Br.) is a slender plant, from 6 inches to 10 inches in height, but its variety (*ingens* Rupp) is often a giant in appearance; this form has a downy, rather blunt tongue. *P. acuminata* resembles *P. nutans*, both in the shape of the flower and coloration, but it lacks the drooping habit. The tongue is narrow and long, and, like the other parts of the flower, is sharply pointed. Flowers in the spring, summer and autumn. Distribution: Q'ld., N.S.W., Vic. and Tas. (Waratah), also New Caledonia. (Fig. B).

Slender Greenhood

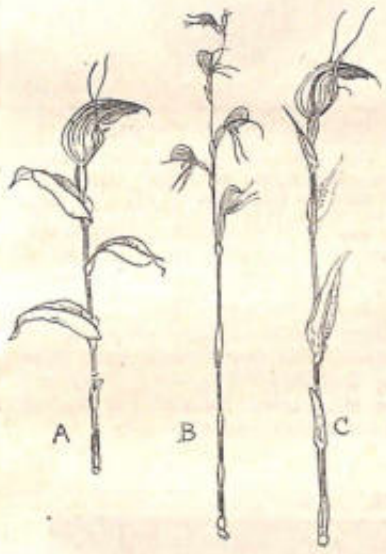
This Greenhood (*Pterostylis foliata* Hk.f.) is a very slender, almost wholly green, plant, with a solitary greenish flower of small size. The tip of the hood is dark-brown and the fine tips of the sepals are erect. The tongue is comparatively large, oblong in shape, with a blunt, often much curved, tip. Grows usually in the shelter of shrubs, etc. Flowers from late in winter until late in spring. Distribution: Vic. and Tas., also N.Z. (Fig. C).

Snake-tongued Greenhood

This Greenhood (*Pterostylis ophioglossa*, R. Br.) usually grows from 5 inches to 8 inches in height, but sometimes reaches 10 inches. It often forms large colonies. The flower (rarely two occur) is greenish-white, with brown and green lines. The tongue is forked, often much so, hence the specific name, which means "snake's-tongue." Variety *collina*, Rupp, is a red form, found usually at higher altitudes. Flowering season: Autumn to early winter. Distribution: Q'ld., N.S.W., also New Caledonia. (See color plate).

The Dwarf Greenhood

The Dwarf Greenhood (*Pterostylis nana*, R.Br.) was described by Robert Brown (Capt. Cook's botanist) from specimens found by Colonel Paterson in Tasmania, over 100 years ago. It is a slender plant of dainty appearance; varying in height from 2 inches to 12 inches (usually dwarf), rigidly erect and with a single green flower (two flowers are not uncommon). Inside the fork of the lower lip is a green tooth or lobule which is turned inwards. The leaves are in a cluster at the base of the plant. Usually found in groups or large colonies, under trees, shrubs, etc.; occasionally on the trunks of trees. Flowers in winter and spring. Distribution: All the States excepting Q'ld, also in N. Zealand. (See color plate).



The Pretty Greenhood

The Pretty Greenhood (*Pterostylis pulchella*, Messmer), found at the Fitzroy Falls (N.S.W.), bears a close resemblance to a small specimen of *P. grandiflora*, but the tongue is distinctly cleft at the apex, as in *P. Toveyana*. Distribution: N.S.W. (Fig. A).

Daintrey's Greenhood

This distinct species (*Pterostylis Daintreyana*, F.v.M.) is much more slender than *P. parviflora*, but bears a close resemblance to it. The flowers are diminutive and finely lined with green. The pointed tongue is dark-brown, with thick margins. Flowers in the autumn and wintertime. Distribution: N.S.W. (Fig. B).

The Moss Greenhood

The Moss Greenhood (*Pterostylis reflexa*, R.Br.) grows on mossy hillslopes. It is a slender and graceful plant, usually 4 inches to 8 inches in height, with small bract-like stem-leaves. The solitary flower is small, with green-brown lines; all the segments end in very fine points. The tongue is long, and has a long, tapering reflexed point. Flowering season: Autumn. Distribution: Q'ld. and N.S.W. (Fig. C)



Notched-tongue Greenhood

This Greenhood (*Pterostylis furcillata*, Rupp) is a rare plant, known only from Kurri Kurri and Abermain, in New South Wales. It closely resembles *P. decurva*, but has basal leaves (usually two, but occasionally one to four), while the tongue is slightly notched. Flowering season: Autumn. Distribution: N.S.W. (Fig. A).

The Red Hood

The Red Hood (*Pterostylis coccinea*, Fitz.) apparently is a close relation to *P. decurva*, but the flower and the stem-bracts are larger. The flower is red or greenish-red, with darker bands. Flowering season: Summer. Distribution: N.S.W. (Fig. B).

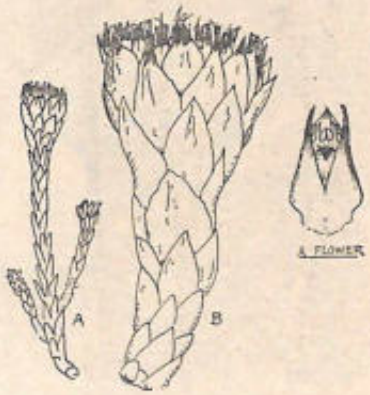
Scaly Greenhood

The extremely rare Scaly Greenhood (*Pterostylis squamata*, R.Br.) resembles *P. rufa*, but, as its name implies, has more scaly stem bracts (6 to 8). Usually it is under 10 inches in height, with one to three small flowers. The tongue, oblong with long hairs on the margins, is sensitive. Flowering season: Summer. Distribution: Vic., S.A. and Tas. (Fig. C).

Eastern Cactus Orchid

A remarkable subterranean species, the Eastern Cactus Orchid (*Cryptanthemis Slateri*, Rupp) was discovered at Bullahdelah (N.S.W.). The flowers are very small and numerous and the capitulum-like inflorescence resembles the flower of a daisy, or a cactus plant. The flowers expand when reaching the surface of the ground, but have a covering of fallen leaves, and other forest debris. Distribution: N.S.W.

(a) Habit of plant. (b) A detached "head" of flowers.



Large-leaf Greenhood

The Large-leaf Greenhood (*Pterostylis Vereenae*, Rogers) is like *P. furcata*, but has larger stem and basal leaves, which are very broad and thick and not stalked. Flowering season: Spring. Distribution: S.A. and Tas. (Mt. Bischoff). (See color plate).

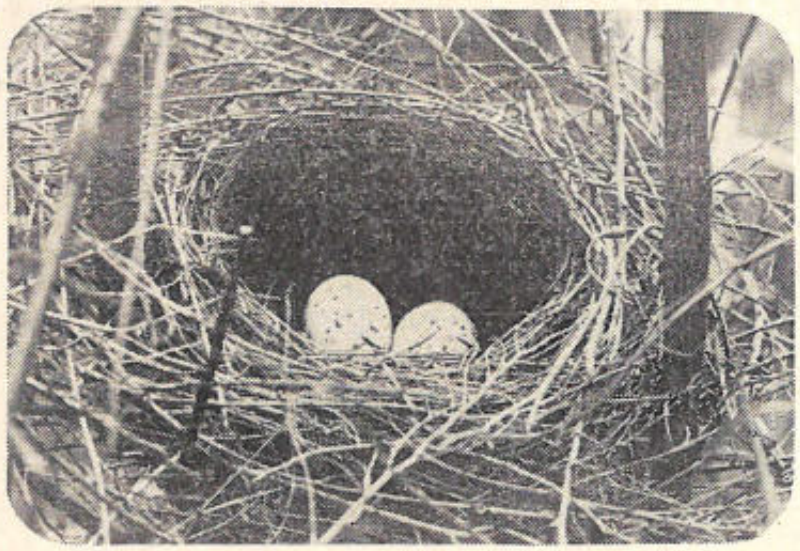
Clubbed Greenhood

The Clubbed Greenhood (*Pterostylis clavigera*, Fitz.) is a little-known form, doubtfully distinct from *P. nana*. It was found, many years ago, in the Mudgee district of New South Wales.



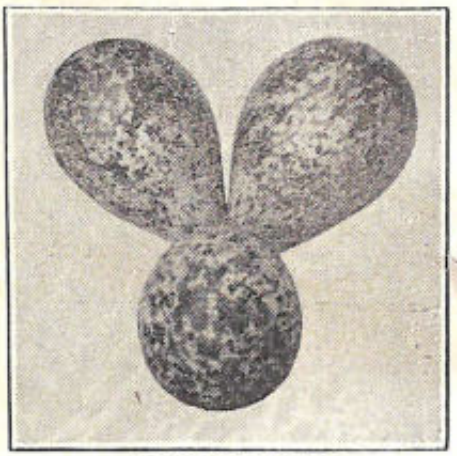
The Brown Hawk's Brood

Nests and Eggs of Australian Birds



THE COACHWHIP BIRD

The Eastern Coachwhip Bird (*Psophodes olivaceus*) forms a cup-shaped nest of twigs and rootlets and lines it with finer rootlets or grasses. It is rather loosely built, and placed at no great height from the ground—one may look into the nest, usually, without climbing. The eggs—two, occasionally three, form the clutch—are beautiful objects—pale blue or greenish-white with sepia black and pale grey or lavender markings, some resembling hieroglyphics.



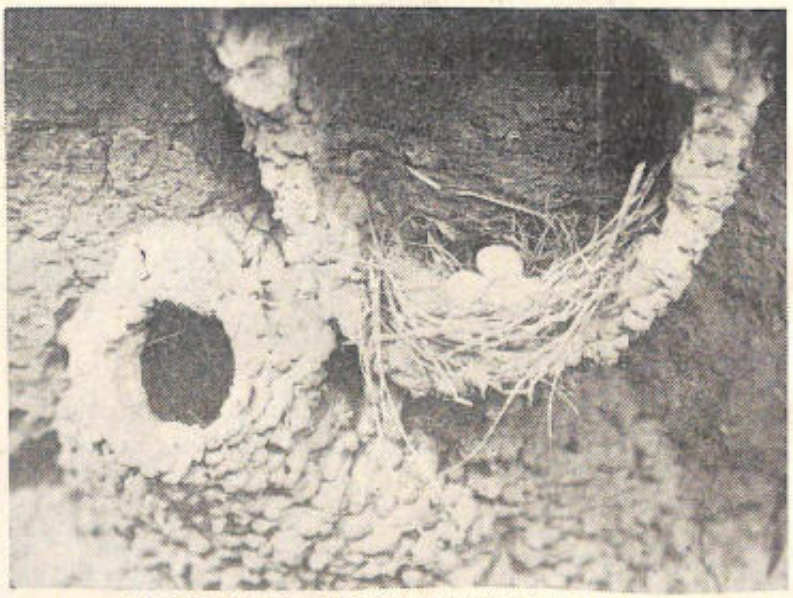
PLAIN WANDERER

The Plain Wanderer (*Pedionomus torquatus*), as its name denotes, is a bird of the open plains and grass lands. It seldom flies and when disturbed it generally crouches and remains still. The nest is a depression in the ground, grass lined, and placed in the shelter of a tuft of grass. The pear-shaped eggs, three or four in number, are a deep buff or stone-color, freckled and spotted with umber and slate-grey.

WHITE-EARED HONEY-EATER

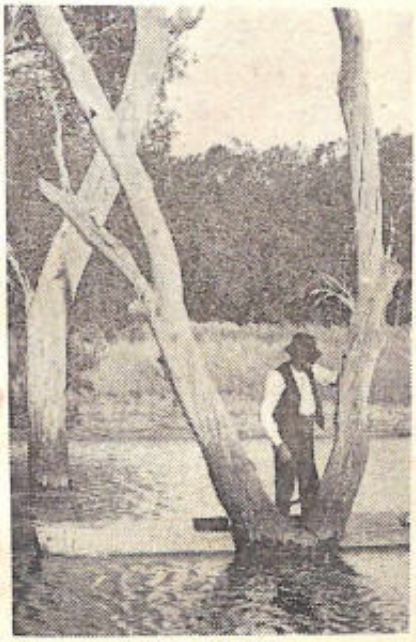
The rather deep, cup-shaped nest of the White-eared Honey-eater (*Meliphaga leucotis*) is built in a low tree, often wedged in an upright fork or in a low bush. The nesting material consists of bark and grasses with cobweb for binding, while the egg cavity is warmly lined, with fur, for example. The eggs are white or flesh-colored, with spots and blotches, pinkish-red and red-brown. The clutch may be two or three.





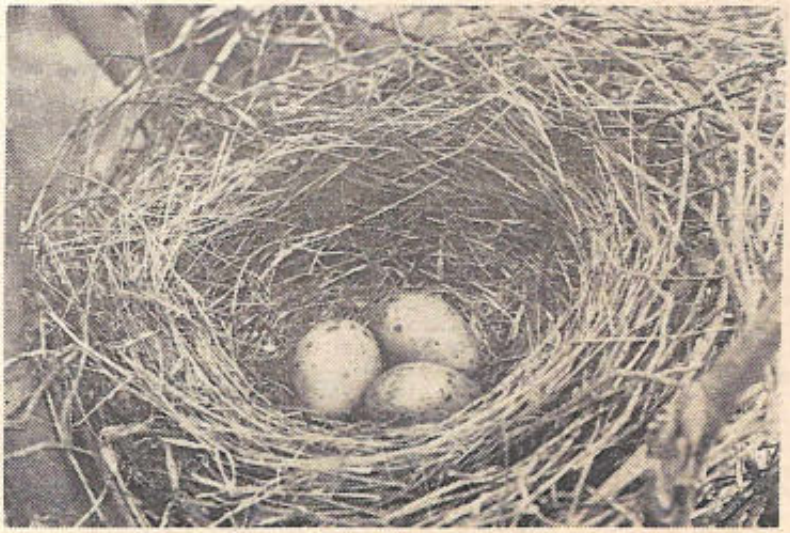
THE FAIRY MARTIN OR "BOTTLE SWALLOW"

Nesting in colonies under river-bank ledges, on cliff faces, beneath culverts and bridges, etc., the Fairy Martin (*Ptrochelidon ariel*) is a mason, its nest being formed of mud or clay pellets. A retort-shaped structure, it has earned for the bird the name "bottle swallow." The four or five eggs, glossy white, and sometimes slightly freckled with pale yellow-brown, rest on a soft bed of grasses and feathers.



THE GALAH

A hole in a dead tree which is standing in water is favored by the Rose-breasted Cockatoo or Galah (*Kakatoe roseicapilla*) for its nursery. Thousands of the birds nest in one locality, and several pairs may be neighbors in the same tree, if it contains suitable hollows. The number of eggs in a clutch varies from four to seven, five being usual.



THE GREY BUTCHER-BIRD

The Grey or Collared Butcher-bird (*Cracticus torquatus*) often called "Derwent Jack" and "whistling jackass," generally selects as a nest site a forked upright branch of a tree, at a considerable height—but it may be only about 15 feet from the ground. The nest is a shallow bowl of rootlets and twigs, with a lining of dry grass, rootlets, etc. The eggs—three or four to the clutch—are greyish-blue, grey-green, sometimes olive or pale-brown, with markings of purplish-red or red-brown.

Cockatoos and the Parrots (with few exceptions) nest in hollows in tree-trunks or "piped" boughs. All species lay white eggs.

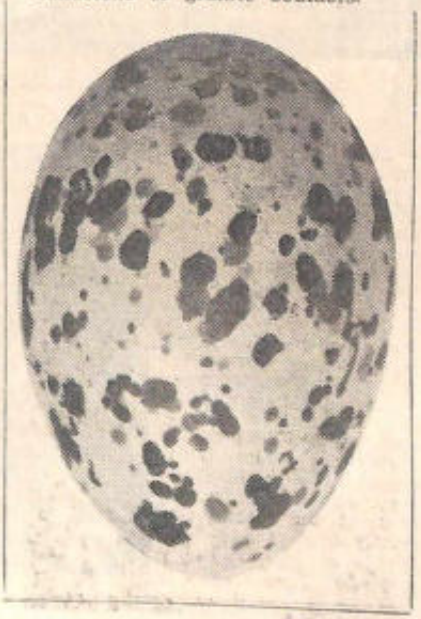


THE FAIRY PENGUIN

The Fairy or Little Penguin (*Eudyptula minor*) nests on islands and in some mainland localities where grass tussocks dot the sand dunes or the rocky shore affords sites beyond high-tide mark. The nest may be in a deep cavity of the rocks, or at the end of a burrow that goes under a low, spreading bush or a grass-tussock. The eggs are dull white, and two form the usual clutch, three being laid occasionally. Penguin chicks in the down are charming little dusky creatures.

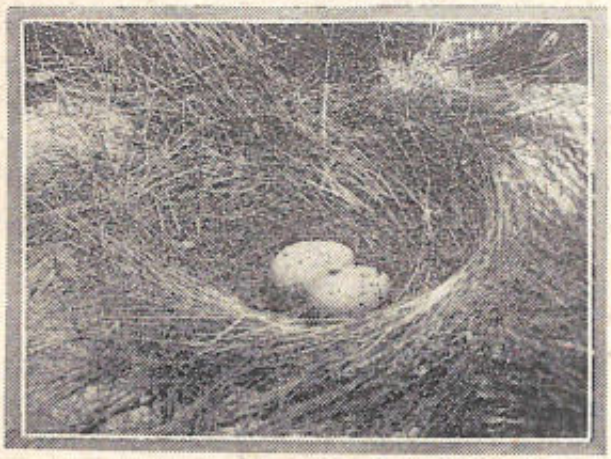
PIED OYSTER-CATCHER

Beyond reach of the longest water-tongue at high tide, the Pied Oyster-catcher (*Haematopus ostralegus*) has its nest—a shallow depression in the sand. It may be slightly lined and rimmed with seaweed, but usually the two pale, stone-colored eggs with umber and blackish-brown markings, are laid on the sand. Often the nest is hidden between low walls of rock—sandstone or granite boulders.



THE PACIFIC GULL

A giant compared with the Silver Gulls which have become so friendly around Port Phillip beaches, the Pacific Gull (*Gabianus pacificus*) is also a robber and a bully. It nests on islands, including some of those in Bass Strait. The nest is formed in a depression, usually, of grass, both stems and roots—sometimes with stalks of other plants, notably "pig-face" (*Mesembryanthemum*). Two to three eggs form the clutch. They are large, oval-shaped, and pale olive-brown in color with umber, lavender and reddish brown blotches.





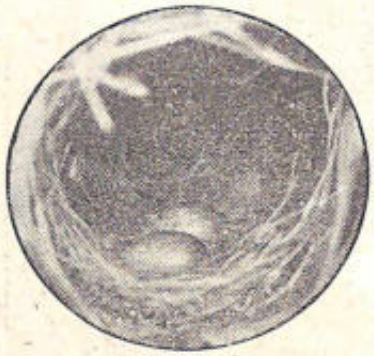
THE GOSHAWK

The Goshawk (*Astur fasciatus*), nicknamed "chicken-hawk," builds a flattened nest of sticks with a lining of leaves. It is placed high among the branches of a gum tree; a horizontal fork often being chosen as the site. The tree may be one of moderate height, or a lofty eucalypt. Two to four eggs form the clutch. They are of a bluish-white color in some cases, with lavender spots and other marking — red, brown or lavender.

THE SORDID WOOD-SWALLOW

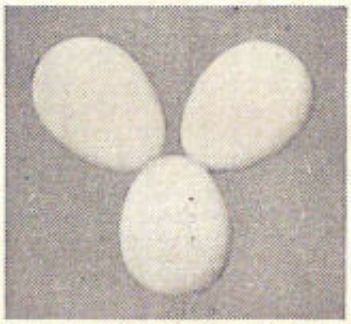
The nest of the Sordid or Dusky Wood-swallow (*Artamus cyanopterus*) is cup-shaped and constructed of fine twigs mostly, the egg cavity being lined with horse-hair in some cases, but more often with rootlets and grass. It may be built in a tree fork, on a tree stump, or some other situation, a cavity in an old, decaying fence post, for example. The eggs, two to four in the clutch, are creamy-white or white with blackish, grey, and brown markings, at the larger end mostly.





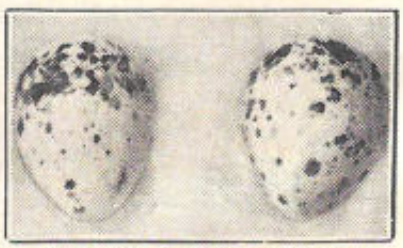
THE BRISTLE-BIRD

The Rufous Bristle-bird (*Dasyornis broadbenti*), whose curious axle-creaking note has earned it the name "cartwheel-bird," forms an oval nest of dry grass stems and wiry rootlets. It is placed close to the ground and well hidden in thick scrub. The eggs — two form the clutch — are pinkish-white or purplish-white, thin-shelled and freckled and spotted with purplish-brown.



GREY-BACKED SILVEREYE

A neat little cup-shaped structure made chiefly of fine grasses bound with cobwebs, the nest of the Grey-backed Silvereye or Blight-bird (*Zosterops lateralis*) is generally placed in a shrub or tree up to 15 feet from the ground. Three or four beautiful pale blue eggs form the clutch.

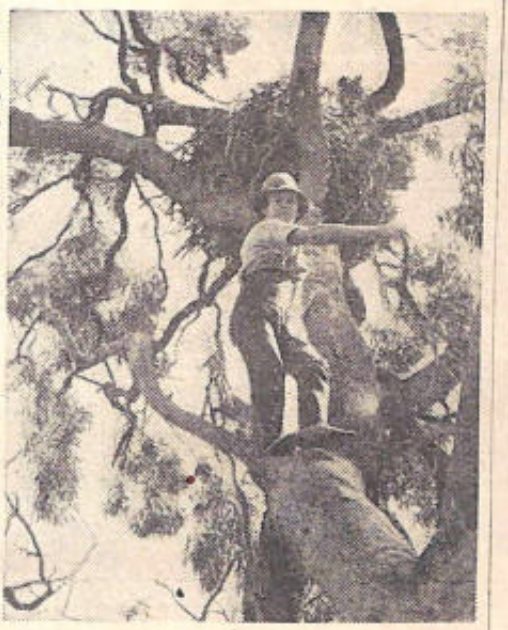


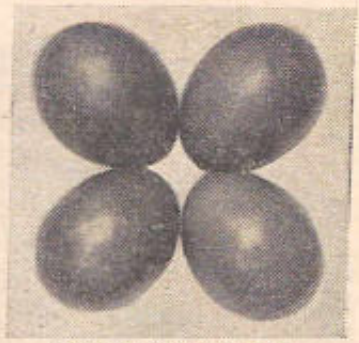
ORANGE-WINGED SITELLA

Sitellas or Tree-runners are noted for their neat little camouflaged nests, built in dead trees—they fit into the small fork of a limb, and often are from 40 feet to 50 feet above the ground. Sharp eyes are needed to detect the nest of the Orange-winged Sitella (*Neositta chrysoptera*), which is constructed of cobweb and spiders' egg-bags, cleverly interwoven, and covered with "shingles" of bark from the nest-tree. Three eggs are laid to the clutch, as a rule; the color is greyish-white; the markings, spots and blotches are olive and slate-colored.

