

QL
1
R885Z
NH

6944
8

PROCEEDINGS
OF THE
**Royal Zoological
Society**
OF
New South Wales

FOR THE YEAR
1940-41.



AUGUST 11, 1941.

SYDNEY:

Published by the Society, 28 Martin Place.

LONDON:

Wheldon & Wesley Limited, 2, 3 and 4 Arthur Street,
New Oxford Street, W.C.2.

ROYAL ZOOLOGICAL SOCIETY OF NEW
SOUTH WALES

(Established 1879.)

Registered under the Companies Act, 1899 (1917).

PATRONS:

His Excellency the Governor of New South Wales, The Lord Wakehurst,
K.C.M.G.

Sir Philip Woolcott Game, G.B.E., K.C.B., D.S.O.

COUNCIL, 1941-42:

President: Gregory Macalister Mathews, C.B.E.

Vice-Presidents: Gilbert P. Whitley, F.R.Z.S., A. F. Basset Hull, M.B.E.,
Albert Littlejohn, and Noel L. Roberts.

Honorary Secretary: A. F. Basset Hull.

Honorary Treasurer: Phillip Shipway.

Honorary Editors: A. F. Basset Hull and Tom Iredale, F's.R.Z.S.

Honorary Librarian: Keith A. Hindwood, C.F.A.O.U.

Members: Ernest John Bryce, F.R.G.S., Neville W. Cayley, F.R.Z.S.,
Aubrey Halloran, B.A., LL.B., Garnet Halloran, B.Sc., M.D., F.R.A.C.S.,
F.R.C.S. (Ed.), Charles F. Laseron, Albert Sherborne Le Souef,
C.M.Z.S., Edward John Lees Hallstrom, Frank Marshall, C.M.G.,
D.D.S., Theodore Cleveland Roughley, B.Sc., F.R.Z.S., and Emil
Herman Zeck.

Assistant Honorary Secretary: Miss Betty French.

Honorary Auditor: Robert J. Stiffe, F.C.A. (Aust.).

OFFICERS OF SECTIONS:

Avicultural Section.

Chairman: A. H. Brain.

Hon. Secretary: Miss Joan Davies.

Budgerigar Section.

Chairman: R. J. Murray.

Hon. Secretary: F. Brennan.

Marine Zoological Section.

Chairman: Miss Maisie Golding.

Hon. Secretary: Harry B. Lee.

Ornithological Section.

Chairman: P. A. Gilbert.

Hon. Secretary: J. Allen Keast.

590.6944
R88

ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES

The Sixty-first Annual General Meeting was held at Taronga Zoological Park, Mosman, on Saturday, 26th July, 1941, at 3 p.m. 87 members and visitors were present. The Honorary Secretary, Mr. Tom Iredale, read the

SIXTY-FIRST ANNUAL REPORT.

Membership.—On the 30th June, 1941, the members on the register numbered 469, the ordinary members (including life members) reaching to 288. This is 38 less than last year, but as the loss is almost entirely due to the war conditions, the reduction was not unexpected. Nevertheless, it is strongly desired that members should endeavour to increase our membership so that the Society shall maintain its high standard of production of scientific work. Associate benefactors still number 3; life members 28; honorary members 8; ordinary members 260; honorary associates 3; life associates 21, and associates 146. Members to the number of 8 passed away, while 27 resigned, due to residential and other reasons. The names of 85 members unfortunately had to be removed, due to the terms of Article 9. The net loss in membership was 66, 44 new members having been enrolled during the year.

The Council.—The meetings of the Council have been fairly well attended, the average attendance being 12.4 and the number of meetings 11. Mr. J. R. Wallace resigned and his place was taken by Mr. G. M. Mathews, while Mr. M. R. Sharland also resigned on account of his taking up residence in Tasmania, and Mr. E. J. Hallstrom was appointed in his place.

Deaths.—It is with great regret that we have to record the death of Mrs. Harry Burrell, who, as one of our women's auxiliary, gave great help to our funds. Messrs. F. I. W. Harrison, F. H. Booth, A. H. Nathan, W. Stuart, H. H. Baker (ordinary members), and Edwin Ashby (life associate), also passed away during the year.

Finances.—Through the publication of a Handbook, the total amount is less than usual, while the loss of membership, through war conditions, as noted above, has also made a decrease. It is hoped that all members will assist in bringing in new members to keep the numbers as high as possible.

Publications.—The volume of "Proceedings" for 1939-40 was issued in August, and Part 4 of the 9th Volume of "The Australian Zoologist" appeared in December.