WEDGE-TAILED EAGLE

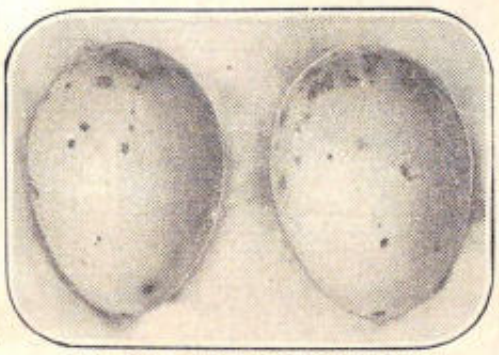
Exceeded in size perhaps by the monkey-eating species of the Philippines, but no other eagle, the Wedge-tailed Eagle (*Uroaetus audax*) is distributed over Australia generally, and also inhabits Tasmania. The "eagle-hawk's" nest is a huge structure of sticks large and small, with a lining of stringybark, sometimes of grass, and green foliage. It is built, in forest country, in a tall, commanding tree. Where such trees are lacking, the site may be a low bush, and the nest material chiefly dry grass, etc. The usual clutch consists of two eggs—occasionally three are laid. They are round-oval, with spots and blotches of dull purple, chestnut or rust-red. Some specimens are devoid of markings.





SPECKLED WARBLER

Little Field Wren and Speckled Warbler are the naturalists' names for this remarkable bird (*Cthonicola sagittata*); popularly it is known as the "blood-tit" or "Speckled Jack." The nest, placed in a depression in the ground and difficult to find, is domed, with a side entrance. It is formed mostly of dry grasses and cosily lined. The eggs—three or four to the clutch—are richly colored, reddish-brown (cochineal red) and glossy, with a belt of darker color at the large end. Their coloration suggested the name "blood-tit."



THE BLUE-FACED HONEYEATER

Pleasure lives in height, for the Blue-faced Honeyeater (*Entomyzon cyanotis*); at least, the nest of the "blue-eye" or "banana-bird" — poular names for the species — often is built on a lofty bough. A flat base of sticks and twigs supports the nest proper, which is cup-shaped and constructed of pieces of bark with a lining of softer material, including hair and dry grass. The eggs—two to five form the clutch — are pale buff or salmon colored, with purplish-red or chestnut-brown spots and blotches.

BROWN WARBLER



The Brown Warbler (*Gerygone richmondi*) builds a dome-shaped nest with a spouted entrance and a "tail." It is suspended, as a rule, from a vine or a slender twig. The eggs—clutch two to three—are white or white with a reddish tinge, and ornamented with fine spots and blotches of purple-red or red. The freckles usually form a zone at the larger end of the egg.

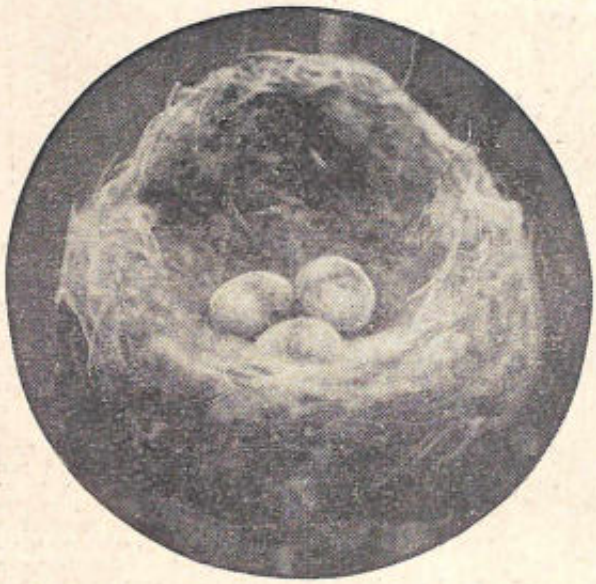
THE MUSK DUCK

The nest of the Musk Duck (*Biziura lobata*), though bulky, is well hidden, often down in the midst of plants whose stems are used in its construction. The large, pale green eggs rest on a warm bed of down or grass. Clutches of two or three are usual. The nest may be covered in, the rush stems being bent down and over; or it may be made in a stump or a log, or a depression in the ground.



THE PALLID CUCKOO

The Pallid Cuckoo (*Cuculus pallidus*), that harbinger of spring, invariably selects as foster-parents birds that build open nests. Possibly this is done because of its size, which would not permit it to enter the little dome-shaped nest of smaller birds. The egg is generally a uniform pink or flesh color with one or two spots of dark red. In some instances, the foster-parent is the White-browed Wood-Swallow (*Artamus superciliosus*), the eggs of which are a light greyish-green, freckled with deep brown, forming a zone at the larger end.



THE WILLY WAG-TAIL

Willy Wagtail is the most popular name for the Black - and - white Fantail (*Rhipidura leucophrys*), a friendly little favorite. Its nest is a cup of bark - strips with a cobweb binding, material also used to fasten the structure to a horizontal bough —often one overhanging water. Three or four eggs go to the clutch; they are yellow-brown or of a rich cream-color, with a zone of markings about the larger end.

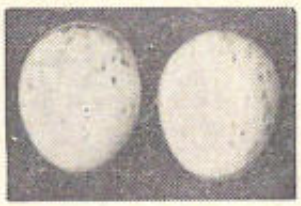


SPOTTED NIGHTJAR

The Spotted Nightjar (*Eurostopodus guttatus*) dispenses with a nest, laying its one egg on the bare ground, sometimes on freshly-ploughed land. The egg is yellowish-olive, with some spots and blotches of reddish-purple or lavender-hued markings.

STRIATED GRASS-WREN

Very often placed in the heart of a clump of spinifex or "porcupine" grass, the nest of the Striated Grass-wren (*Amytornis striatus*) is not only difficult to find but difficult to approach when found. It is a partly domed structure composed chiefly of grasses and bark, and the two eggs are white, freckled with reddish-brown, particularly about the larger end.





GREY-CROWNED BABBLER

Placed in a tree at no great height from the ground, the nest of the Grey-crowned Babbler (*Pomatostomus temporalis*) is a large domed structure made of twigs. It has a side entrance and is cosily lined with soft material. Three to six eggs form the clutch, and these are a greyish-brown or buff color marked with hair-like streaks of black or dark brown.



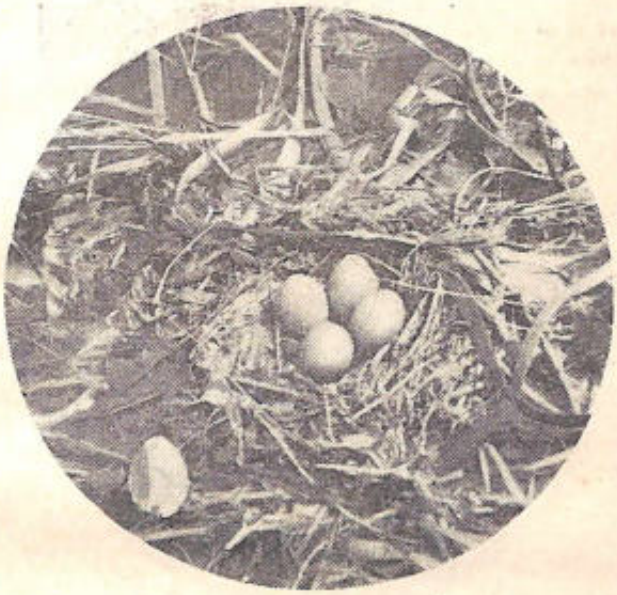
THE STONE-PLOVER OR CURLEW

Without the eggs, the nest of the Stone-Plover or Curlew (*Burhinus magnirostris*) would never be noticed. The birds may use a slight depression for the nursery, or make a pretence, as it were, of nest-forming, by clearing a small space among twigs, etc., on the ground. Two eggs form the clutch. Their coloration is variable; but commonly the ground-color is pale yellowish stone, with light brown and dull umber markings.



GREAT BOWER-BIRD

Measuring about eight inches over all, the open nest of the Great Bower-bird (*Chlamydera nuchalis*) is constructed of twigs, and has no lining. It is placed in a tree, at a height varying from about 9 feet to 15 feet. The clutch consists of one egg, or perhaps two. The ground color is grey-green, with a fine tracery of olive-brown, dark brown and umber markings.



THE LITTLE GREBE

The eggs of the Little Grebe (*Podiceps ruficollis*) are bluish-white when fresh, but become stained a raw sienna hue. From four to six is the average clutch, seven or eight being laid occasionally. The nest is a rounded raft of reed stems or other aquatic vegetation, afloat in the midst of water plants, moored to rushes, or perhaps to a snag or a pile of debris.



MANY-COLORED PARROT

The Many-Colored or Mulga Parrot (*Psephotus varius*), a bird familiar to folks in the Mallee, nests in a hole in the trunk of a tree or a hollow bough. It prefers a tree on the bank of a stream, but often nests in one distant from water. The eggs are white, and from four to six are laid to the clutch.



BLACK-FACED CUCKOO-SHRIKE

A well-concealed nest is that of the Black-faced Cuckoo-shrike (*coracina novae-hollandiae*) the "blue jay," or "summer-bird," of many young folk. It is a small, round, nearly flat structure, composed of twigs, grass, rootlets, etc., built in the angle of forked horizontal branches of a tree. There are usually three eggs, of an olive-green color, well spotted with varying shades of deep brown.

BLACK-FRONTED DOTTREL

Inland swamps and streams are favored by the Black-fronted Dottrel (*Aegialitis melanops*), and its nest is a slight depression on a sandy rise, among riverside shingle, or the pebbly bed of a dry watercourse. Three eggs are laid in a clutch. They are of pyraform shape, and yellow-buff or light stone color, closely marked with lines and dots of umber; there are also greyish markings. They are hard to find, since they harmonise with their surroundings; the chicks, too, are protectively colored.





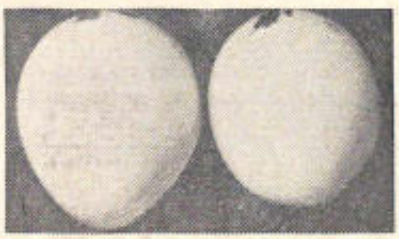
CRESTED TERN

The Crested Tern (*Sterna bergii*) forms large colonies in nesting time, on islands off the coast. The nest is merely a depression, and generally one egg is laid; clutches of two are not numerous. The eggs are stone-colored, pale or dark, with handsome markings in brownish black and umber. There is much variation.



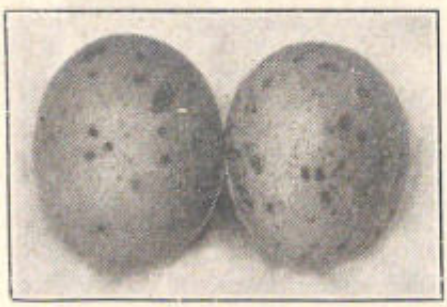
THE WHITE-BREASTED CORMORANT

Frequenting rocky coasts, islands and inlets chiefly, the White-breasted Cormorant (*Phatacrocorax fuscescens*) nests in colonies. Island rookeries often are formed on slippery rocks within reach of the spray, and many nests may be clustered, while others are yards apart. Nesting material consists of seaweed, etc. The eggs—two to four form the clutch—are bluish-white, but the color mostly is concealed by a limy coating. There are cormorant rookeries on Storehouse Island and other isles of Bass Strait.



GREY JUMPER

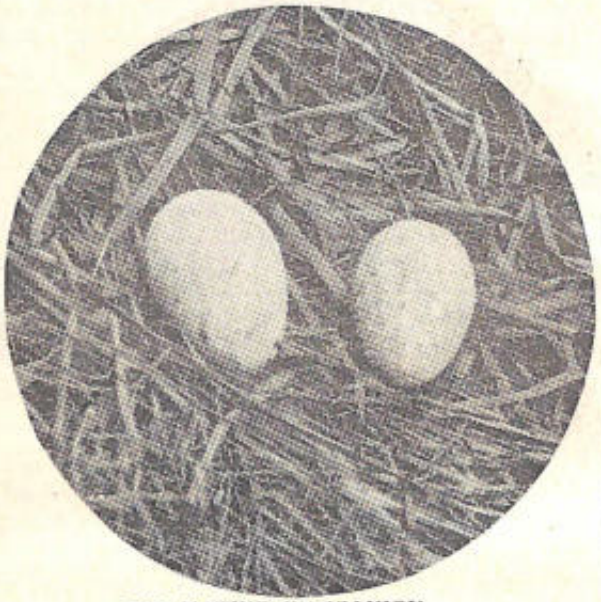
The Grey Jumper or Apostle-bird (*Struthidea cinerea*) is one of the few mud builders, making its basin-shaped nest of mud, with grass as a means of reinforcing and lining. The clutch consists of from five to eight eggs, almost white, with a few large spots of black and grey on the larger end.



SPOTTED CRAKE

Among the reeds in marshy localities or on the banks of streams the Spotted Crake (*Porzana fluminea*) constructs its open nest of coarse grasses. Like all Crakes and Rails, it is a very elusive bird, and is seldom seen. Five or six eggs are laid, the basic color being olive-grey, tinged with red and spotted with reddish-brown.

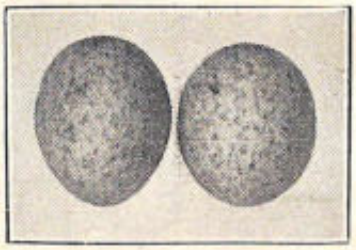
The Brolga, or Native Companion (*Megalorins rubicundus*) lays two eggs to a clutch. White or light drab, and glossy, they are ornamented with some umber or purplish-red blotches. The nest is a flat structure of coarse grass, reed stems, or other aquatic vegetation, with an addition of sticks, etc., in some cases. It may be built on a tiny islet in a swamp, or in the midst of a lagoon, when the egg cavity is almost awash. Often the Brolga is content with an "apology" for a nest, and lays its large, elongated eggs on the bare ground.

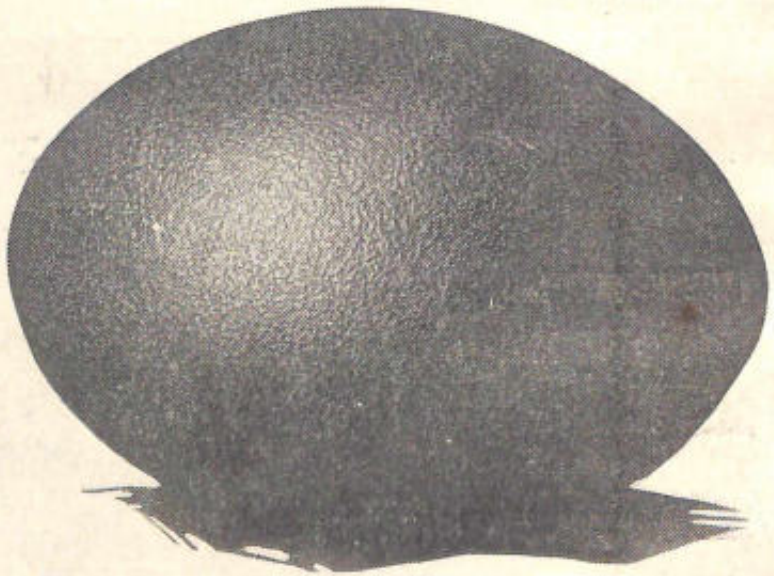


THE NATIVE COMPANION

BROWN TREE-CREEPER

Secure in a hollow limb or trunk of a tree, or even in a hole in a fence post, the Brown Tree-creeper (*Climacteris picumnus*) makes its comfortable nest of fur, feathers and hair. The clutch consists of two or three eggs, which are pinkish-white, liberally freckled with deep red.





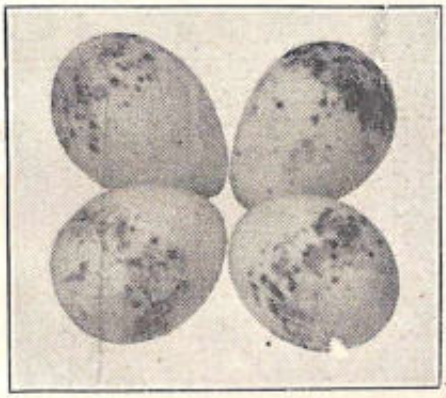
THE EMU

The nesting habits of the Emu (*Dromaius novae-hollandiae*) are of special interest. Weather conditions may cause the birds to nest in the autumn or winter time; or delay the season until late in the year. The nest, generally, is formed by the trampling of grass or other herbage into a more or less oval platform, 4 feet or more in diameter. In some cases, twigs, bark, etc., are used also as nesting material. The average is about nine, but from seven to 18 eggs, pale green with dark granulations, may form the clutch.



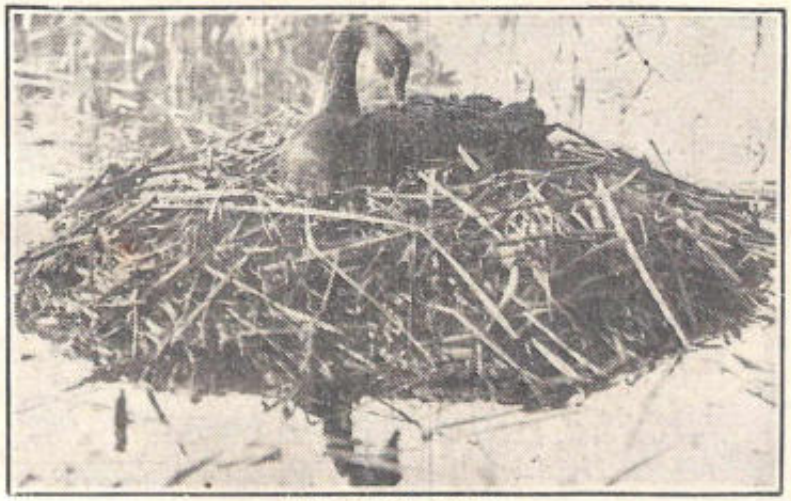
THE MARSH TERN

The Whiskered Tern or Marsh Tern (*Chlidonias leucoparela*) nests often in large numbers, amid aquatic plants on lakes and lagoons, also in swamps. The nest is flat and composed of water-plants or rush stems; usually it is afloat, but kept from drifting by dense surrounding vegetation that carpets the surface of the water. The eggs — two to four form the clutch — are greenish-buff, ornamented with dark markings, which vary considerably.



THE MAGPIE LARK

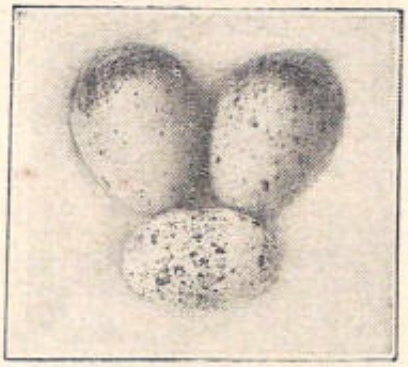
The bowl-shaped mud nest of the Magpie Lark (*Grallina cyanoleuca*), more often termed the Mudlark or Peewee, placed on a bare horizontal limb of a tree, is a familiar sight to most people. In number and color the eggs vary considerably, but usually the clutch consists of four of a pale pink ground color with a band of deep red or reddish-brown spots round the larger end.



THE BLACK SWAN

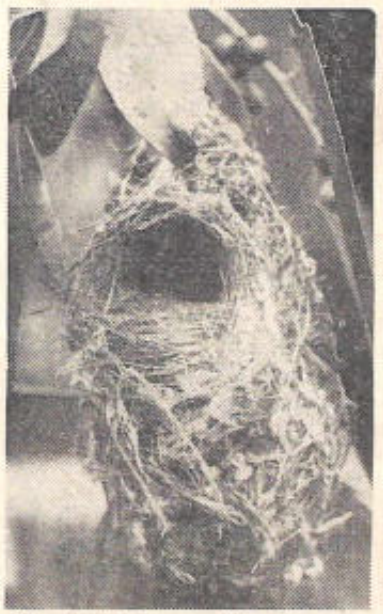
The architecture and the building material both vary, but always the nest of the Black Swan (*Chenopsis atrata*) is bulky, and where hundreds of the birds are breeding, their nests resemble islets scattered over the shallows of swamp, lake or lagoon. Or they may be dotted, like hollow-topped mounds, on an island or lake-promontory. Aquatic plants mostly are used in construction, and the egg-cavity is sparingly lined with down. The eggs are greenish-white or of a pale green hue; five to about nine form the clutch.

NARROW-BILLED BRONZE CUCKOO



The Narrow-billed Bronze Cuckoo (*Chalcites basalis*) shows a preference for dome-shaped nests as nurseries for the young it will not rear itself. More than 60 species, including several species of Malurus, the Yellow-tailed Thornbill, Brown Thornbill, the Fantail Warbler, the Emu-wren, the Scarlet-breasted Robin and the Silver-eye, have been recorded as foster-parents of this cuckoo. The egg, which is pinkish-white, covered in pinkish-red spots or finely freckled, in the illustration, is shown with those of the foster parent—a Yellow-breasted Robin.

STRIATED THORNBILL



Of Thornbills or Tits there are many kinds, but none builds a neater nest than that of the Striated species (*Acanthiza lineata*), of eastern and southern Australia. Oval to pear-shaped and pendant (from twigs of a gum tree usually), it is beautifully constructed of fine reddish brown bark, with an admixture of dry grass and cobweb. The egg cavity is lined with some soft material, often feathers. Three eggs are laid to the clutch. They are glossy and pearly or pinkish-white, freckled with chestnut or red-brown and purple-brown. These markings form a zone at the larger end of the egg.



WHITE-BROWED SCRUB-WREN

The bulky nest of the White-browed Scrub-wren (*Sericornis frontalis*), is placed, as a rule, near the ground, and hidden in a loose heap of debris or among the dead twigs and leaves of a fallen bough. It may be placed in a bush or a clump of sword-grass. More or less rounded, with an entrance at the side, it is loosely made of bark, grass stems, withered leaves, etc. Three eggs form the clutch; the ground color varies from pale purple-buff to grey or buffy-white, and the markings are purplish brown, forming a zone at the larger end.

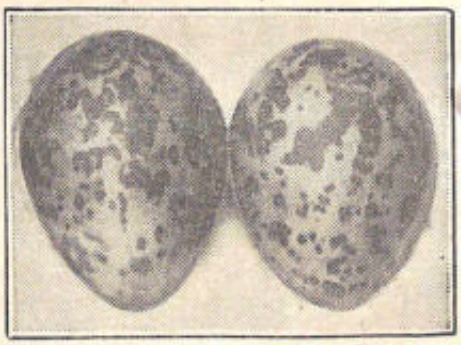
"Bark-tit" is a boys' name for the Buff-tailed Thornbill (*Acanthiza reguloides*), which ranges from Southern Queensland to South Australia. It likes open forest country, and scrublands, and is found also on lightly-timbered hillsides. Its dome-shaped nest, with a small side entrance, is constructed of bark and fine grass stems, mingled with cobweb; the egg cavity being lined with feathers. Three to four eggs are laid to the clutch. The shell is of fine texture and glossy, warm fleshy-white or white, freckled, mostly at the larger end, with reddish-brown, pale red or purplish-brown.

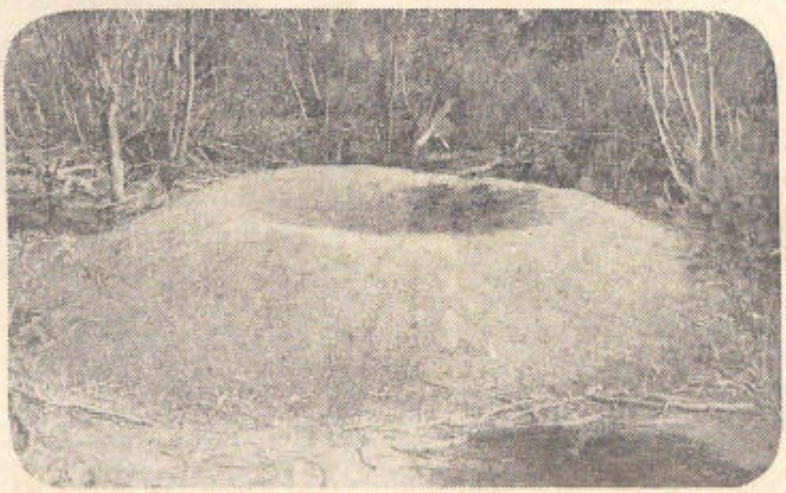
THE BUFF-TAILED THORNBILL



WHITE-HEADED STILT

The nest of the White-headed Stilt (*Himantopus leucocephalus*) when situated in a swamp, is constructed of dry aquatic herbage, twigs, etc., but it often is merely a shallow depression, lined sparingly with grass, in dry ground or by the waterside. Four eggs constitute the clutch. They are greenish-stone or olive-yellow in color, heavily marked with dark purplish-brown spots and blotches, and fainter markings of lavender.





THE MALLEE FOWL

A column would be needed to give a description of the nest-mound and nesting habits of the wonderful Mallee Fowl or Lowan (*Lipoa ocellata*). The mound—an "open" one is illustrated—is pyramid-shaped and formed of sand, twigs and debris—a mixture of materials—gleaned from far and near by the birds. In the midst is the "hot bed" of fermenting leaves, etc. The eggs are large and beautifully tinted, delicate pink or pinkish-buff, when they are fresh. From five to six to a dozen or more may be found in one mound. They are placed in the hot-bed in layers.



EASTERN SHRIKE-TIT

Near the top of a gum sapling, up to 50 feet from the ground, is the favorite nesting site of the Eastern Shrike-tit (*Falcunculus frontatus*). The nest is a deep cup-shape, composed of fine strands of bark bound with cobwebs. The eggs — two or three—are white, spotted chiefly on the larger end, with black and grey.

THE "SMOKER" PARROT

"Smoker," this beautiful bird (*Polytelis anthopeplus*) generally is called. Its other popular names include Regent Parrot, Black-tailed Parrot, and rock pebbler. In the Mallee National Park, north of Rainbow, it nests in fair numbers, choosing either a tree-hollow or a hollow limb for the nursery. The eggs, as is the rule among parrots, are white; four to six form the clutch.





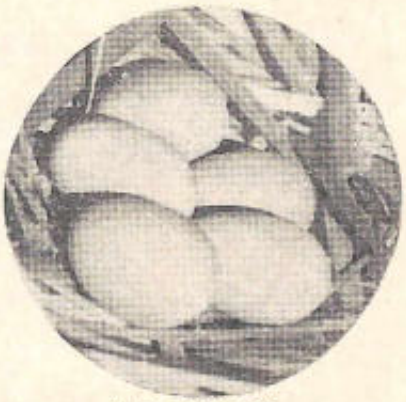
SCARLET-BREASTED ROBIN

The Scarlet-breasted Robin (*Petroica multicolor*), places its cup-shaped nest of bark, dry grasses and spiders' web (for binding) on a horizontal bough, in a forked one, or perhaps conceals it behind a flake of bark projecting from a gum tree bole. The eggs are freely marked with brown, umber, and purple-grey, on a bluish or greenish-white ground. Three or four constitute the clutch.



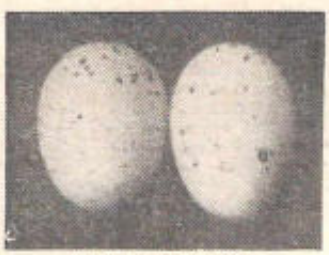
THE STRAW-NECKED IBIS

This "farmer's friend" — one of the most valuable birds as a destroyer of insects, notably grasshoppers — nests in very large colonies. Frequently the site for one of these bird cities is a lignum swamp, and several nests may occupy one straggling bush. The Straw-necked Ibis (*Threskiornis spinicollis*) lays from three to five dull white eggs, the nest being a more or less hollowed platform made of lignum sticks, reed or rush stems, etc., according to the situation.



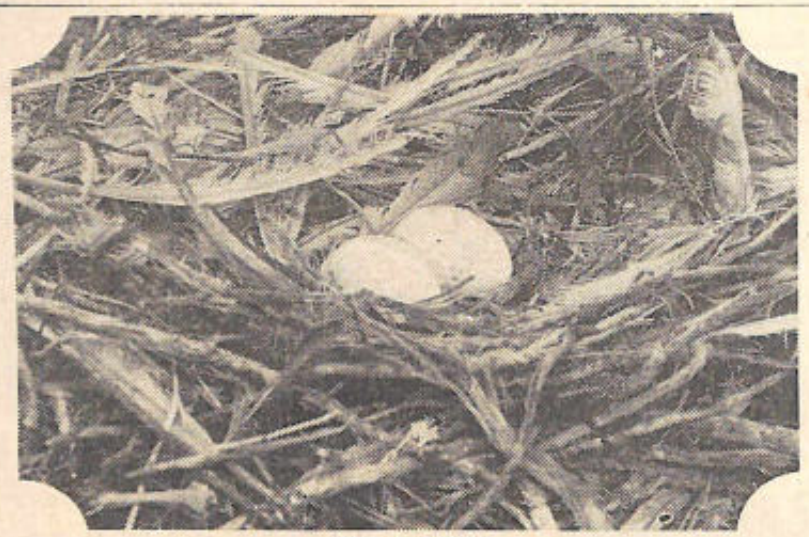
THE BITTERN

The Australian or Brown Bittern (*Botaurus poiciloptilus*) sometimes termed the "bull-bird" and "boomer," hides its platform-nest of reeds or rushes in the heart of a swamp or a lagoon. A difficult nest to discover. The eggs—four or five constitute the clutch—are pale olive green, and lustrous.



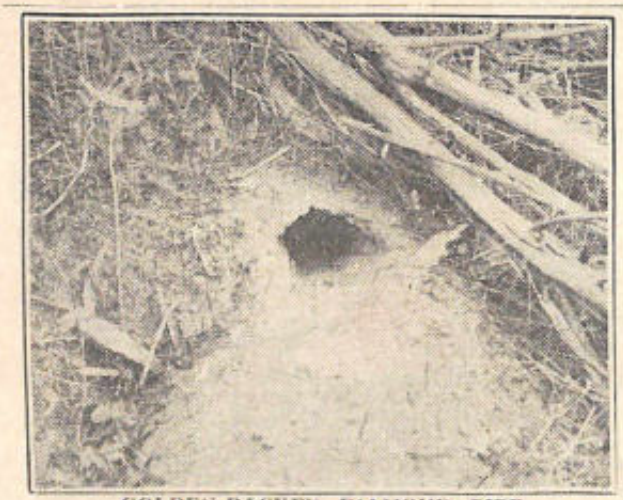
THE WEDGEBILL

Situated in a bush a few feet from the ground, the Wedgebill (*Sphenostoma cristatum*) makes a shallow cup-shaped nest of twigs and grass, lined with finer material such as fur, shredded bark or fine grass. In color the two eggs—occasionally three—are a rich blue, sparingly spotted with black towards the larger end.



THE PELICAN

There are many Pelican islands, some in the sea, others in rivers. The Pelican (*Pelecanus conspicillatus*) also forms big colonies on temporary islands where flood-waters have created ideal conditions for nesting. The nest is formed, usually in a depression, of sticks, grasses, moulted Pelican feathers, etc. Two or three eggs are laid to the clutch; they are unlovely objects—dull or yellowish-white, and often patchily coated in lime.



GOLDEN-BACKED DIAMOND BIRD

The Golden-backed Diamond Bird or Yellow-tailed Pardalote (*Pardalotus xanthopygius*) makes a rounded nest of bark, with a side entrance, at the end of a tunnel excavated in a sandy rise or hard ground. The hole is drilled obliquely and measures about 2 feet in length. A cavity to contain the nest is formed. The eggs are white and glossy, of a round-oval shape, and four form the clutch.

Jacky Winter, the Brown Flycatcher (*Microica fascinans*), a friendly little bird with a number of popular names, delights in high nest-sites. The nest is so small, it is hard to detect, a saucer of fine grasses, bark, etc., built across the horizontal fork of a bough, perhaps 60 feet above the ground. Often, however, the site is much nearer to the ground. Two eggs form the clutch — greenish - blue eggs, prettily marked with purple-brown and greyish-lilac.



THE BROWN FLYCATCHER



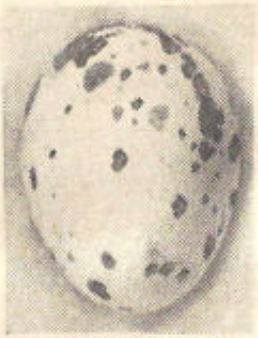
NOISY PITTA

Three to four eggs are laid to the clutch by the Noisy Pitta (*Pitta versicolor*). They are roundish, with a fine textured shell whose pearly white, glossy surface is blotched and spotted with chestnut, dark-brown and purple-grey. The nest, dome-shaped with an entrance at the side, is constructed of sticks, dry leaves, fern fronds, etc., and situated close to, or on, the ground.



THE LANDRAIL

The Banded Landrail (*Hypotaenidia philippinensis*), known also as Pectoral Rail and "Corncrake," builds its open nest of dry grasses and other plants among herbage in a swampy place in a tussock, or other "hidden" spot. The eggs number four to six, sometimes the clutch is much larger. They are handsomely marked in purple-red, brownish-red, etc., on pale buffy-white or richer, cream-buff ground.



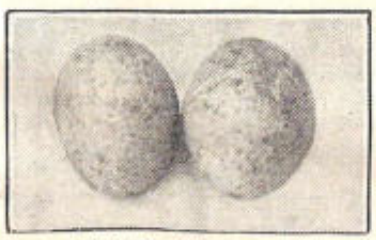
GREY THRUSH

The nest of the Harmonious Thrush or Grey Shrike-thrush (*Colluricincla harmonica*) is built in various situations, among them being a wide crevice in the trunk of a burnt tree, the hollow top of an old stump, and an upright tree fork at a height of about 8 feet to a dozen feet. Large and cup-shaped, the nest is formed of bark, grass, roots, etc., with a lining of finer material—rootlets and grass stems. Three to four eggs go to the clutch. The shell is creamy—or pearly white, with olive-brown, olive, and light grey spots and blotches.



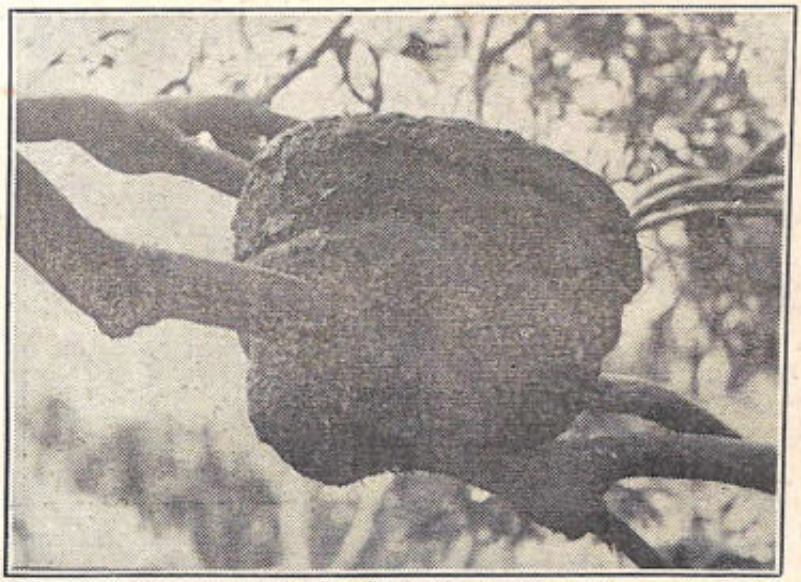
THE DELICATE OWL

The Barn Owl (*Tyto alba*) or Delicate Owl, as it is commonly termed, lays from three to as many as seven eggs to the clutch. They are dull white and oval in shape. The nest is either a hole in a tree-trunk, or a hollow limb. Usually a dead tree is chosen, sometimes one standing in a creek or a billabong. The Barn Owl roosts in tree hollows in the daytime and may use its retreat also as a nursery.



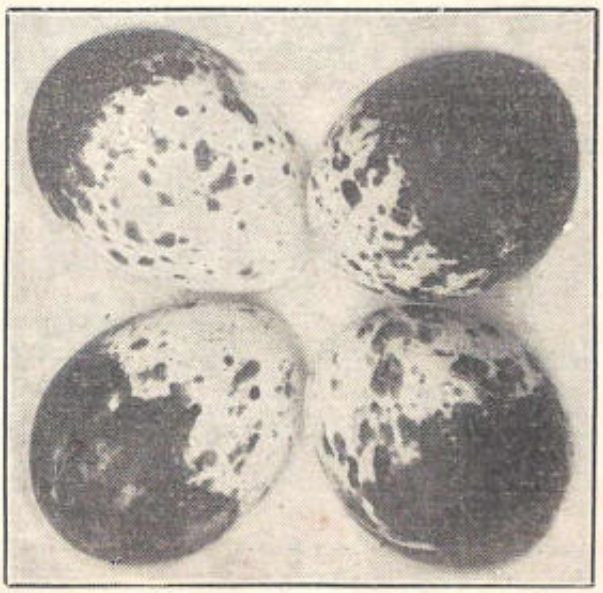
BROWN SONGLARK

Chiefly it is a ground dweller, but nevertheless the Brown Songlark (*Cinclorhamphus cruralis*) may be seen rising from the middle of a crop and ascending into the blue, singing and trilling in a similar manner to that of the British Skylark. The nest is cup-shaped, composed of dried grasses and placed in a depression in the ground. The clutch consists of three or four eggs, white or pinkish-white, liberally freckled all over with red, particularly at the larger end.



WHITE-WINGED CHOUGH

Like a big "pudding basin" made by some primitive potter is the mud nest of the White-winged Chough (*Corcorax melanorhamphus*), also known as "black jay" and "black magpie." As a rule, several choughs share the task of nest-building, and two hen birds may use the one nest. As many as nine eggs may be found in a nest, but usually from five to seven. They are creamy-white, ornamented with blackish-brown and olive-brown spots and blotches, and other markings of a slate-grey hue.

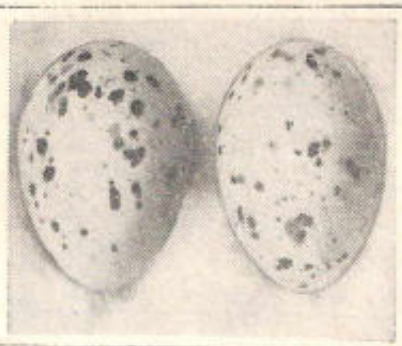


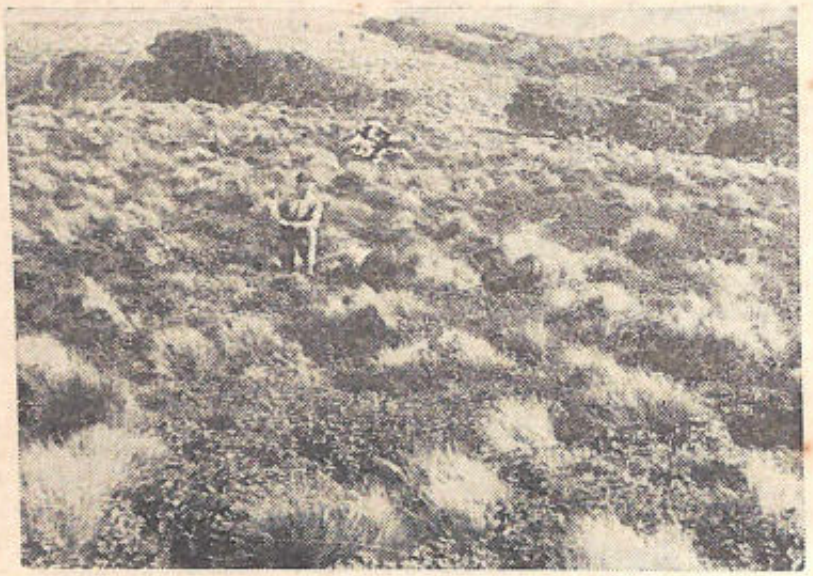
BLACK-SHOULDERED KITE

The Black-shouldered Kite (*Elanus axillaris*), which preys upon lizards, rodents, and insects (the larger kinds), builds a flattened stick nest, with a lining of leaves; or it benefits by the labor of other birds. Many a kite brood is reared in an old nest of the Magpie or a Raven's deserted nursery. The whitish eggs bear reddish-brown blotches, which may be spread over the shell or practically confined to the larger end.

OLIVE-BACKED ORIOLE

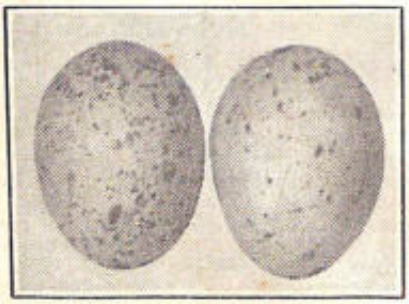
A lofty pendulous bough usually is selected by the Olive-backed Oriole (*Oriolus sagittatus*) for its deep, open nest formed of soft stringy-bark or that of a Melaleuca (paper-bark), and lined with dry grasses. Into the outer walls leaves, in some cases pieces of string and jute, are woven. The nest is slung by the rim to slender stems, perhaps 50 feet or more above the ground. The three eggs are glossy, light cream ground color, with spots and some blotches of umber and grey.





THE MUTTON-BIRD

Mutton-birds (*Puffinus tenuirostris*) nest in extensive rookeries, notably on certain islands in Bass Strait, and at Cape Woolamai, Phillip Island. The "Cape" is sanctuary for the birds, but annually a harvest of eggs and young is gathered from the Bass Strait rookeries. The egg of the Mutton-bird or Short-tailed Shearwater is white; one forms the clutch. The nest is a hollow, lined with grass or feathers, at the end of a burrow.



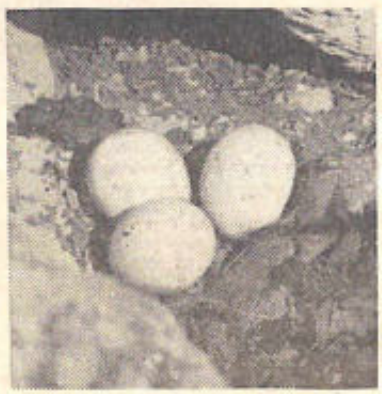
SPOTTED QUAIL-THRUSH

Like most ground-dwelling birds the Spotted Quail-thrush or Ground-bird (*Cinclosoma punctatum*) builds its nest at the foot of a tree or tuft of grass The material used is strips of bark, leaves and grasses, loosely put together in the shape of a cup and lined with softer materials. The two eggs—occasionally three—are yellowish-white, spotted, particularly on the larger end, with blackish-brown and grey.

GROUND-LARK

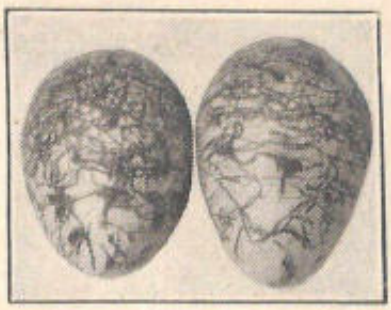
The nest of the Ground-lark (*Anthus australis*) is an open, cup-shaped structure of dry grass, filling a depression in the ground, the rim usually being level with the surface. A tussock may be selected as the site, and generally, the nest is sheltered, perhaps by waving grasses. Three to four eggs form the clutch. Their surface is slightly glossed and the color varies from light drab to a greyish hue, finely and freely marked with freckles.





THE ROCK PARROT

The Rock Parrot (*Neophema petrophila*), of South and Western Australia—coastal areas and some of the islands—is happily named: it delights in rocky places. The nest is a hole in a cliff, or, as on an islet in Kellidie Bay, a crevice in craggy limestone or a cavity beneath a rock. From three to five eggs, pure white, form the clutch.