Part I of a "Handbook of the Fishes of Australia", by Mr. G. P. Whitley, dealing with the Sharks and Rays, was issued in July, and has been warmly greeted throughout the world. Orders, as anticipated, have been received from Europe and America, but recently even from Nairobi, British East Africa, Shanghai, China and Japan. An American reader was so enthusiastic that he broadcast a fine account of it at Los Angeles, California. A copy has been accepted by His Majesty the King, and a letter of thanks to the author has been received. The sales have been satisfactory, 580 copies having already been disposed of, but members are still urged to push its further sale as the continuation of Mr. Whitley's great work is hoped for soon. In the near future another Handbook, dealing with the Insects of Australia, by Mr. K. C. McKeown, will be issued, the MSS being completed and already in the printer's hands.

Handbook Fund.—This has been reduced through the cost of the publication above-mentioned, and will be further lessened when the

Insects Handbook is published, so that every sale will assist in its repletion.

Accounts.—The Rules have been amended to simplify the accounting, the Handbook Fund being in the future known as Publications Fund, "The Australian Zoologist" and "Proceedings" being paid for from that fund, as well as the Handbooks.

Sections.—The Sections have continued their work under adverse conditions, the attendances decreasing through absence of regular members on war work. The accounts of the year's work in each Section are published in the Proceedings, along with the programmes of subjects to be discussed at meetings for the coming year. As the Proceedings are sent to each member, it is hoped that the information therein given will be made use of. It is unfortunate that the General Section inaugurated last year has failed to meet with success and has temporarily gone into recess with the hope that under better conditions it may be revived.

Budgerigar Show.—Again a successful Lawn Show was held by the Budgerigar Section, at the residence of Mr. and Mrs. J. Hubert Fairfax, Double Bay, on April 26, 1941.

Presentation of Portrait of Mr. Hull.—An excellent oil painting of our evergreen and energetic Nestor, Mr. A. F. Basset Hull, by Mr. Hayward Veale of the Max Meldrum School, has been presented to the Society by Mr. E. J. Hallstrom to commemorate the lengthy unrivalled service of Mr. Hull to this Society. Mr. Hull is now in his thirty-second year of active membership of Council, having held office as President, on three occasions, and at other times as Editor and Secretary. While this painting, which is hung in the Society's Rooms, will be gazed upon with reverence by future generations, the present members give due homage to the great leader this Society has been blessed with.

The portrait was unveiled by the Premier, Mr. Alexander Mair, at a meeting on April 16, which was attended (by invitation) by the representatives of other Scientific Societies, the Australian Museum and Taronga Park Trust.

Taronga Park Trust.—Mr. Hull resigned from this Trust conditionally upon Mr. E. J. Hallstrom being appointed in his stead, and, as Mr. Hallstrom is a member of our Council, the rapprochement between the Trust and this Society is maintained.

Fur Farming Proposals.—A committee has been constituted by the Government to investigate this matter, and this Society has registered its protest against the introduction of further carnivorous animals which may prove later dangerous pests. The proposal to farm silver foxes seems especially dangerous, as the common fox has already been branded by nature conservators as Public Enemy No. 1. The silver fox might quickly revert to a similar or perhaps worse pest. The mink, being a member of the weasel tribe, already notorious in its native land as a great chicken destroyer, must never be introduced. The idea of exploitation of native animals for fur sales must also be strongly criticised, as otherwise it would mean extermination, whereas conservation is the policy of this Society.

Birds and Animals Protection Act.—Suggestions for the preparation of a better Act were desired by the Government from all Scientific Societies, and this Society co-operated with others in formulating amendments, but a change of Government has postponed their acceptance. It is hoped, however, that the matter will soon be followed up by the present Government, as there are many clauses in the present Act needing emendation.

Diploma.—The Diploma has been awarded to Messrs. C. F. and J. Laseron for their intensive study of the Marine Molluscan Life of Sydney Harbour.

Government Grant.—From the date of transfer of the Society's collections to Taronga Park in 1916, the Government granted £50 per annum to the Society until 1929. The Chief Secretary then withdrew the grant as he considered that the Society was financially able to carry on without Government assistance. Mr. Mair, when Premier, promised to look into the question of the subsidy being restored, and it is hoped that the present Government will favourably consider the matter.

The Honorary Treasurer (Mr. Phillip Shipway), presented the Balance Sheet.