SPOTTED BOWER-BIRD

The Spotted Bower-bird (*Chlamydera maculata*) builds a shallow, open nest of thin sticks and twigs, the lining consisting of fine twigs, or dry grass in some cases. The site is in a tree at various heights—up to about 30 feet. The eggs—two to the clutch—are of a light greenish-yellow color, thickly marked with a tracery of blackish-brown, umber and purple-grey lines.

THE GOLDEN WHISTLER

Golden voiced and with rich yellow in its plumage, the Golden Whistler (*Pachycephala pectoralis*) is happily named. The nest is constructed of rootlets, grass stems, leaves, etc., and placed in the fork of a tree or among a cluster of twigs and foliage, often within hand's reach from the ground. The eggs are white or stone-colored, with handsome dark markings at the larger end, which form a zone.

The Fairyland of Fungi

While toadstools are unlikely ever to become such general favorites as wild flowers and ferns, interest in fungi is increasing. Hitherto, there has been no popular guide to even the commonest Australian kinds. Here is an introduction to the Fairyland of Fungi. The color illustrations should enable anyone easily to recognise the toadstools dealt with in the following notes:—

Gilled-fungi or agarics are divided into genera primarily on the color of their spores, which may be either white, rosy, rusty, purplish or black. The genus **Cortinarius** (meaning "a veil") is typified by rusty-colored spores and a delicate, web-like membrane, which is stretched across the gills to protect them while they are young. This is the largest genus of all the gilled-fungi, and has, in England alone, more than 200 representatives—indeed, probably more than half the total kinds of agaric in Northern Europe belong to this one group.

A remarkable feature of Cortinars is the almost endless variety of colors which they display; many of them are "Gems of the Bush," conspicuous objects in nearly every forest during the winter time. But they attain best development in the cooler parts of our island-continent.

The species illustrated on the color plate are—

(1) Cortinarius cinnamomeus.

This toadstool is common in temperate regions, the color of the cap varying from a beautiful bottle-green, through bronze and brown to russet; the gills are golden yellow in each of the color forms.

(2) Craterellus multiplex.

This curious fungus, with vein-like wrinkles instead of gills, is not one of the true agarics, but is closely related to them; it is of especial interest on account of the leaf-like caps, which are arranged in tiers along a common stem. The orange fruiting bodies may be looked for on the ground near old decaying stumps.

(3) Cortinarius sanguineus.

If you glory in color effects, make acquaintance with the Cortinars, and you will be rewarded for your trouble: there are brilliant purples, violets and scarlets, reflecting flashes of metallic light; softer greens, melting into shades of copper and bronze; creams, yellows and vivid orange, and such delicate, haunting touches of pale lilac and blue that you wonder whether the colors are inventions of the fancy after all. It would be hard to imagine a more pleasing color contrast than is given by this ox-blood red Cortinar where it nestles in dells of moss and ferns, and one is constrained to wonder why such treasures seem often to remain unnoticed by a busy world.

(4) Hygrophorus candidus.

For its elegance alone, this little toadstool claims more than a passing glance. It is usually at home under moss-covered banks, or among leafy shrubs, and resembles a miniature pedestal of ivory.

(5) Cortinarius archeri.

Cortinars are well represented in Australia, but very little is yet known of them. Cooke, in his "Handbook of Australian Fungi" (1892) describes only seven species, but it is extremely doubtful whether seventy would include all that may be found in our country. This bright purple species is not a well-known fungus; it lurks among dead leaves and fallen bark, and is covered, when young, by a transparent, viscid slime, which serves only to emphasise the gorgeous coloring.

(6) Lepiota cristata.

The Lepiotas are collectively known as "parasol mushrooms," and usually bear a striking resemblance to fancy umbrellas. Excepting two or three doubtful species, they are edible, being palatable, and as full of flavor as the ordinary mushroom. The group is characterised by having a distinct collar around the stem, no basal cup, white spores, and a usually scaly cap. It should not be confused with the highly poisonous genus **Amanita**, in which the stem is always sheathed by a basal bulb or cup. **Lepiota cristata** is one of the smallest and daintiest members of the genus, and, like most of the other species, prefers moist and grassy positions.

(7) Galera hypnorum.

This is a moss-inhabiting toadstool, with delicate brown bells poised on slender stems.

(8) Omphalia fibula.

Another moss-loving species, which simulates nothing more closely than an elfin parachute. The tiny caps are golden and the gills white.

(9) Hygrophorus miniatus.

Found throughout the world, on low lying grassy flats, this small, scarlet toadstool is one of our most beautiful species. It belongs to a genus almost as varied and colorful as the Cortinars, but differing in the white spores and absence of a web-like veil. Hygrophores are typically waxy fungi, usually shining with a silky lustre and growing in damp, mossy places.

(10) Mycena pura.

Here we have a reputedly poisonous fungus, but the evil trait is offset by a rich, rosy or plum-colored cap and stem, and the singular gracefulness of the species. **Mycena pura** smells strongly of radish when bruised, and is most abundant among fallen pine needles, although occurring also in the hardwood forests; it is the largest member of its genus, which embraces small, bell-like fungi with white spores, and in numbers is probably excelled only by the Cortinars.

(11) Amanitopsis pulchellus.

This is an all-Australian toadstool, abundant in Victoria, whence it was first described. It is readily distinguished by the delicate basal envelope and absence of a collar from the stem. The color varies from pale lemon yellow to vermilion, and the cap is always flecked with rather large, white or yellowish scales, which later drop off. **Amanitopsis** is a lover of grassy meadow lands, and may often appear in quantities during showery spring weather.

Only a small percentage of fungi are actually poisonous, many of the little-known kinds being equal to the common mushroom in flavor and nutritive value. But great caution must nevertheless be used by all who gather fungi to eat. Never run a risk, is a golden rule. If you have the slightest doubt regarding the edibility of a fungus, leave the plant where it grows.

INFINITE VARIETY

The fungi display bewildering variety. There are many thousands of species, ranging in size from the microscopic bacteria to giant, woody bracket-fungi, several feet across. Many kinds grow on the ground, like other plants; others flourish in the perpetual gloom of cellars, mines, and caves; some may be looked for on charcoal, on manure heaps, or on arid wastes of sand. Still other species grow from the branches of tall, forest trees. There are cup-fungi, coral-fungi, parasol-fungi, and lattice-fungi, all deriving their names from the fantastic shapes assumed by the fruiting bodies which appear each year.

In our Fairyland are fairy lights. Some kinds of gilled-fungi are luminous. Probably nocturnal insects are attracted to the plant, like moths to a lamp, in order that they may feed upon it, and thereby carry away the spores. Eerie, if beautiful, after dark, are the white spectral hoods of these wonder-plants, aglow with greenish light.

The season for fungus hunting in temperate Australia is comparatively brief. On a misty day in May or June go to the bushland and you will see these flowerless plants at their best. Old logs gleam with translucent masses of colored jelly, stumps are fringed with rainbow-hued velvet, and the ground is gay with little fleshy cups and clubs, of rare metallic colors, as charming to the eye as the patterns in a kaleidoscope.

Return to this corner of Fairyland a month later, and you may find that all its fungus gems have gone.

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The plant illustrated in the cover design is the Cooktown Orchid (Dendrobium bigibbum).

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ACKNOWLEDGMENTS

It is owing to the co-operation of Mr W. H. Nicholls that the orchid section of this book is so authoritative and complete. He has made available his extensive knowledge of Australian orchids, in the notes accompanying his drawings and photographs. Mr Nicholls is Hon. Curator of the Herbarium, Botany School, University of Melbourne.

The wonderful drawings of birds' eggs in the double page color plate were done by Mr Neville W. Cayley and Mr F S. Rodriguez. Thanks are due to Mr A. F. Basset Hull, of Sydney, who loaned specimens of all the eggs figured, from his private collection; to Mr T. Green, for photographs of Sun Orchid columns (page 15); to Mr F. J. Bishop, for photograph of the White Diuris; and Ward Symons Studio, for that of the "Rock Lily."

To Mr J. H. Willis, a field officer in the Victorian Forest Commission service, I am indebted for notes on the species shown in the color plate of fungi, from the water-color painting by Mr M. I. Howie.



AUSTRALIAN TOADSTOOLS



The Great Sun Orchid (*Thelymitra grandiflora*)

Printed and published by LAWRENCE KAY, of 100 Barkly St., St. Kilda, for Pictorial Newspapers, at its offices, 62 to 74 Flinders St., Melbourne.

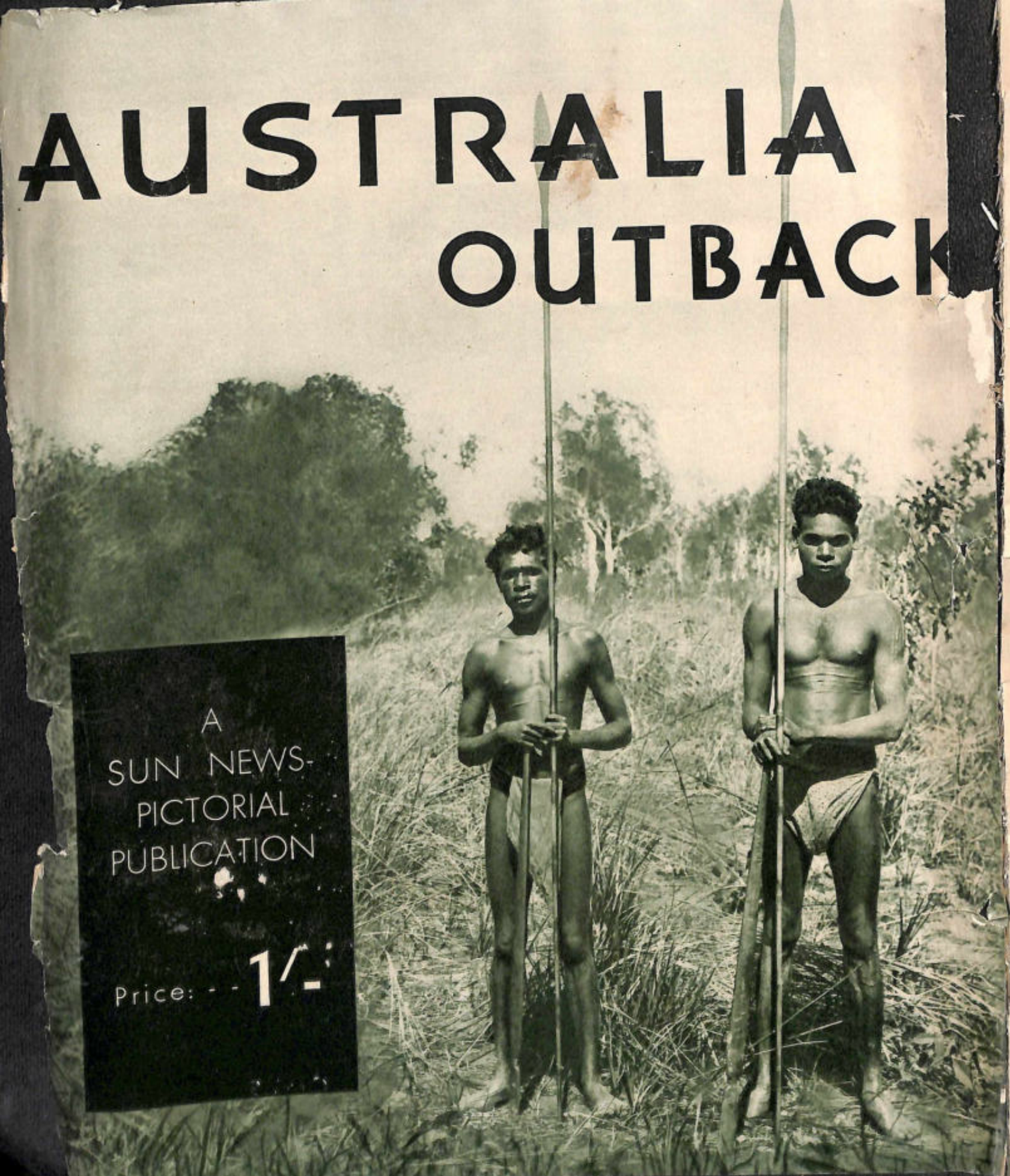
Wanderings with a Camera in Australian Wilds



Group of Aborigines on the Daly River, Northern Territory.

Photographs by CHARLES BARRETT, C.M.Z.S.

AUSTRALIA OUTBACK



A SUN NEWS-PICTORIAL PUBLICATION

Price: - - 1/-



Hinchinbrook Island, North Queensland,
from the mainland.



← There are many big caves on the Treeless Plain. The photograph shows the entrance to one with a lofty "main hall."



Descending a blowhole.



← Young cave owl. These birds nest in caves and blowholes on the Nullarbor Plain.

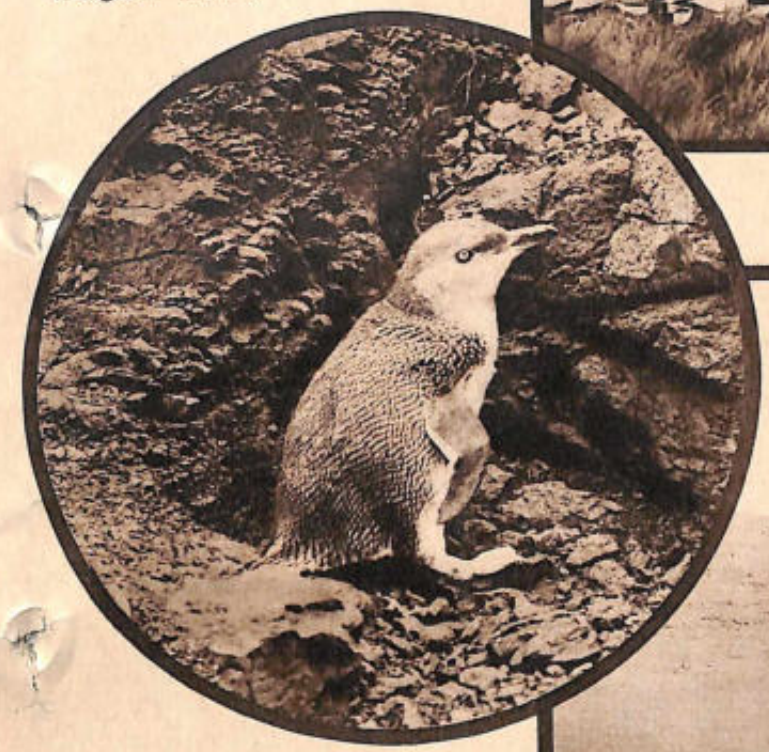


→ Southern edge of the Nullarbor Plain: the way down to the lowland; and a station homestead.



Cat Island, Bass Strait, is famous for its Gannetry. Several thousands of the big sea birds nest there every year.

Young Fairy Penguin. Hundreds of these birds nest at The Knobbies, Phillip Island; there are other rookeries, one being on Penguin Island, in Bass Strait.





The Valley of Dry Bones, on King Island, Bass Strait. Sub-fossil remains of the extinct Island Emu, and of marsupials, are found in profusion on the great sand-blow.

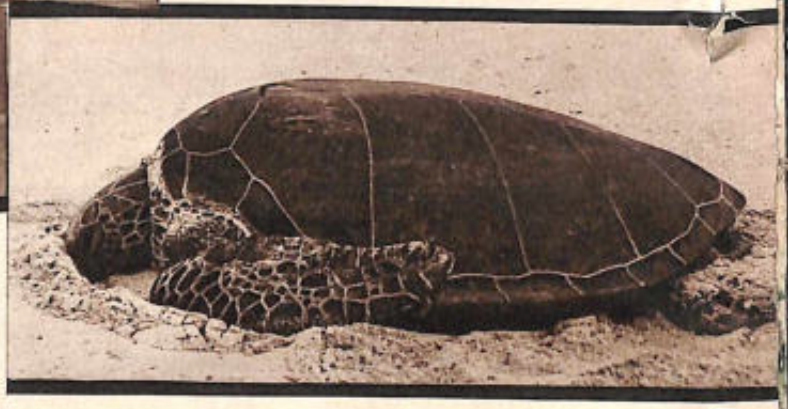


An Island Shore. These rocks are a feature of the lonely coastline of Three Hummock Island, Bass Strait.



Leech-gatherers at work, in the shallows of a Murray River overflow.

Green Turtles are plentiful in Australia's tropic seas, and resort to some of the island beaches in the breeding season.



A peanut farmer's home in the Northern Territory. Pile of peanuts on the left.





Bleached Turtle bones on a Queensland island where soup-canning was done.



Methodist Inland Mission Truck at a bore in the Northern Territory.



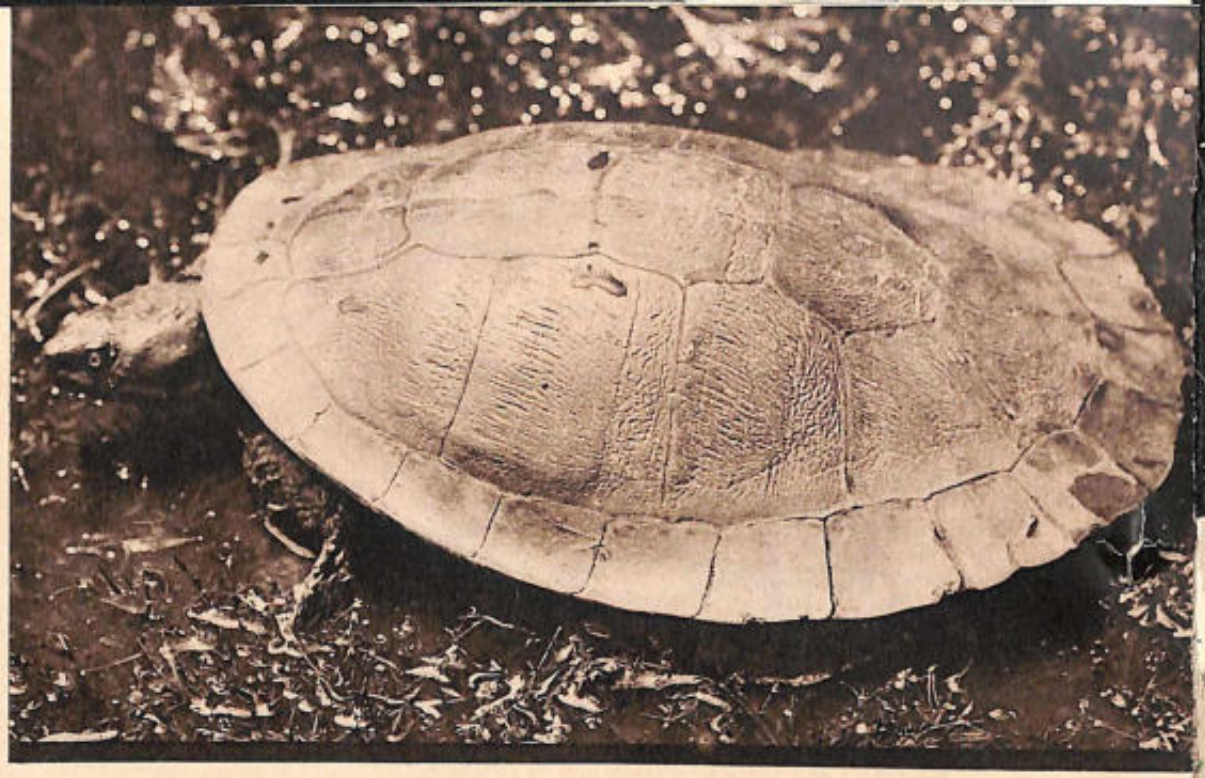
An outback mail box in New South Wales





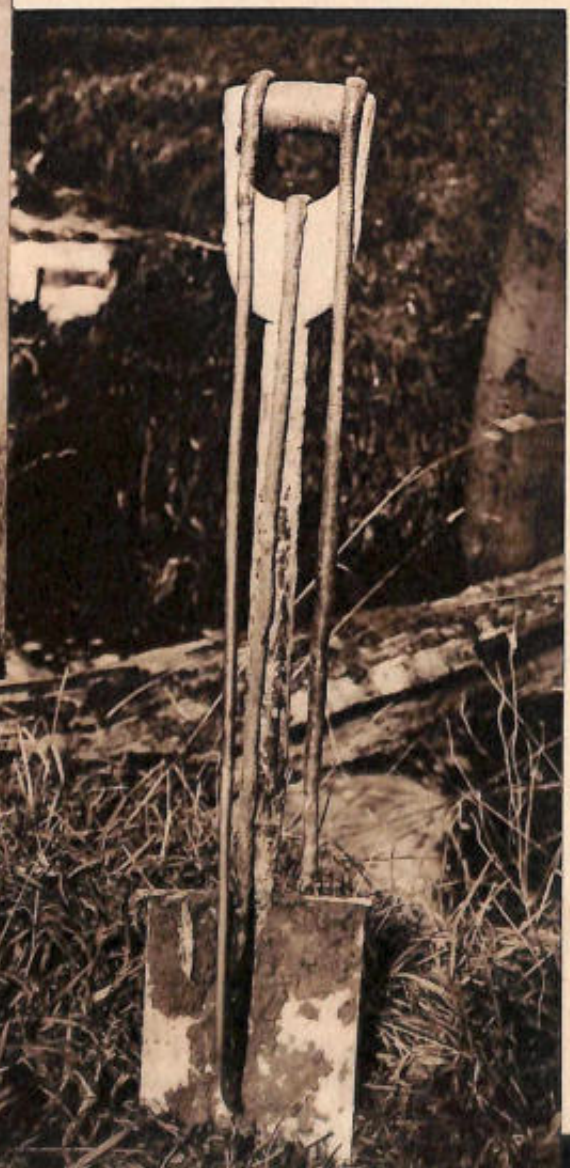
His Majesty's mail on the Overland Track—Alice Springs to Birdum (terminus of the railway from Darwin).

Home-made "yard" for baby at a Mallee homestead in Victoria.

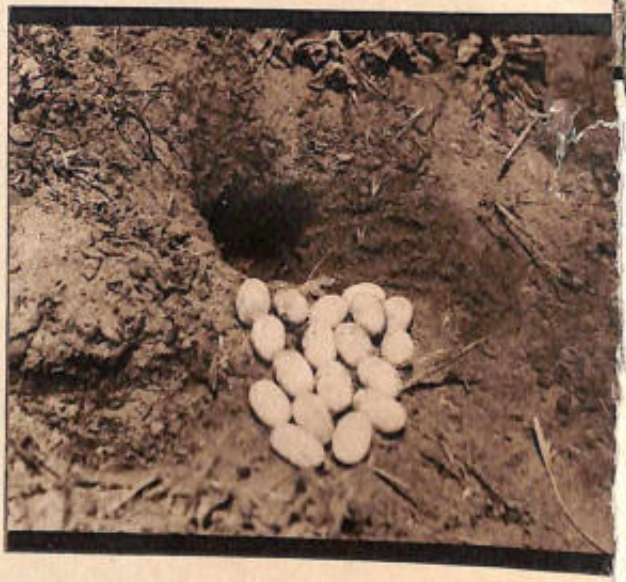


→ Murray River Tortoises often are kept as pets in suburban gardens.





Proof of its size: The Giant Earthworm displayed measured nearly eight feet in length.



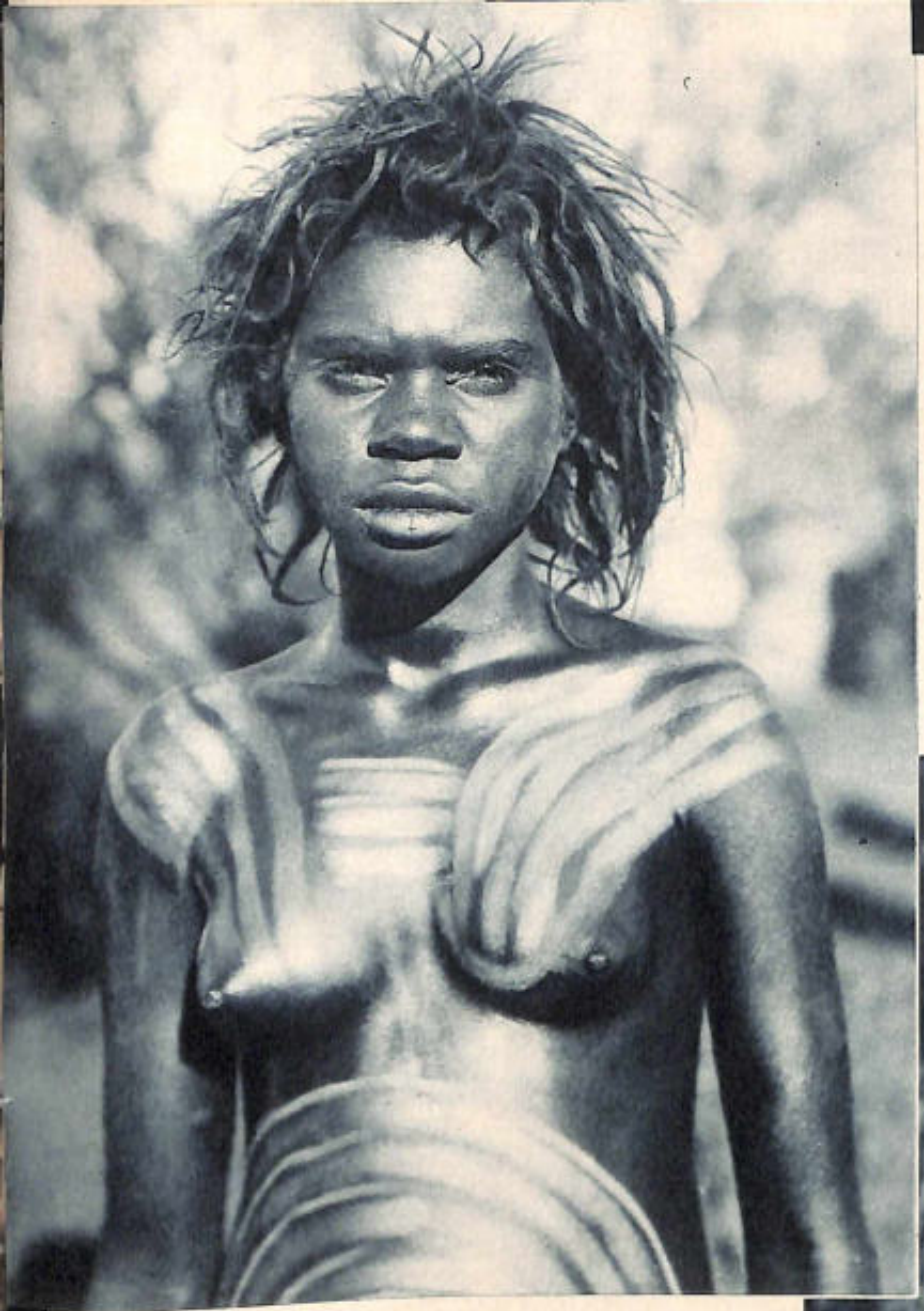
The Murray Tortoise's nursery is a burrow excavated in the ground. The white eggs are soft-skinned.

← Giant Earthworms, which, when fully extended, attain a length of up to 11 feet, are found in a few parts of South Gippsland, Victoria, notably Bass River Valley.

Where Mica is mined. Scene on the Hart's Range, Central Australia.



The Cattlemen's Rest. This picturesque hut on Barrington Tops, New South Wales, is used by cattlemen when mustering in the Ranges; many anglers and tourists have camped in it, too.



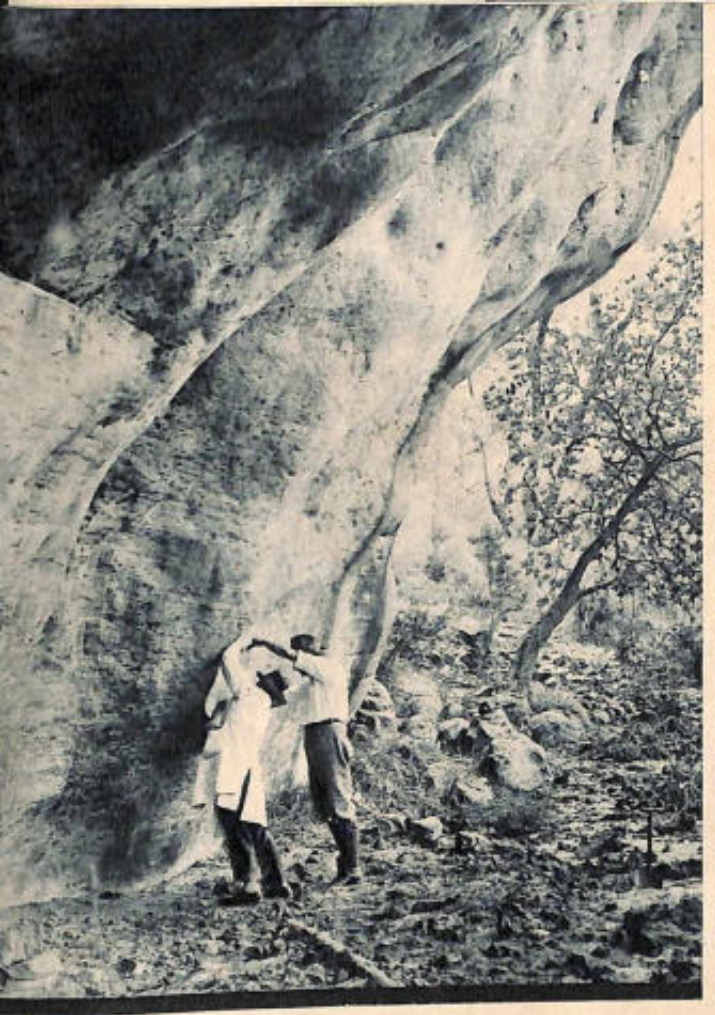
← A young Arunta woman.



A Roper River man, wearing plaited grass bracelets, and with tribal markings on his body. →



A ROPER RIVER ABORIGINE
AT HOME
On the borders of Arnhem
Land, Northern Territory.



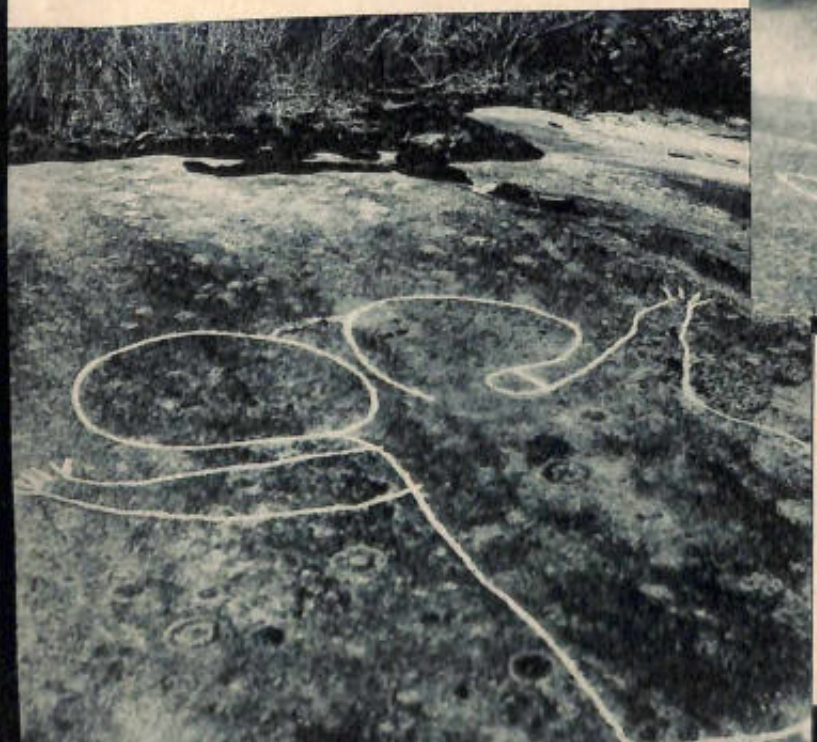
Glen Isla Rock, Victoria. Symbols and other markings in red ochre, are painted on this rock, one of the most famous aboriginal "art galleries" in Australia.

↓ Rock carving, depicting a lyrebird; the only known representation of this bird among the thousands of petroglyphs in New South Wales.





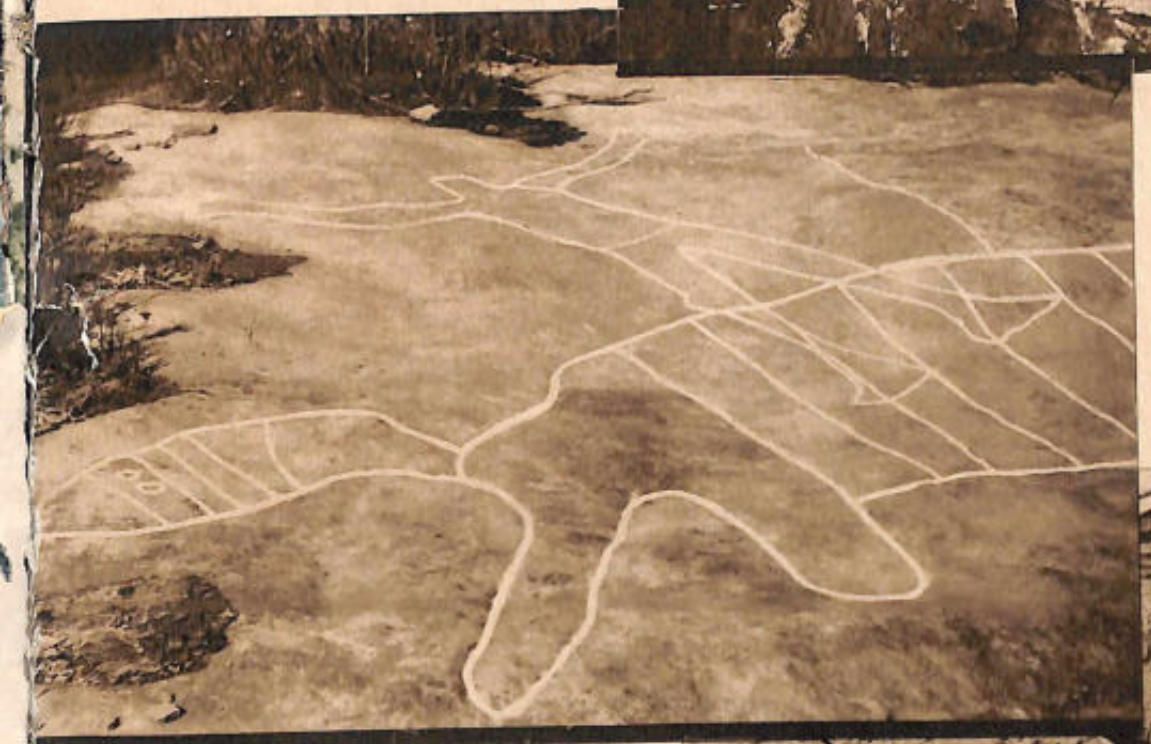
An "art gallery" near Sydney, where aboriginal initiation ceremonies were held in the long ago. A rock pool at the left. Note.— The carvings in each case were chalked over for purposes of photography.



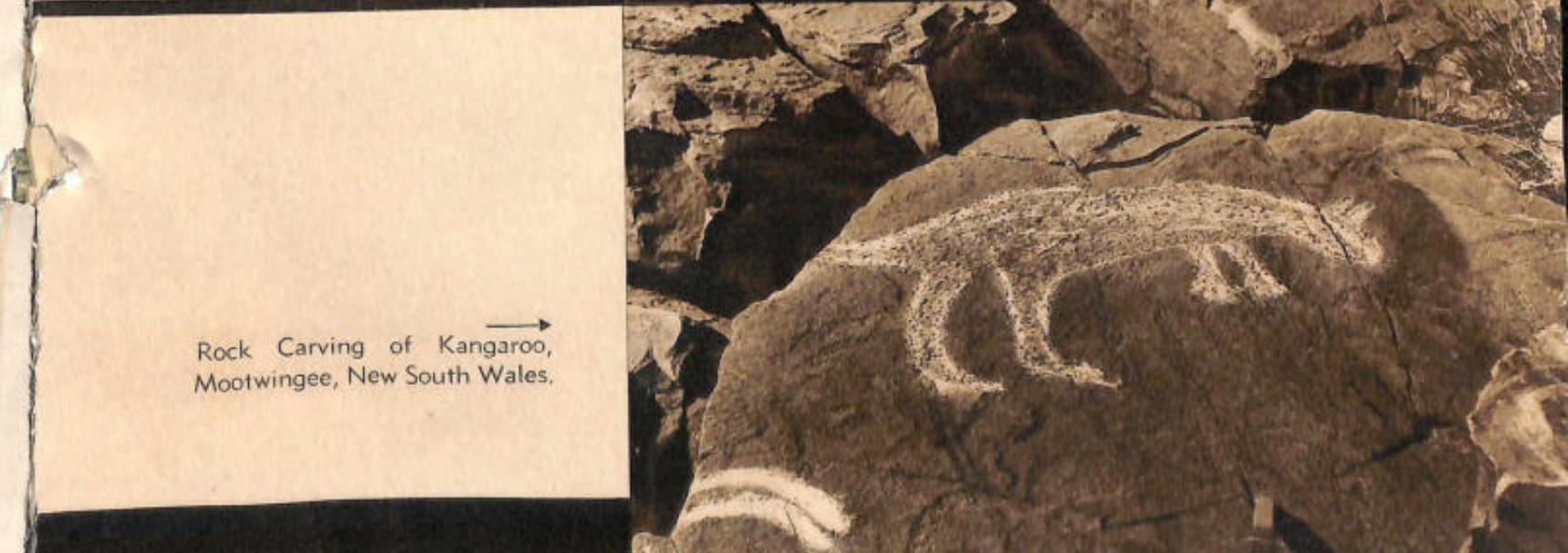
← Rock carving near Sydney. The figure represents a double-headed deity, and is unique.



Ancient Rock Carving in the far north of South Australia. Estimated age, between 5000 and 10,000 years.



This huge rock carving near Sydney may have been intended to represent the Bunyip, that mythical monster in whose existence the aborigines had firm belief.



Rock Carving of Kangaroo, Mootwingee, New South Wales.



Thatched homes at Hermannsburg Mission, Central Australia.



A Native Camp in the Macdonnell Ranges.



Queensland mia mias. This type was favored by the Tully River blacks and other tribes.



← Giant Huntsman Spider. There are many kinds of these long-legged creatures; some of them are called "Crab-spiders."

↓ Where the deadly Funnel-web Spider of New South Wales lurks, in the bush near Sydney.





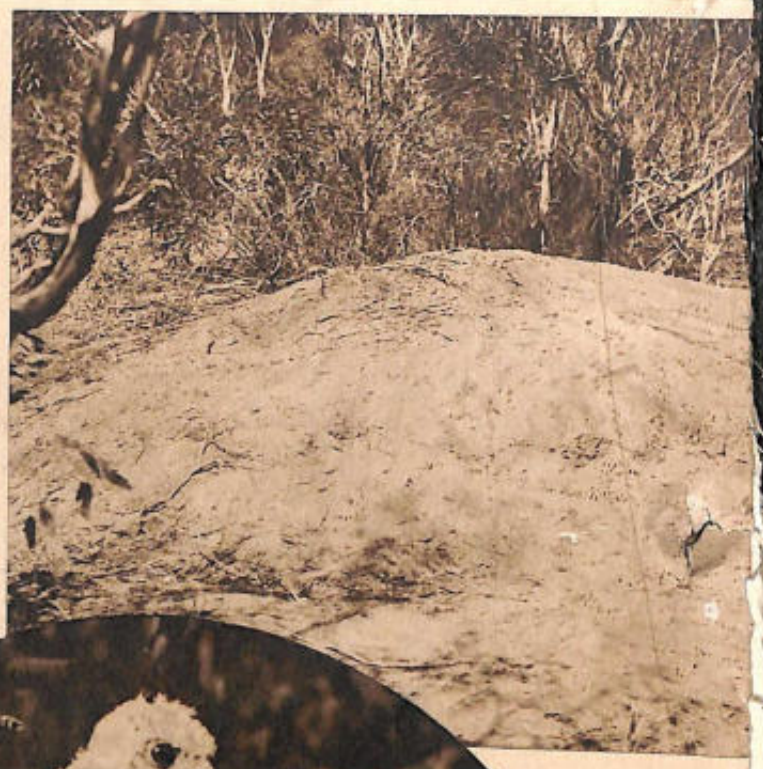
…st of the famous tree-dwell-…g Trapdoor Spider. When the …nged lid is closed down, the …ider's retreat is perfectly …mouflaged, the outside being …vered in tiny pieces of bark.



← Trapdoor Spider in fighting attitude.



← Great Palm Cockatoo, the largest of all the cockatoos.



The Goshawk's Brood. ↘





← Australia's laughing bird, the Kookaburra.



← Nest mound of the Lowan or Mallee-fowl.



→ The Rufous Bristle-bird at its nest, Anglesea, Victoria. The notes of this shy bird sound not unlike the creaking of an un-oiled cart wheel, and it has been called the "Cartwheel-bird."



Baby Galahs are as grotesque-looking as pigeon squabs.



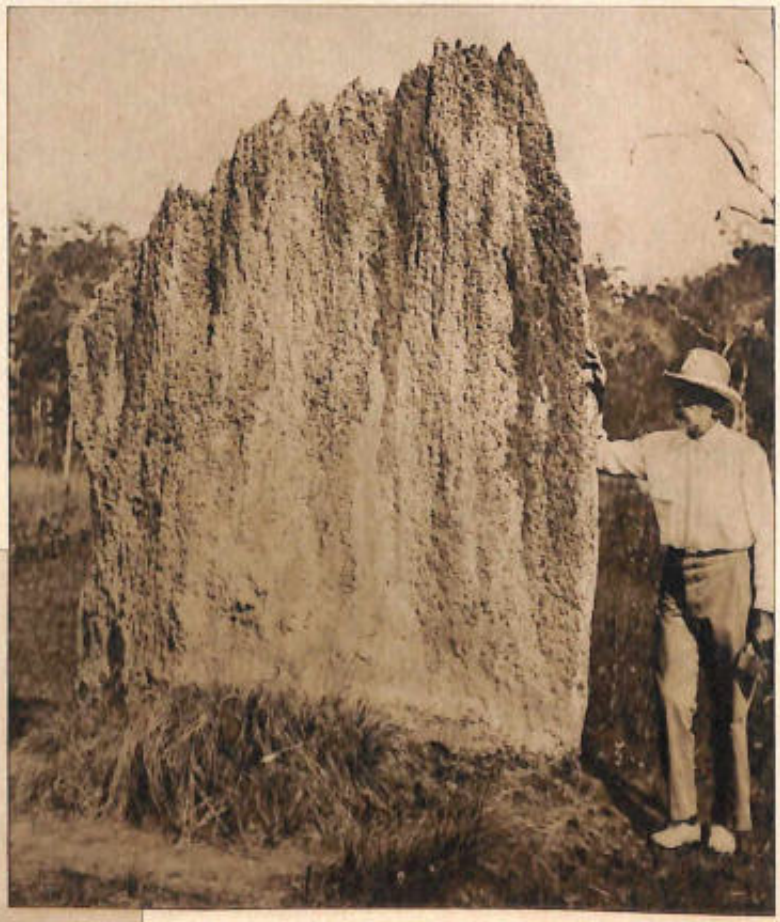
→ Young Tawny-shouldered Frogmouth or Podargus. This is the bird popularly called Mopoke; the Boobook Owl utters the curious "more-pork" call; the Podargus, a series of "ooms."



← Tall palms, on the edge of the Adelaide River Plains, Northern Territory.