In moving the adoption of the Annual Report and Balance Sheet, Mr. Aubrey Halloran referred to the strong claims the Society has to the support of the Government, as its work was wholly educational and performed in an honorary capacity by its members. Other scientific societies received substantial grants, while the Royal Zoological was overlooked. The motion was seconded by Dr. Garnet Halloran, and carried.

The President, Mr. Gilbert P. Whitley, then delivered his address on "The Study of Australian Fishes". (See page 7.)

BALANCE SHEET AS AT 30th JUNE, 1941.

ACCUMULATED FUNDS.				ASSETS.	
	£ s. d.	£ s. d.		£ s. d.	£ s. d.
General Account—			General Account		
Working			Investments—		
Account—			Office and		
Balance			Lecture room		
at 30th			Furniture and		
June, 1940			equipment at		
—Debit ..	204 18 11		valuation,		
Add Excess			plus addi-		
of Expen-			tions	214 7 10	
diture			Library books,		
over In-			etc., at		
come for			valuation ..	500 0 0	
the year ..	65 6 0				714 7 10
	270 4 11		Handbook Fund		
Funds Invested	714 7 10		Account		
		444 2 11	Investments—		
Handbook Fund			A u s t r a l i a n		
Account—			C o n s o l i d a t e d		
Working			I n s c r i b e d		
Account—			S t o c k (F a c e		
Balance			V a l u e)	660 0 0	
at 30th			A u s t r a l i a n		
June, 1940			C o n s o l i d a t e d		
—Credit ..	252 14 8		T r e a s u r y		
Add Trans-			B o n d s (F a c e		
fer of In-			V a l u e)	650 0 0	
v e s t e d			M e t r o -		
F u n d s . . .	400 0 0		p o l i t a n		
	652 14 8		W a t e r, S e w -		
Less Excess			e r a g e a n d		
of Expen-			D r a i n a g e		
diture			B o a r d I n -		
over In-			s c r i b e d S t o c k		
come for			(F a c e V a l u e)	100 0 0	
the year ..	180 9 7		M e t r o -		
	472 5 1		p o l i t a n		
Funds Invested	1,510 0 0	1,982 5 1	W a t e r, S e w -		
			e r a g e a n d		
			D r a i n a g e		
			B o a r d		
			D e -		
			b e n t u r e (F a c e		
			V a l u e)	100 0 0	
					1,510 0 0
			Including:—		
			Albert Little-		
			john Endow-		
			ment	100 0 0	
			Hume Bar-		
			bour Endow-		
			ment	106 0 0	
			Walter & E.		
			Hall Endow-		
			ment	175 0 0	
			Cash at Bank		
			and on Hand—		
			Commonwealth		
			Savings Bank:—		
			General Ac-		
			count	62 16 2	
			H a n d b o o k		
			F u n d A c -		
			count	133 5 6	
			Cash on Hand	5 18 6	
					202 0 2
					£2,426 8 0
					£2,426 8 0

**Auditor's Report to the Members of the Royal Zoological
Society of New South Wales.**

I hereby report that I have audited the books and accounts of the Royal Zoological Society of New South Wales for the year ended 30th June, 1941, and have obtained all the information and explanations I have required, and, in my opinion, the above Balance sheet exhibits a true and correct view of the state of the Society's affairs as at 30th June, 1941, according to the best of my information and the explanations given to me and as shown by the books of the Society.

I have examined the register of members and other records which the Society is required to keep by law or by its Articles, and am of opinion that such records have been properly kept.

(Sgd.) ROBT. J. STIFFE, F.C.A. (AUST.),

Hon. Auditor.

Sydney, 23rd July, 1941.

GILBERT P. WHITLEY, President.

A. F. BASSET HULL, Vice-President.

PHILLIP SHIPWAY, Honorary Treasurer.

COUNCIL MEMBERS.

The six retiring members of Council—Messrs. Neville W. Cayley, Aubrey Halloran, E. J. L. Hallstrom, A. F. Basset Hull, Charles F. Laseron, and Gregory M. Mathews—were re-elected, there being no other nominations.

OFFICERS FOR THE YEAR, 1941-42.

At a meeting of Council, held on 26th July, 1941, the following officers were elected:—

President: Gregory Macalister Mathews, C.B.E.

Vice-Presidents: Gilbert P. Whitley, A. F. Basset Hull, Albert Littlejohn, and Noel L. Roberts.

Honorary Secretary: A. F. Basset Hull, M.B.E.

Honorary Treasurer: Phillip Shipway.

Honorary Editors: A. F. Basset Hull and Tom Iredale.

Honorary Librarian: Keith A. Hindwood.