Frangipani grows luxuriantly in many Darwin gardens. →



Magnetic Ants' (Termites) mound, near Darwin, Northern Territory →

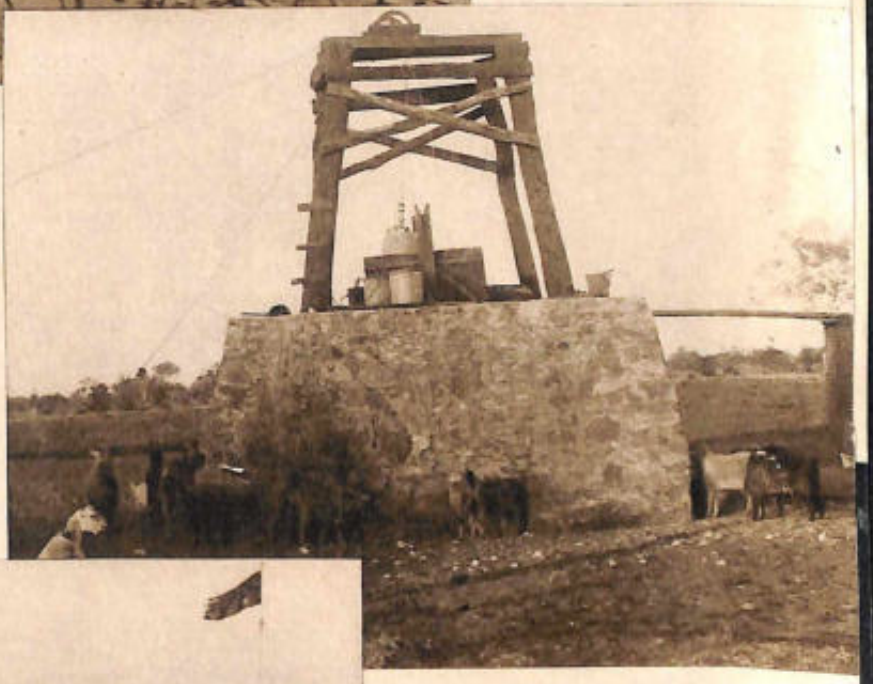


← Mindil Beach, Darwin; a popular resort.



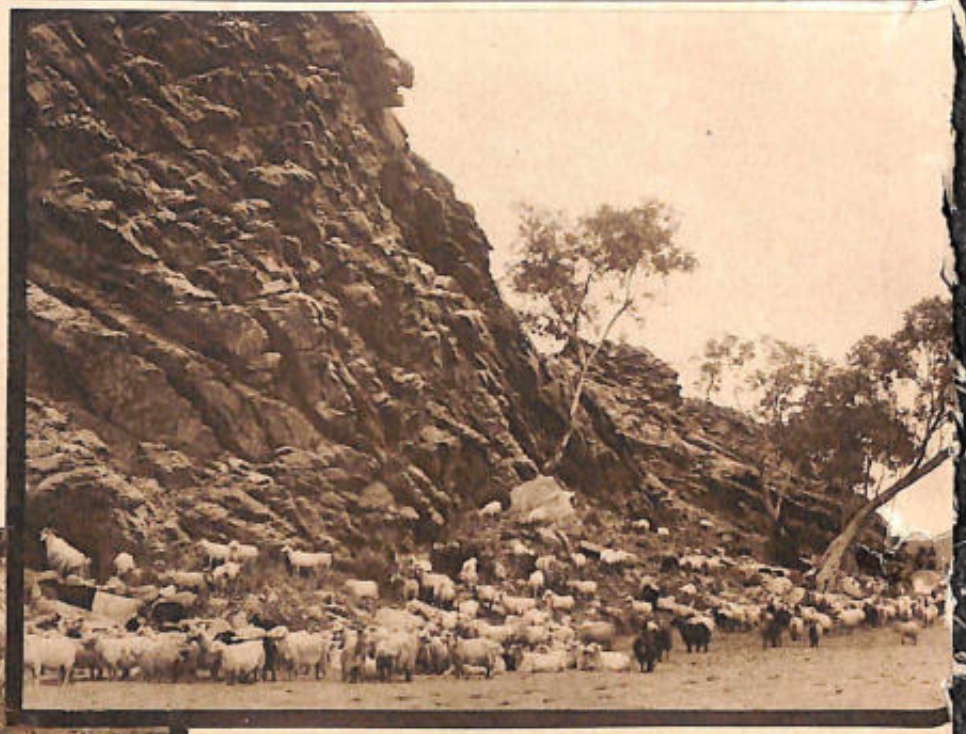
↑A lily lagoon in the Northern Territory. Pygmy Geese and other water-fowl frequent these lagoons, often in large numbers.

A well in Central Australia. →





← The Soldiers' Memorial, Darwin Residency in background.



Goats coming through Heavitree Gap, Alice Springs.



Camp at Jay Creek, Central Australia.



A "modern" mia mia at Newcastle Waters, Northern Territory.



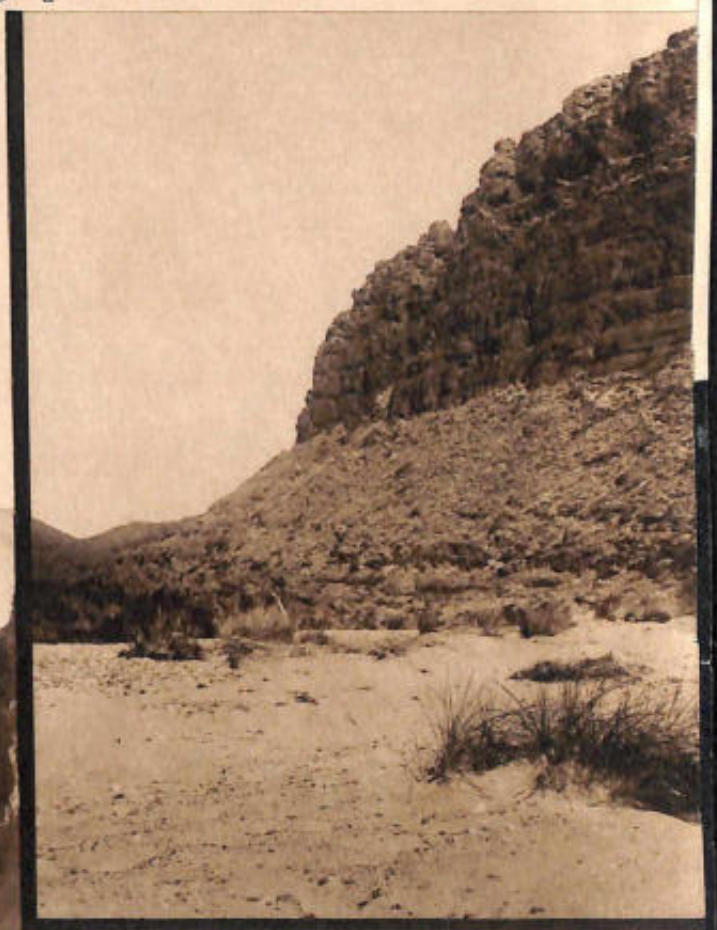
Camels are still used for transport in Central Australia, though since the advent of the utility motor truck their numbers have steadily decreased.

At Jay Creek, about 30 miles to the east of Alice Springs. →





Bed of the Finke River, Central Australia, at the entrance to a gorge. →



↑ The "Ghost Gum" is a characteristic tree of the Macdonnell Ranges.



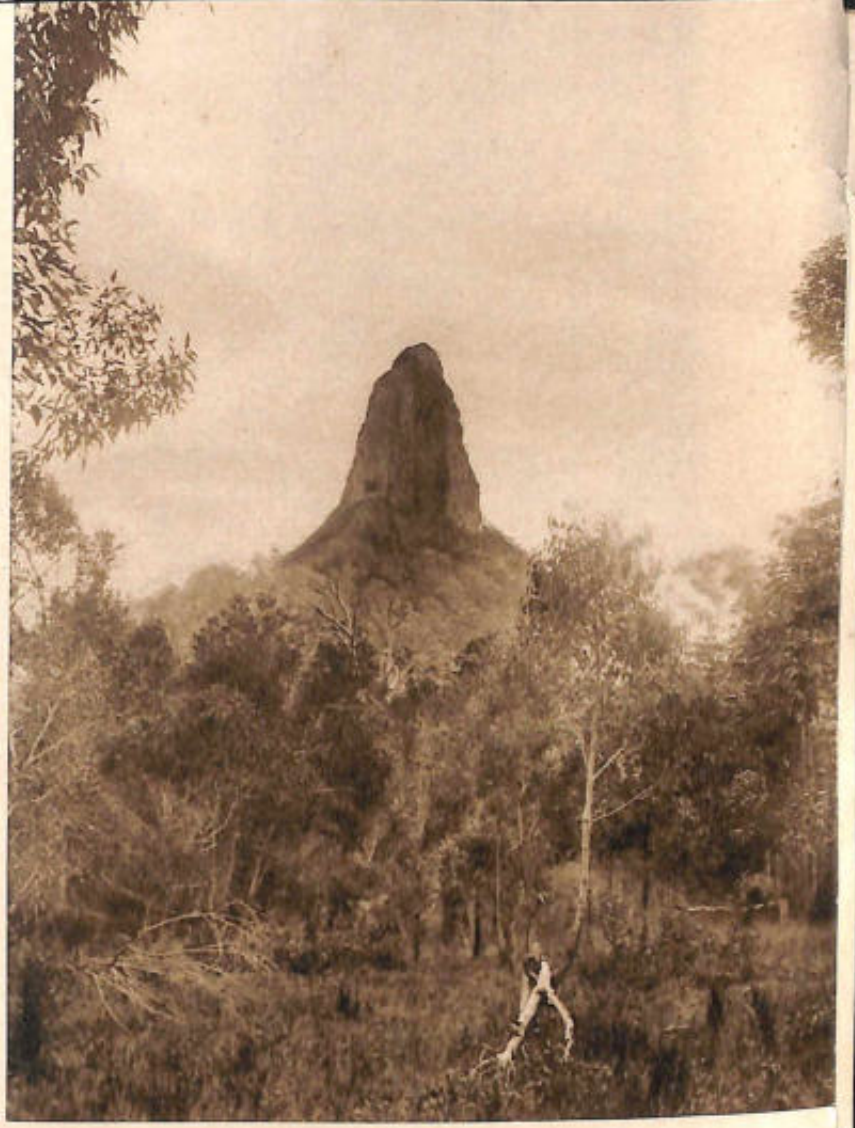
← Glen Helen Gorge, Finke River.



Palm Valley, Macdonnell Ranges, has been called the most beautiful spot in Central Australia.



← Scene in Palm Valley. Nearly 100 miles to the east of Alice Springs, this wonderful valley is a mecca for tourists to Central Australia.



The most impressive peak of the Glasshouse Mountains, South Queensland.

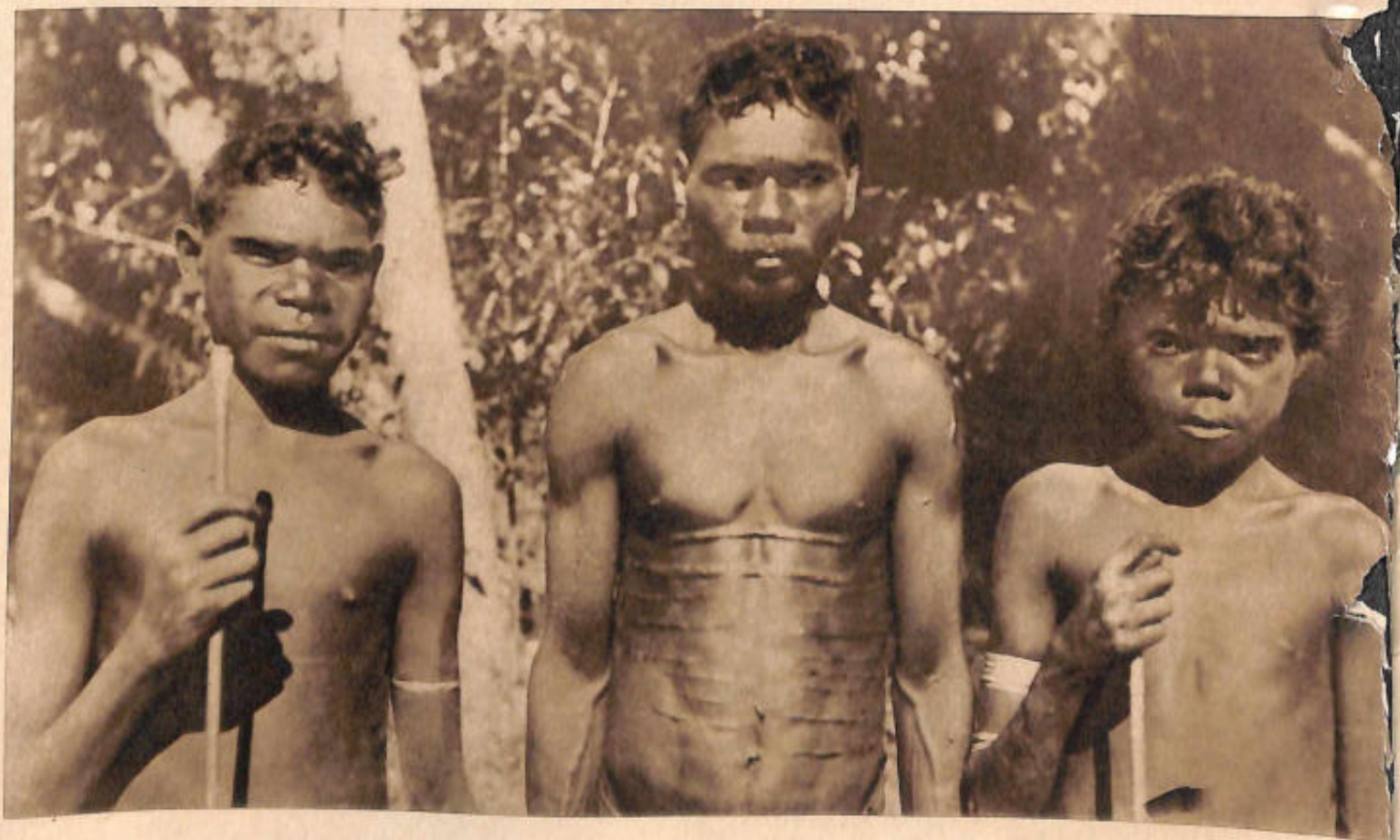
Tibrogargan (1160 feet), is the highest of the Glasshouse Mountains. These remarkable peaks were named by Captain Cook, who saw them from the sea, and thought that they resembled glasshouses.





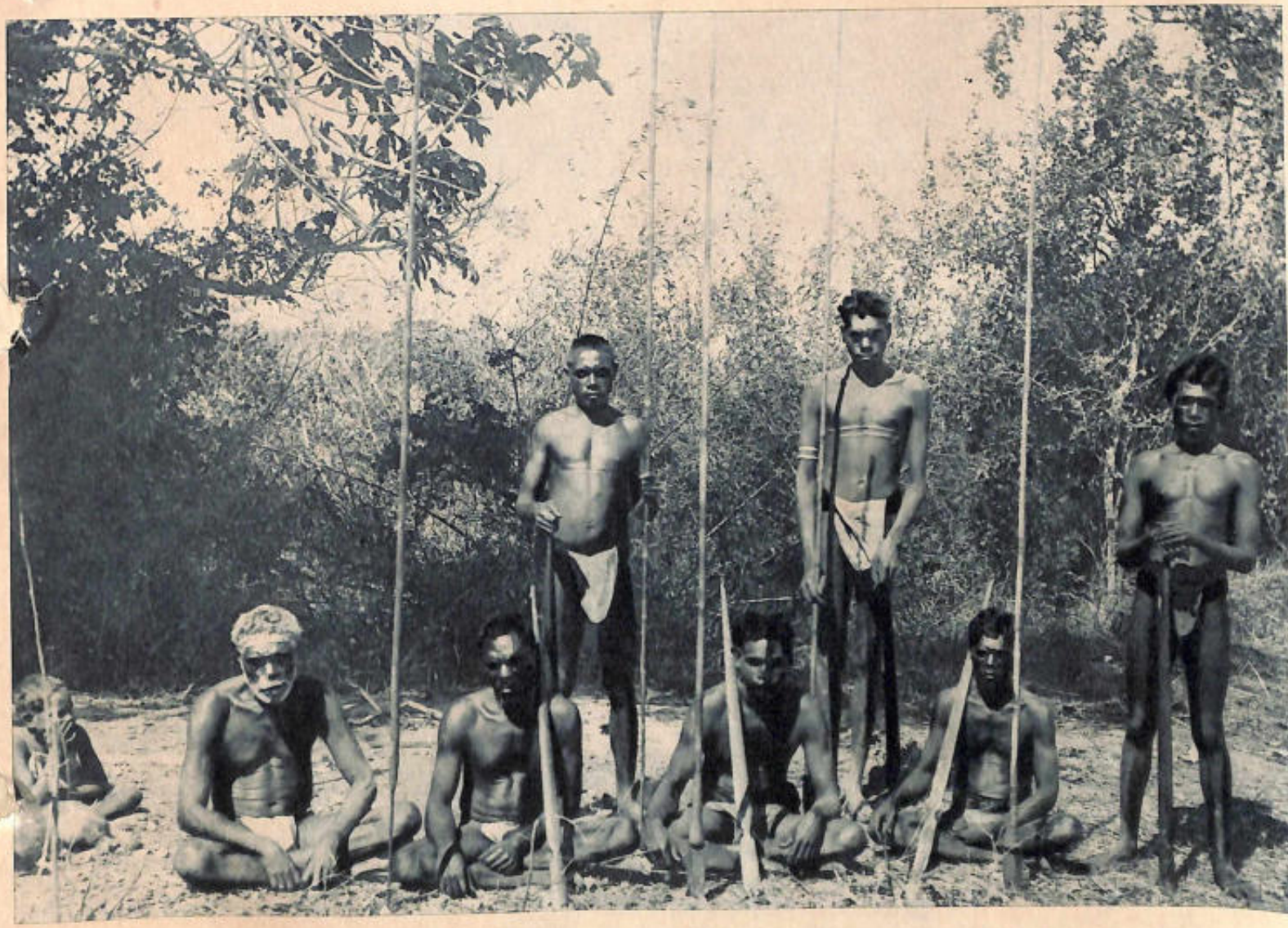
← Arunta Women. The Arunta tribe is the most famous of all Australian tribes.

↓ Blackfellows of the Far North.

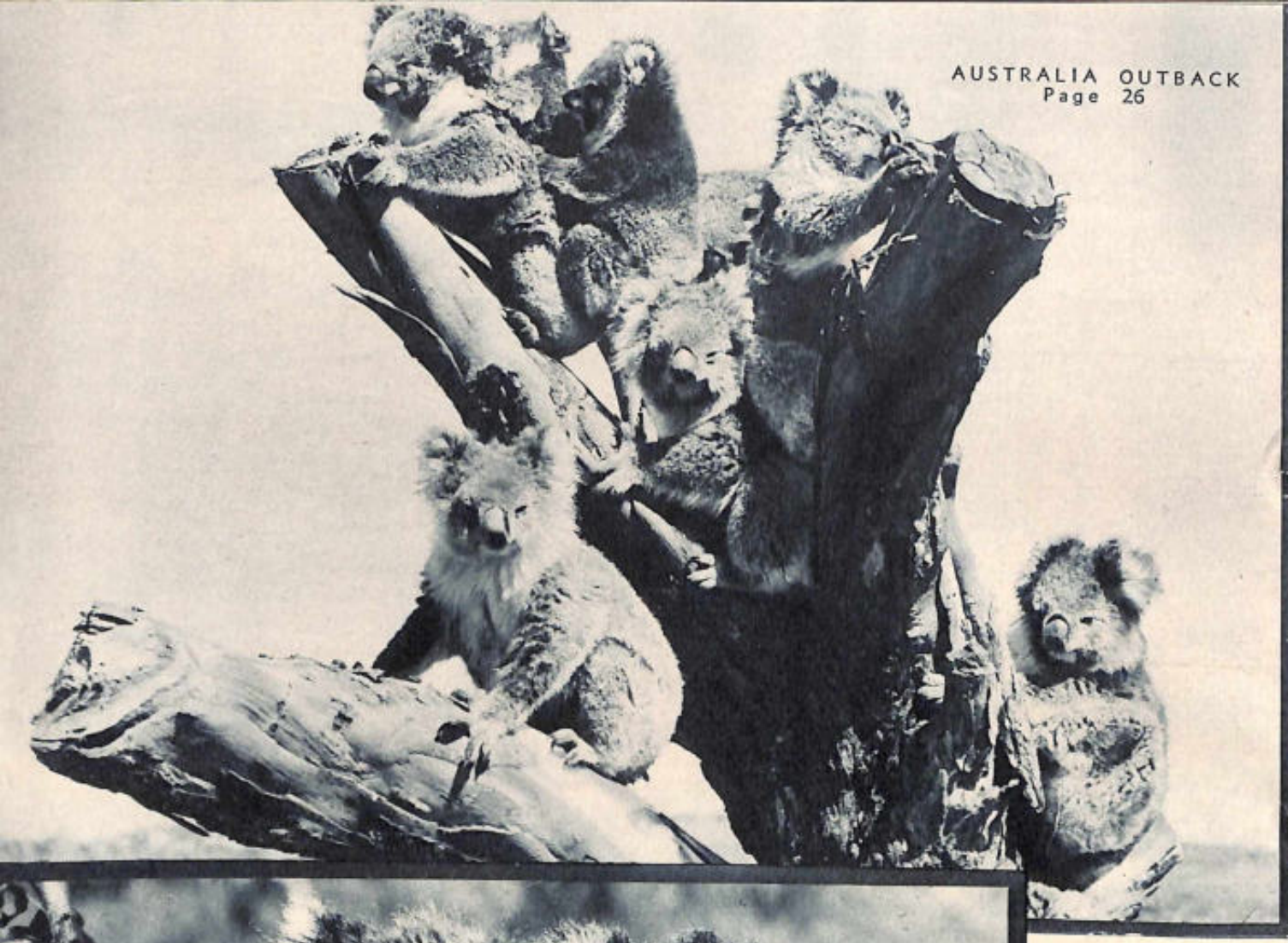




How the deadly shovel-nose spear is thrown.