Honorary Assistant Secretary: Betty French.

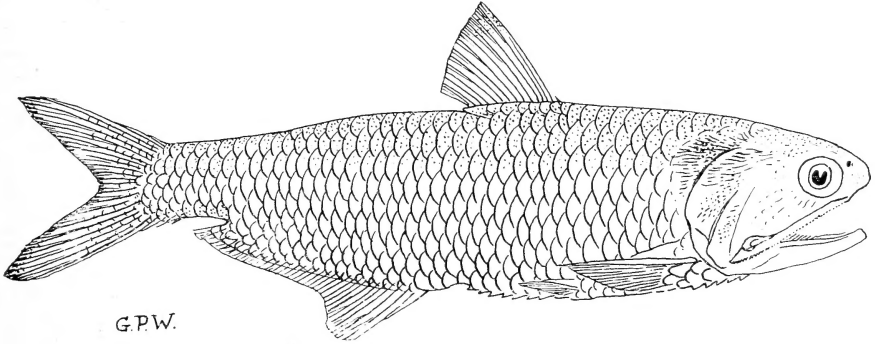
Honorary Auditor: R. J. Stiffe.

PRESIDENTIAL ADDRESS

THE STUDY OF AUSTRALIAN FISHES.

By Gilbert P. Whitley, F.R.Z.S.

At the present time, when we in Australia are being thrown more and more upon our own resources, our fishes must not be forgotten. We have long been used to importing immense quantities of canned and otherwise prepared fish into the Commonwealth, even though similar, practically identical, species occur off our own coasts. Statistics are almost worthless as a guide to the value of our fishes because of the abnormal times through which all countries have passed in the last quarter of a century. The latest figures available to me are those of the "Official Year Book of the Commonwealth of Australia", No. 32, 1939, which continues, from previous years, the hardly pertinent comparison that "The annual consumption of fish per head of population in Great Britain is set down at 42 lb., while in Australia it has been estimated at only 13 lb." The total take of fish in New South Wales for 1937 was valued at £550,498; that of the Commonwealth for about the same period was £1,334,095, a decrease when compared with previous years. Against this, Australia imported £1,540,522 worth of fish in the same time, an



An Anchovy (*Thrissina aestuaria*) from southern Queensland.

increase on previous years. Salmon from Canada, Russia and Japan, herrings of various kinds from the United Kingdom and Scandinavia, potted and fresh fish from Britain, and smoked or frozen fish from South Africa and New Zealand have formed the bulk of our purchases. Now that these imports are restricted or entirely barred, we must look more closely than ever into food-fishes of potential commercial importance. Now is our chance.

Apart from the introduced Brown and Rainbow Trout, which are used purely for sporting, we have no true Salmon to replace the imported article, our so-called "Salmon", the Kahawai (*Arripis*), being a wholly unrelated marine spiny-finned fish of uncertain ancestry, whilst the Broome and Cooktown "Salmon" are Threadfins (*Eleutheronema*). However, we have many different kinds of herrings (including pilchards, sprats, and some large tropical kinds) and anchovies—a Silver Horde we do not turn to gold—and amongst other fairly cosmopolitan types, tunnies, mackerel, and kingfish, besides hundreds of native marine fishes which could be eaten much more than they are, to say nothing of using them to make oil, fish-meal and fertilizers. Even the repulsive looking catfishes are excellent to eat, and our sharks, skates, and many tropical fishes could be profitably exported to those countries north of the Commonwealth, where millions of fish-eating humans annually net thousands of pounds worth of similar fishes from the sea. Many of our northern fishes, such as the Bombay Duck (*Harpadon*), are the same as Indian ones and could be exported to India for curries or kedgeree. We do not like to think that the prolific northern waters of "White Aus-

tralia" might some day be populated from parts of the Far East (our Near North), but, if that happened, one thing is certain: the neglect and waste of fish life now allowed from, say, Carnarvon in the west and around the Northern Territory to Cape York, would be transmuted into a thriving industry. On the other hand, Australian enterprise in this matter would presage development and defence for our extensive northern shores.