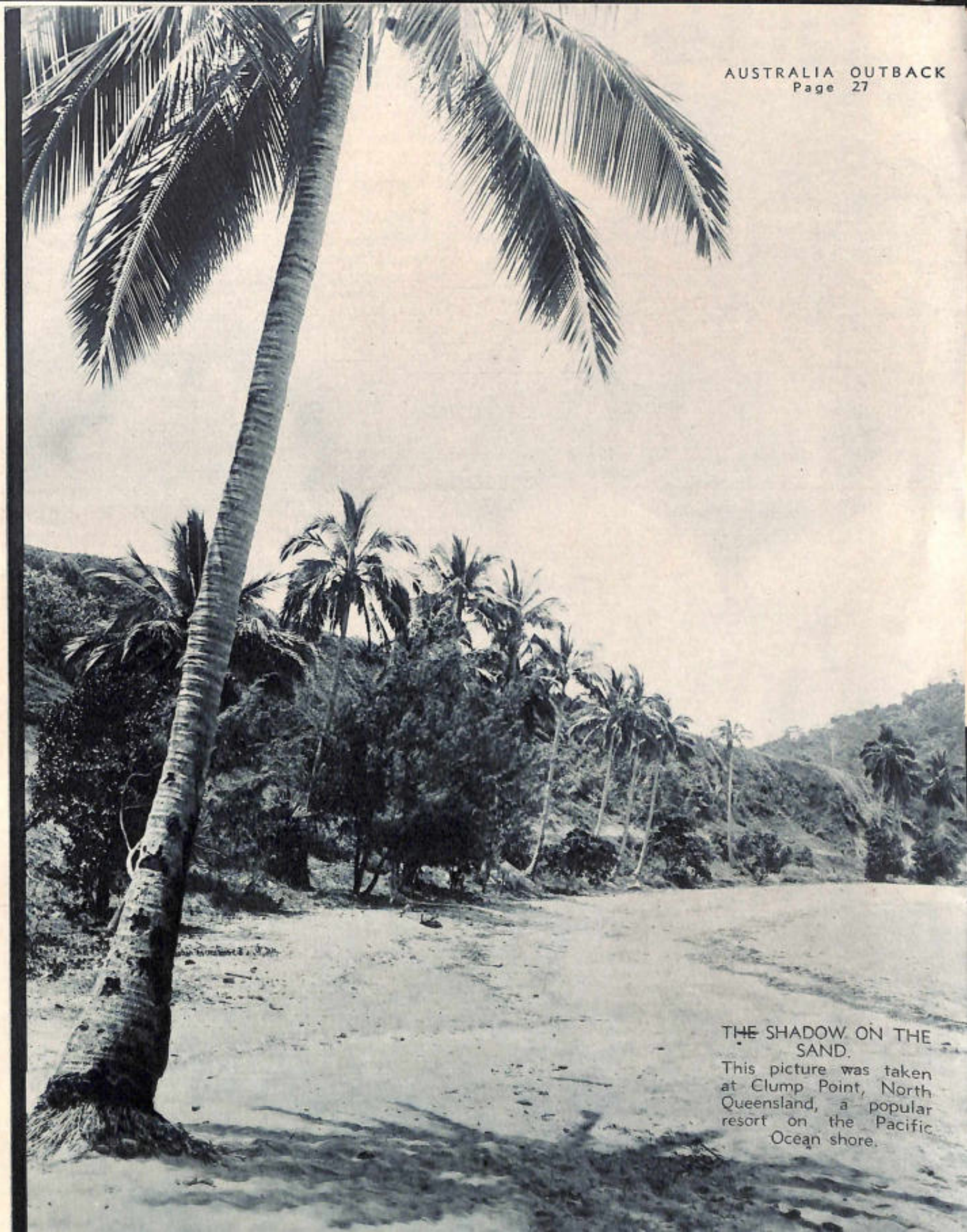
Aborigines of the Daly River, Northern Territory. The weapons are shovel-nose spears, and the long wooden objects resting on the shoulders of the men sitting are womeras, used in throwing spears.



"The Grandstand." Koalas on French Island, Westernport Bay, awaiting transport to an island sanctuary.



A perfect study of mother and son. The Victorian koalas differ from those of North Queensland, in having longer fur, and generally are more engaging in appearance.



THE SHADOW ON THE SAND.
This picture was taken at Clump Point, North Queensland, a popular resort on the Pacific Ocean shore.



Slender Tree-ferns on the edge of a jungle clearing.



The dreaded "Lawyer Palm," whose long stems are beset with little recurved hooks that tear flesh and clothing.



Fan-ferns growing on the bank of a creek in North Queensland.



The Flannel Flower is a gem of the bush in New South Wales.



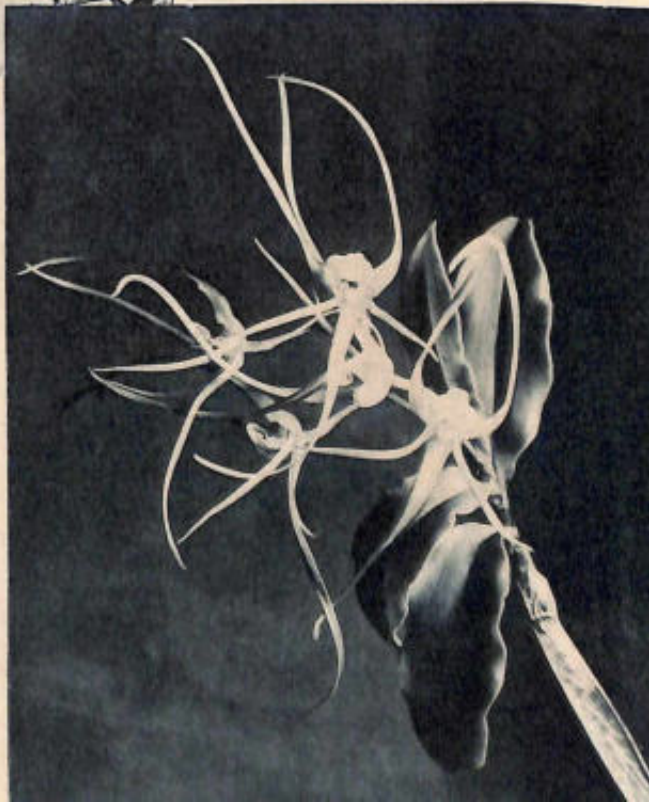
Queensland's "Tassle-fern" really is a giant clubmoss. It grows on boles and boughs of trees in the rain-forest.

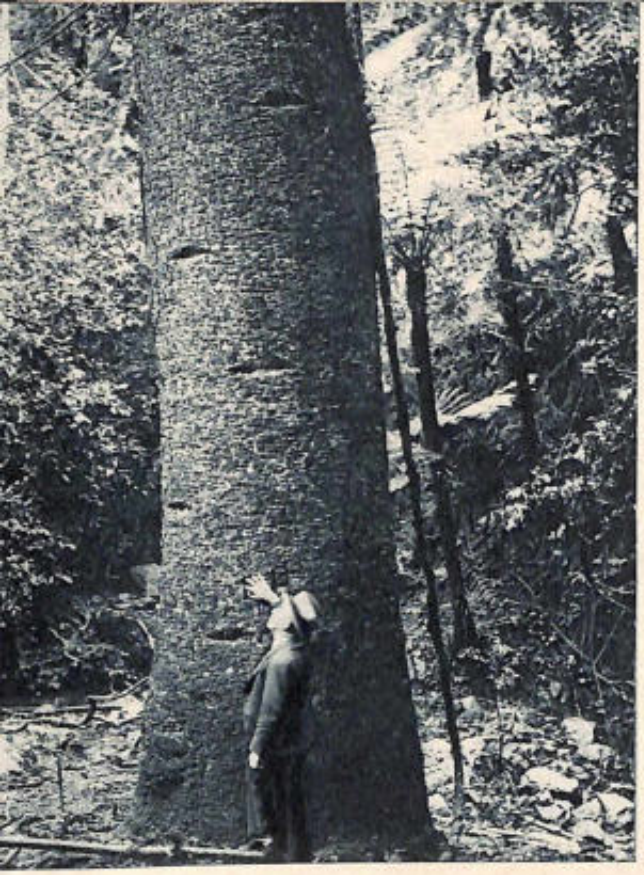


Bowenia serrulata is not a fern, as popularly supposed, but one of the Cycads. It is confined to a few districts in North Queensland, notably Byfield.

The Tree Spider Orchid (Tetragonum) is one of many beautiful epiphytes to be seen in the palm scrubs or bushes of New South Wales and Queensland.



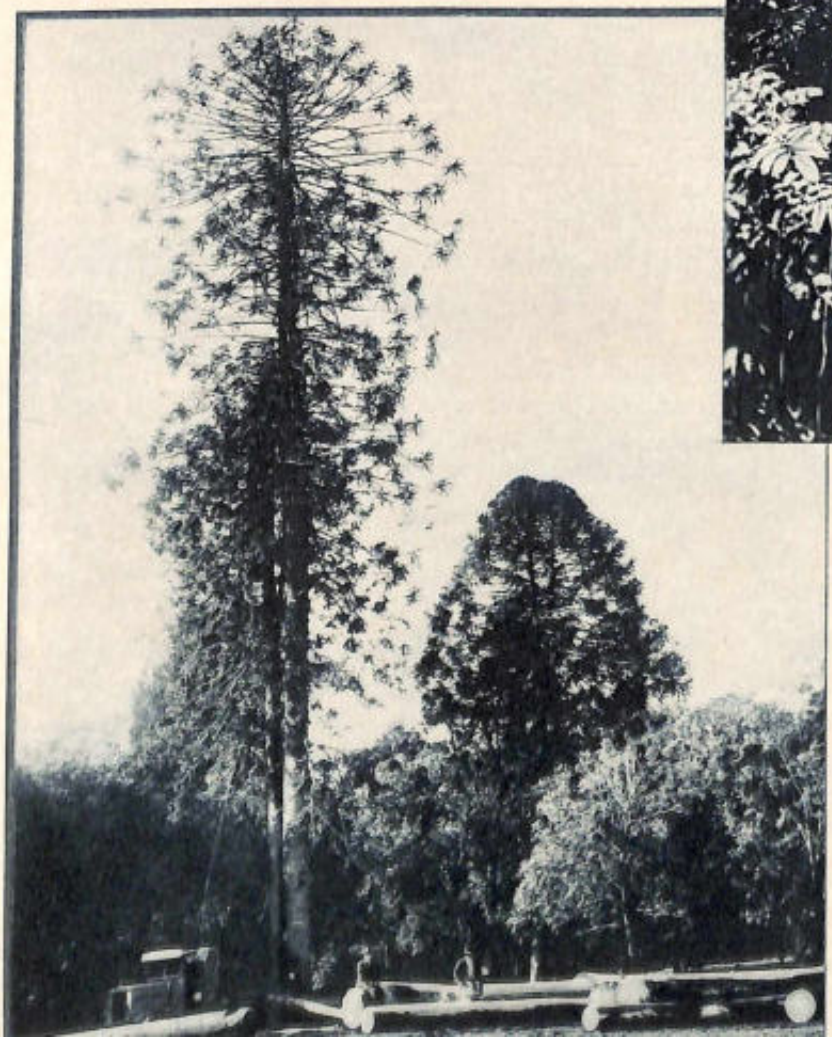




Bunya Mountains, South Queensland, are headquarters of the Bunya Bunya, a pine whose large seeds were eaten by the blacks. This tree-trunk shows axe-marks made by an aboriginal climber long ago.



Aboriginal method of tree-climbing. The "rope" is a length of jungle-vine stem.



Bunya Pines, and logs ready for transport to the mill.



Mangrove roots have been likened to giant, crooked white fingers clutching at ooze and water.

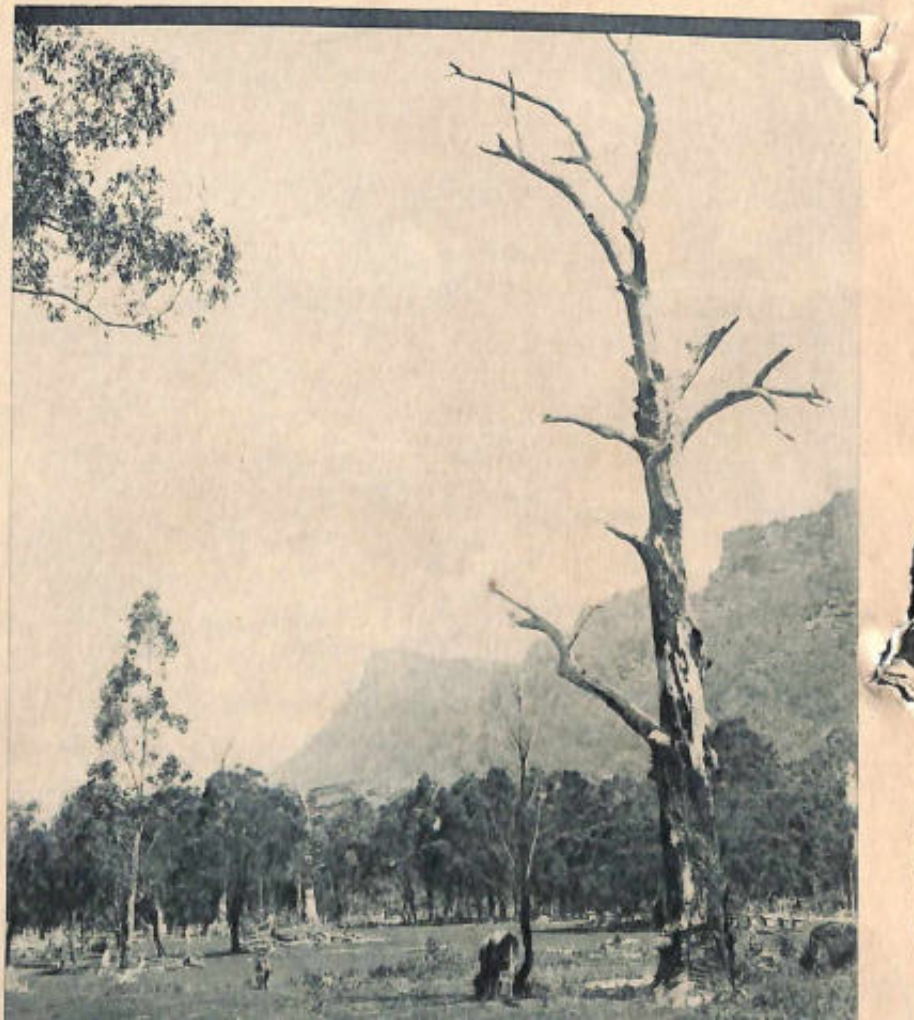
Caladium Pool, on a jungle creek in the Daintree River country, North Queensland.

A typical scene in sheep country. The photograph was taken on a station in the Federal Territory.



The Eaglehawk's eyrie. The Australian Wedge-tailed Eagle, popularly called "Eaglehawk," is, with one exception, the monkey-eating bird of the Philippines, the largest eagle in the world.





In the Victorian Grampians, which are famous for rock scenery and wild flowers.



← A piccaninny poses shyly before the camera.

↓ The proud father. This photograph of a North Queensland native and his youngest child was taken at Tully River.





← A little black girl at Birdum, Northern Territory. The ring-tailed opossum is her pet.



←
These posts, which are decorated with red and yellow ochre and white, as well as being carved, mark the grave of a Bathurst Island man.

One of the most remarkable relics of vanished native tribes in North Queensland. The big structure of stones, built centuries ago, is on the west coast of Hinchinbrook Island. It was a fish-trap and is submerged at high tide.





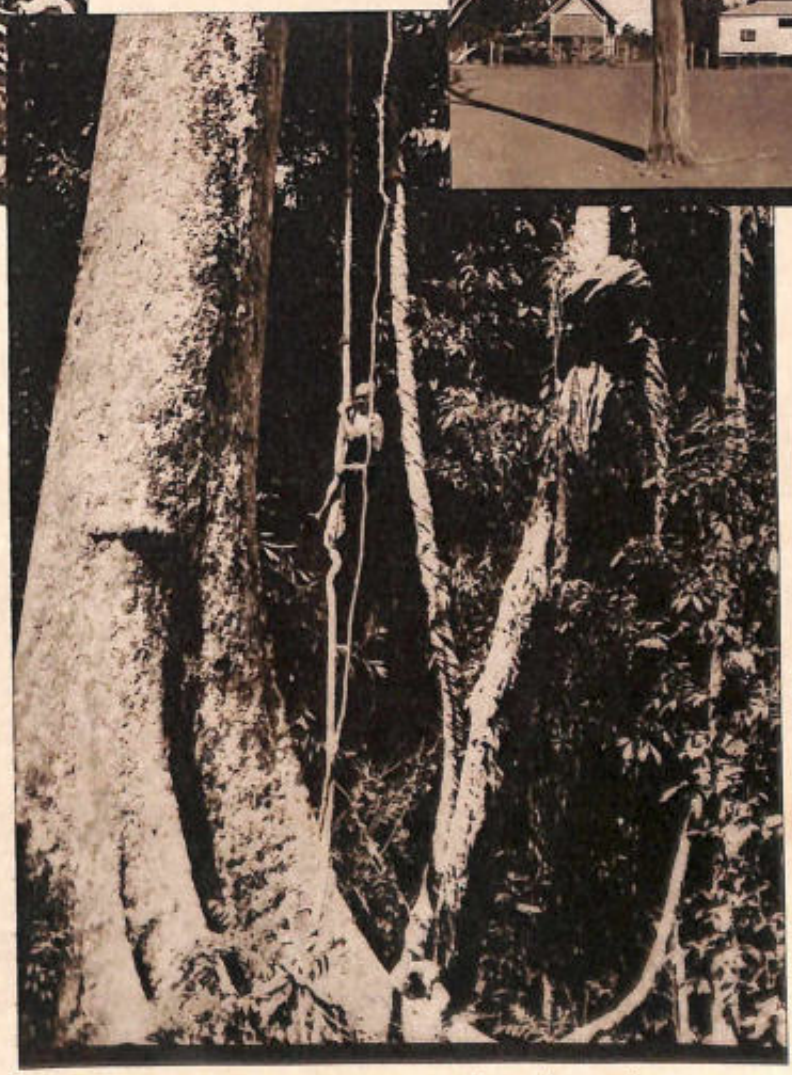
This tree on the edge of the jungle, near Tully, North Queensland, was marked by the explorer, Kennedy.



← Tree marked by surveyors when camped at 4000 feet on Bellenden Ker, Queensland's famous jungle mountain.

This dead tree at Daly Waters, Northern Territory, was marked by the explorer John Macdouall Stuart when on his great journey across Australia. →





Blackfellow climbing a liana or "jungle rope" to reach the branches of a giant tree, in which a tree-kangaroo



← Group of Screw Pines (Pandanus) near Darwin.





Another species of Pandanus, growing on an island of the Capricorn Group, off the Queensland coast.

Giant cone (fruit) of a Queensland cycad. ←



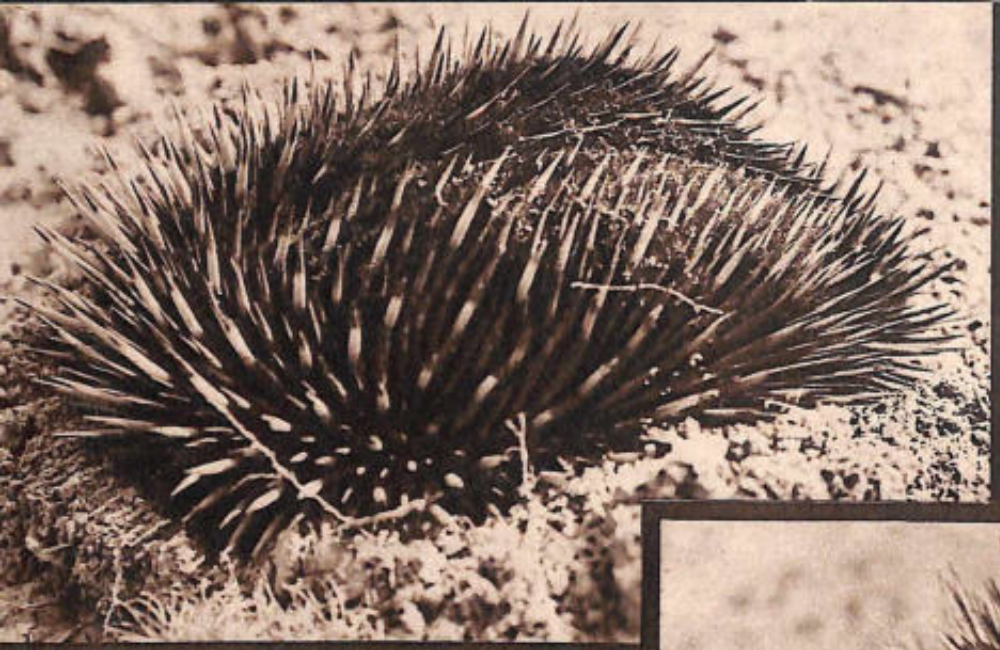
↑Hen Lyrebird approaching nest with food for her chick.



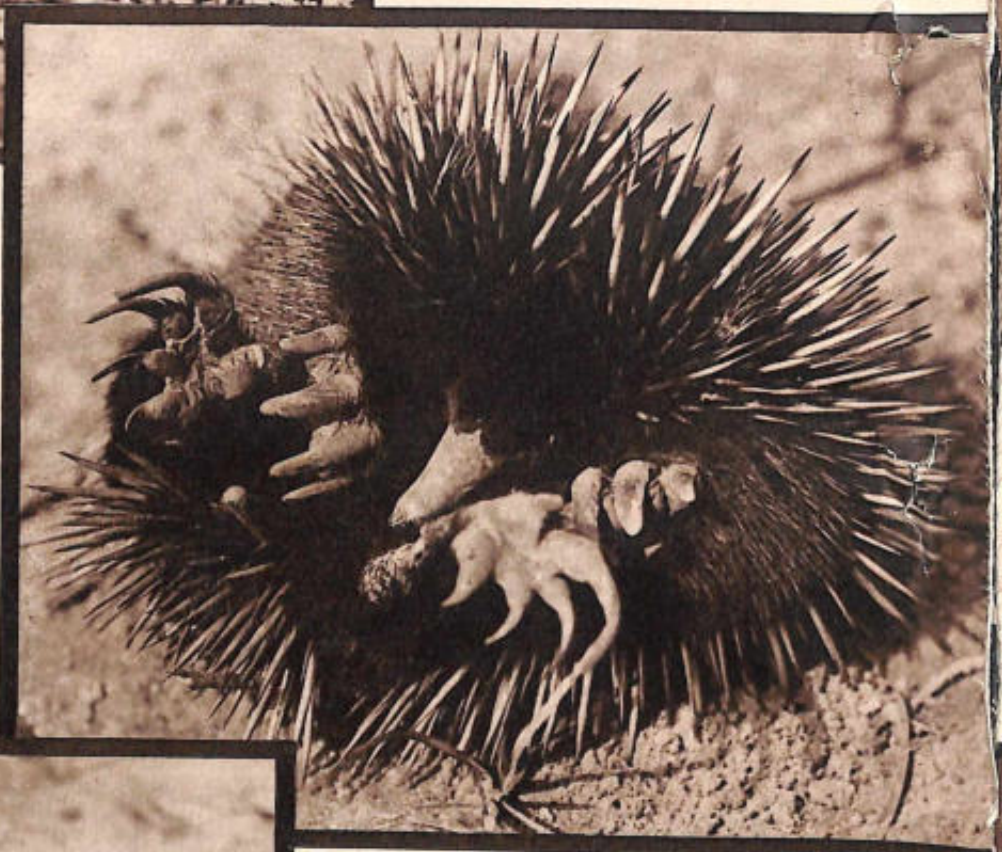
↑Haunt of the Lyrebird: a Victorian fern gully.

↓Lyrebird nestling at entrance to the bulky nursery, which is composed of sticks, root-fibres, etc.





The Echidna or Spiny Anteater may dig in when alarmed —



Roll over and present its long-clawed hind-feet to the enemy —



Or form itself into a sphere of spines, with all vulnerable parts close to the ground.



← The Spotted Cuscus, an engaging marsupial inhabiting Papua and portion of Cape York Peninsula.



Like the Ringtailed Opossums, the Cuscus has a prehensile tail.

Bennett's Wallaby is a native of Tasmania.





← One of the Tropical Ringtails. This snapshot of a wild Opossum was taken in the vicinity of Darwin.



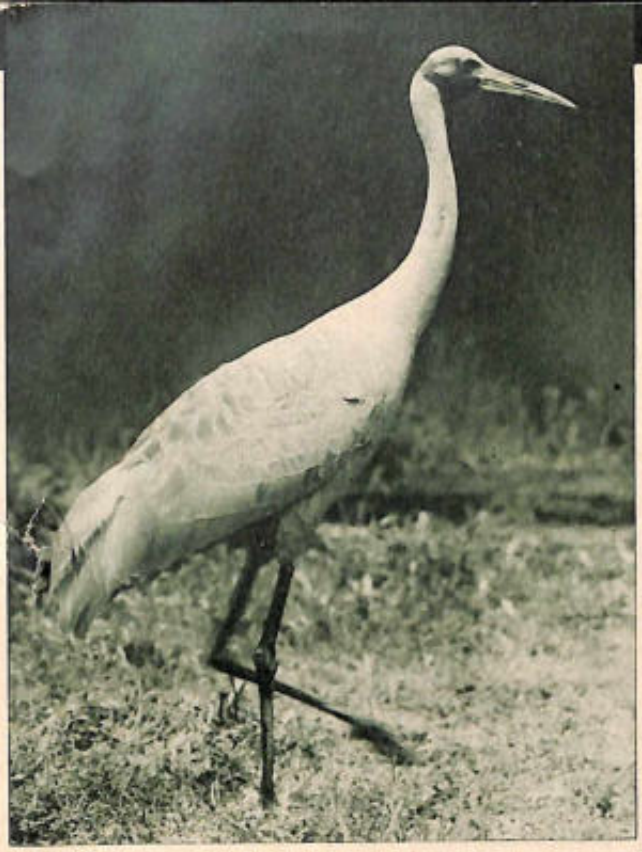
← The Emu, second largest of living birds, still abounds in many parts of Australia.

Emu chick: the stripes gradually disappear as the bird becomes older.



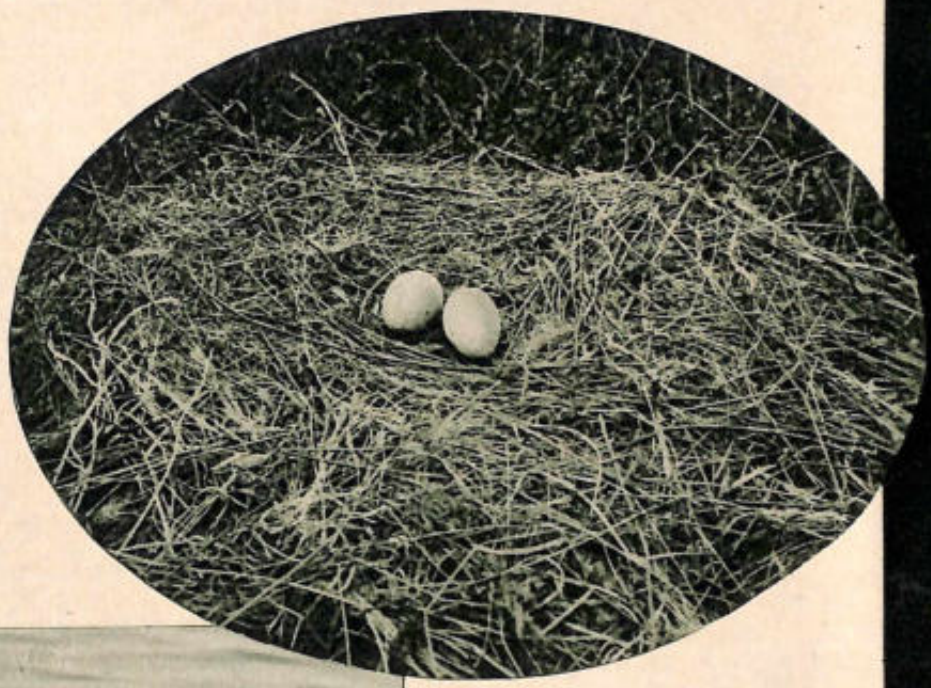


A Clutch of Ostrich eggs. Ostrich farming has been carried on in several of the States. This photograph was taken on a South Australian station.



← The Brolga or Native Companion is Australia's only true Crane.

↓ Nest and eggs of the Brolga.





Black Swan and cygnets. These handsome birds still abound in many parts of their range — Australia.



→ Nest of Black Swan on a swamp island in North-western Victoria.

AUSTRALIA OUTBACK



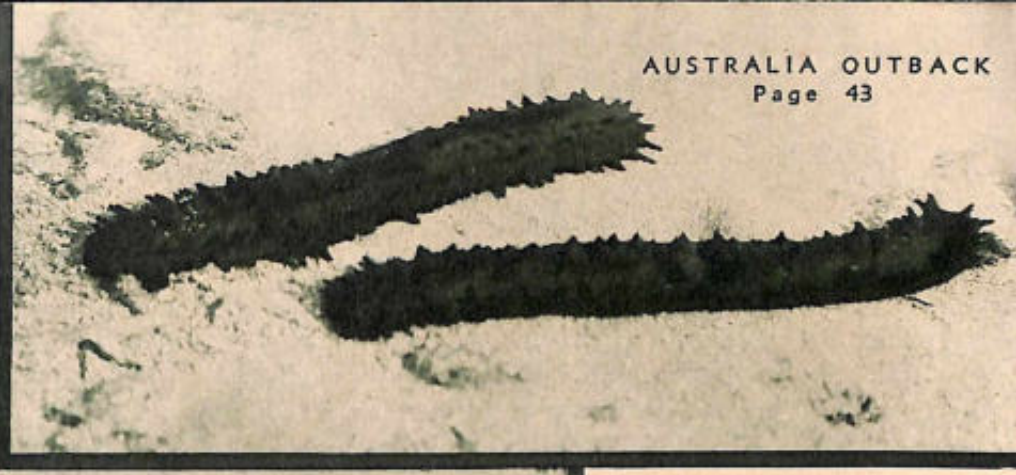
← The Great Barrier Reef Expedition (1927 - 28) had its headquarters on Low Isles. This sand cay probably was the first coral isle to be seen by Captain James Cook.

Diving helmets are used by naturalists when they "go under," to observe living coral, fishes and other inhabitants of the coral island lagoons. ↓

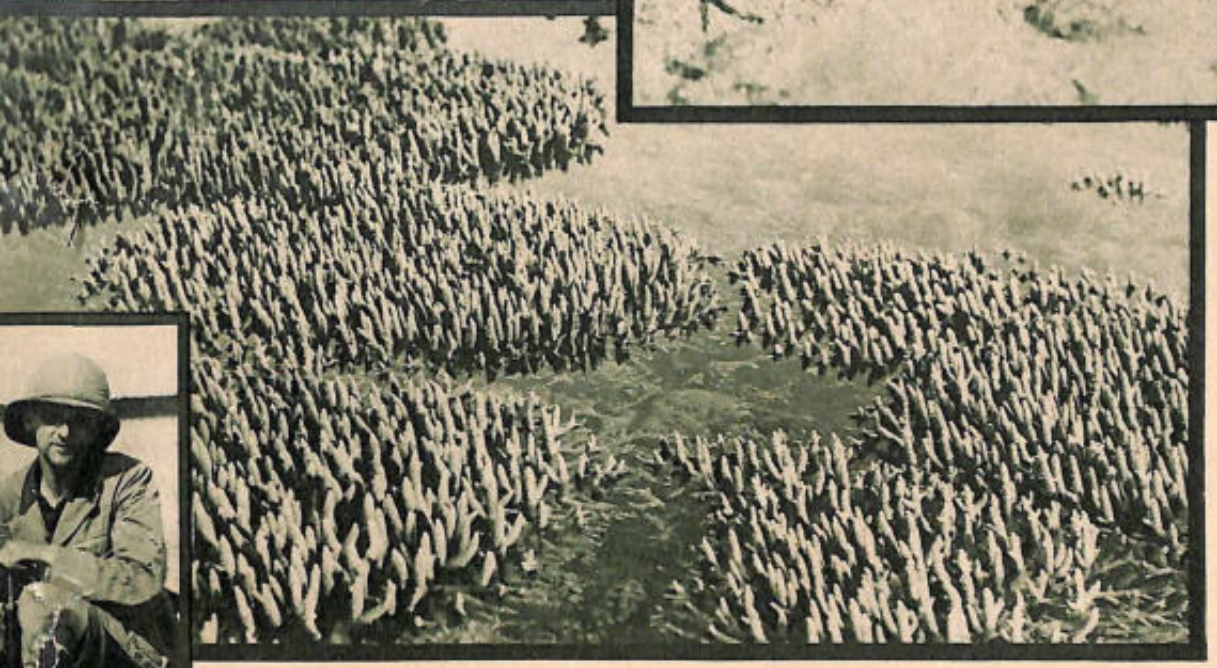


↓ A Coral Strand: Brammo Bay, Dunk Island. The author of "Confessions of a Beachcomber" and his wife lived on this beautiful tropic isle for a quarter of a century.





The Coral Reef at low tide. This living staghorn coral is of a lovely purple color.



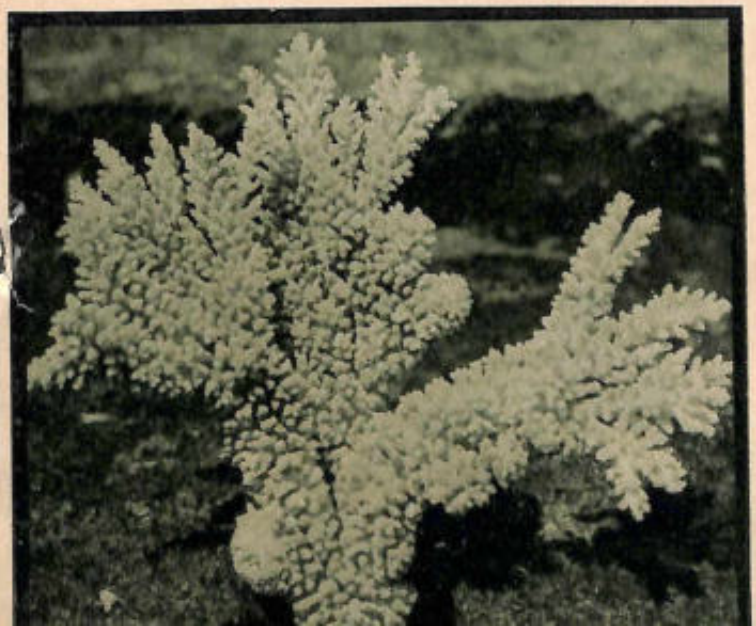
Sea slugs in a coral pool. These lowly creatures of the sea are harvested in vast numbers, smoke-dried, and sent to China and other Oriental lands as beche-de-mer or trepang.



Scientist at work in a coral island laboratory: She is observing plankton, collected from the sea near the Outer Barrier Reef.



Bleached coral: a perfect specimen





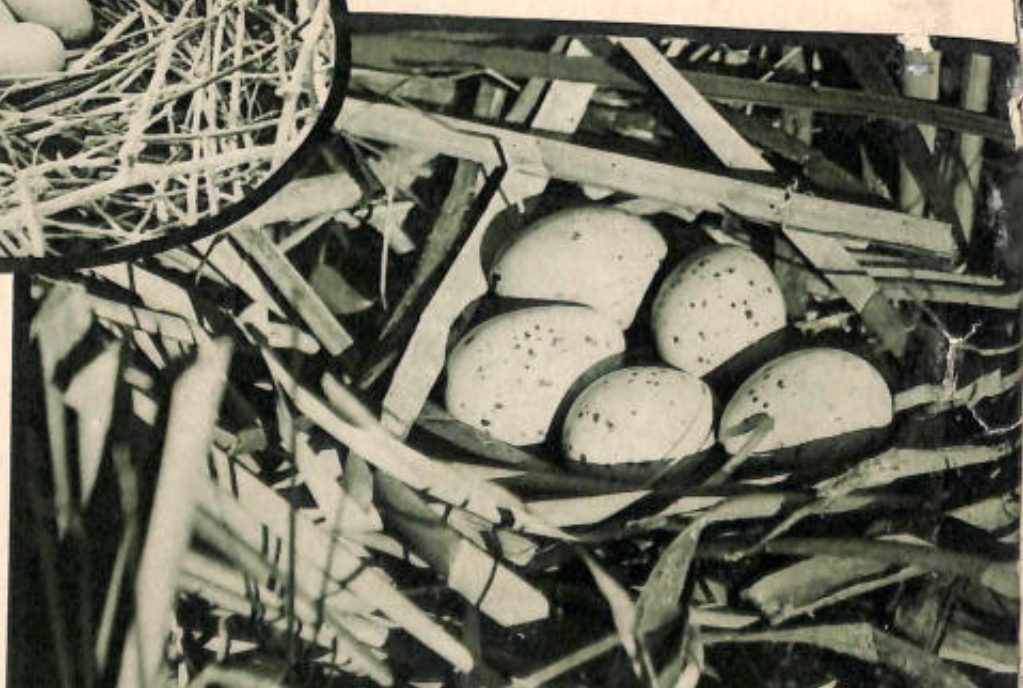
← Herons' nests in dead gum trees, standing in a Murray River Swamp.



Cruising in a "Flatty" on Moira Lakes, Victoria, where hundreds of thousands of Ibises nest.



Nest and eggs of the Glossy Ibis.



Australian Coot's → nest and eggs.



← Tully River Falls, North Queensland, rival in height and beauty the famous Barron Falls.





OLD AND NEW WAYS OF TIMBER TRANSPORT IN QUEENSLAND RAIN-FORESTS.

Left: Bullock team fording a creek.

Above: Tractors now haul big logs out of the deepest gullies on to tracks and the highway.



Thorny Devil or Moloch Lizard. This remarkable little reptile inhabits desolate areas of the Interior: it is at home amid spinifex and sand.

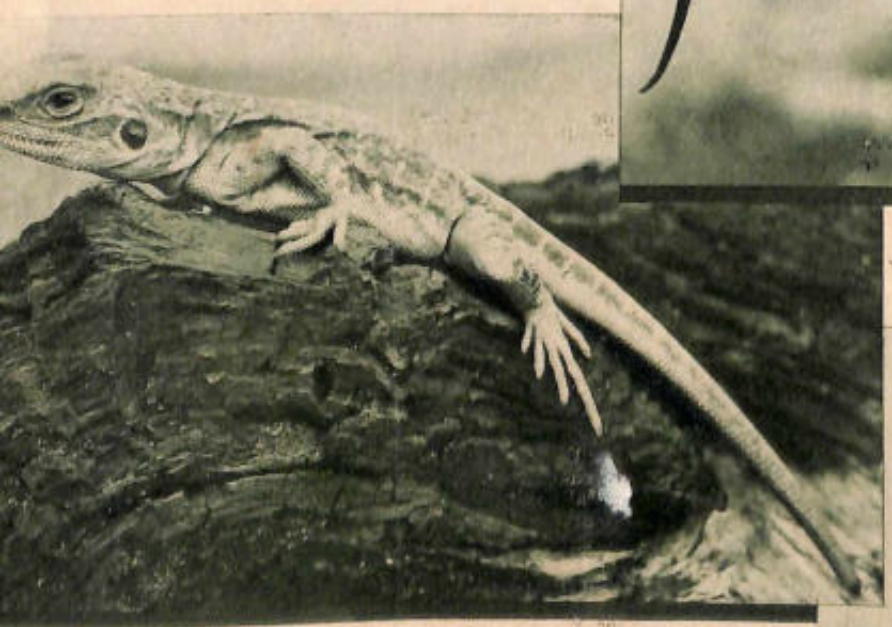


Tropical Tree-frog. A large, smooth-skinned dweller in Queensland jungles and palm scrubs of New South Wales.



The Bearded Dragon Lizard is common in many of the drier inland parts of Southern Australia.

The Painted Dragon, perhaps Australia's handsomest lizard: blue and brick-red are included in its color scheme.



↓The Bandy Bandy or Black-and-white Ringed Snake.



"Wild Life" in Australia

By CROSBIE MORRISON, M.Sc.

OF course, Australia is unique; but have you ever paused to wonder why? Other countries are as vast; as young in settlement; as broad in outlook. The Outback of Australia, which this volume portrays, has a character of its own, but America has its Wild West, too. South America has its Pampas, Russia its steppes, Canada its prairies. . . .

It is the Australian bush, and the creatures that dwell in it, that has made all the world wonder. The bush is the abiding place of the things that the world forgot — strange, primitive things the like of which had disappeared from other lands before man learned to abandon the tree-tops for the shelter of a cave.

Gum-tree Saga

The Australian gum-tree itself is primitive; its nearest relatives in other lands are found only as fossils now, along with the rabbit-like Eohippus that became a horse, the lizard-like Pterodactyl that first took wings and learned to be a bird, and the giant dragons that roamed the Carboniferous swamps — for there really were dragons in those days.

The gum-tree's relations succumbed to the growing pains of the ancient world, but Australia was already isolated, apart, and, like Peter Pan, it never grew up. So the gum-tree remained, and the modern world has discovered in it so many virtues that its story now is like an ancient saga. It brought shade in the desert to Addis Ababa; it brought relief from fever to the Pontine Marshes of Italy; it brought forests to the treeless Steppes of Russia; and its leaves have been for the healing of the nations. . . .

Orchids, Rare and Sweet

Beneath the gum-tree's shade grow orchids, small, indeed, but as beautiful in form, and as delicate in color and perfume as any hothouse prize won from tropical jungles. Do you know them? If not, you must, for many of them are unique as the gum-tree which shelters them.

The gum-tree, too, and its companions of the forest, shelter the wallaby and Australia's famous koala, the wombat and the possum, the grotesque spiny anteater that is different from all other anteaters, and a host of smaller fry that are mere names or even less than names to those who roam the bush on holiday—and they are all unique. The spiny anteater lays eggs like that more famous missing link, the platypus. The rest bring forth their young as tiny, almost formless embryos, and carry them about in a waistcoat pocket with all modern conveniences including central heating and milk laid on until they are old enough to see the world.

And because they are unique, and furry, and cuddlesome or winsome or lugubrious or grotesque, and helpless to injure anyone, the world comes to see them.

Enter the Wombat

A has been written of so many human beings—usually when it is too late to do anything about it—"to know them is to love them." People began to know the little koala only when it was almost too late. . . . Now the koala is rigorously protected, and large sums are being spent to encompass the healthy increase of the famous little pet. But just the other day some visiting American girls threw a spanner in the works. They had cuddled and caressed the koalas, as they had expected to, but Wenda the Wombat was a surprise, and they lost their hearts to her.

Wenda is as playful as a kitten or a pup, and there is no reason why other baby wombats, brought up in a similar environment, should not exert the same charm. The ascendancy of the koala has been definitely challenged—and by a creature with much of the appearance and not a little of the popular opprobrium of a hairy pig!

But there are hundreds of other creatures of the Australian bush with similar instincts and a similar capacity for charm. It only requires someone to "discover" them, as Bass's wombat has been "discovered," and there will be another furore. The little sugar-squirrel, with its grey-furred "wings," which is not a squirrel at all, has already had a human, poignant book written about it. . . .

Voices of Birdland

In birdland, the kookaburra has become the voice of Australia from screen and radio the world over. He is a rogue and a vagabond, but a cheerful one withal, and no one thinks the less of him because he is a scallywag. The lyrebird has more dignity, and since his mocking voice has been recorded and his portrait has appeared on postage stamps he has become famous, too.

But who knows the charm of the dainty little scrub wren, the vanities of the satin bower-bird, or the almost unbelievable domestic routine of the so-called scrub turkey, another of Australia's unique relics? These, too, are destined to an early "discovery," then to become part and parcel of Australia's popular treasure of the wild.

Even Australian ants are not as other ants. They, too, are primitive, the living representatives of the antediluvian ancestors of all the other ants. The insect and the spider world, the world that lives in a puddle of water, the world that dwells unseen in the woodpile and the rubbish heap of your own back yard, all are little self-contained microcosms—each occupied with its own Lilliputian dramas of birth, and life, and death, and each as a whole playing its own small role in the life of the larger universe.

And Now—"WILD LIFE"

Would you know more of these things? . . . See them in picture and story as they have never been presented before? . . . Follow the progress of those who work to unfold their drama and their romance? . . . Would you like to discuss with others the parts of the pageant which you, or they, have observed?

"Wild Life" will give you all this, and more. "Wild Life," a monthly magazine devoted to bush lore and creature life in Australia, will appear this month for the first time, and it will cost only 6d. an issue at your nearest newsagent's. Or, better still, send a cheque or postal note for 6/ to United Press, 62-74 Flinders Street, Melbourne, C.1, Victoria, for a year's subscription, post free.

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HOMEWARD BOUND
The man in the "flatty" is po
his way back to Camp.
Plants in the foreground ar
yellow swamp lilies.