It may be that the tropical fish are less to our taste than the colder water kinds from our southern seas, but the trawlers have already overfished the narrow Continental Shelf of New South Wales and have either to work farther south or south-east or risk wrecking their nets on northern reefs. The great trawl-fishing ground to supply our Commonwealth of the near future seems to me to be the Great Australian Bight, far from all likely spheres of aggression, a great and unharvested store of fish-food. Few ships have trawled its waters, the most notable being the Federal Investigation Vessel "Endeavour" in the years preceding the Great War. She discovered many new kinds of fishes in great plenty and made such huge collections for scientific purposes that hundreds of her specimens have still to be classified. This work is being done at the Australian Museum, which has been for over half a century the "nerve-centre" of Australian ichthyological research. That institution has extensive collections, including 800 type-specimens and uncounted thousands of others; card-catalogues and indexes with thousands of references to specimens and the literature in its library; and the means of quickly supplying whatever information is available about every Australian species to Government departments, press, public, research workers here and overseas, to factories and fishermen.

Concerning the British Museum (Natural History), a blue book issued during the Great War truly stated: "All work connected with the conservation and arrangement of the collection of fishes may be regarded as of potential economic importance", and Dr. F. A. Bather, F.R.S. (*Museums Journal*, xvii., 1918, p. 123), elaborated this with: "Officers of the Board of Agriculture and Fisheries, with other students of fishery questions, find in the national collections material for their researches. A commercial fishing company, which proposed to exploit a new region, took the sensible step of first making a collection of the fishes and crustaceans found there and submitting it to the Natural History Museum for an accurate report. Government departments have also been furnished with reports on the poisonous fishes of the West Indies, on the various kinds of fish preserved as 'sardines', and on the lobsters of the Cape. Brands of tinned 'lobster' have been examined for the London Chamber of Commerce, sometimes with curious results, for one such brand was found to consist of the leg-muscles of a large Japanese crab".

SUBJECTS FOR STUDY.

The study of Australian fishes can be approached from many angles, yet always presents many facets of interest. In a short address, I cannot hope to indicate more than a very few aspects. In assembling my notes, I soon enumerated some seventy different topics all related to the main theme, and each of these I may elaborate in some other publication which can be read leisurely, shelved for reference, or relegated to obscurity. Consider some of them, though, and let your thoughts revolve around them: The structure of fishes, their colours and camouflage, senses and faculties, speed, food, size, migrations, breeding, enemies. Their diseases are a study in themselves and your ichthyologist must cultivate a fitting "bedside manner" beside the ailing goldfish of a friend. Aquaria, from the amateur's bowl to the excellent display here at Taronga Park, may enable us to determine something of the age of fishes, their growth-rate, and varying habits. Consider, too, the mythology of fishes from the earliest legends and the lore of aborigines to modern sea-serpent tales—books have been written on that alone—and the romance of vitamins.

The remarkable limits to the distribution of fishes in salt and fresh water have already been roughly mapped, though the causes of these unseen barriers still puzzle us. "Do fishes fall in rain?" and numerous other questions call for answers. The student of Australian fishes may be fascinated by fossils, or be concerned to distinguish poisonous fish from edible ones; alternatively he may only be interested

in fishes as food or wish to join the shade of Walton in the contemplative man's recreation. Much of the unfair discrimination against cormorants would vanish if prejudiced persons would heed the voice of science. For science is a grand disperser of cherished illusions and, relying solely on facts, seeks only the truth. Many stomachs of cormorants and other birds have been carefully examined and the fish-remains in them proved to belong to small unimportant species, not "baby trout" as so many shooters and anglers aver.

Accurate classification and identification of every fish studied is of paramount importance; without this sure foundation any superstructure must fall. That such work is necessary may be borne out by a couple of instances. Some years ago, a reward was offered in a southern State for the capture of any man-eating sharks. The local fishermen easily imposed on the authorities by catching numerous common, small, harmless kinds and parading these as the young of the large and dangerous ones. A zoologist with some knowledge of identifying species could have prevented this fraud. Many years ago, a dinner was given in Melbourne by interested business men to celebrate the discovery of the true Newfoundland Cod in Victorian and South Australian waters. It was obvious to anyone, bearing in mind the rich fisheries of the Atlantic, that a sort of marine gold-rush was imminent and fat dividends were visualized. However, a learned naturalist intervened with the poser: "How many fins has a Codfish?" The famous question as to how many legs a caterpillar possesses could hardly have caused less commotion, for our zoologist was able to show that the true and valuable Newfoundland Cod (*Gadus morrhua*) had three dorsal fins, to say nothing of the others, whereas the Australian Codfish (*Physiculus barbatus*) never has more than two, and was different in other respects. Thus did a mere zoologist upset the entire scheme of the promoters and, probably, their appetites as well.

Systematists have been classifying Australian fishes for many years, but there remains much work to be done, and I may be pardoned perhaps for looking far ahead and mentioning here a sort of fifteen-year plan towards this end: a **Genera Piscium** listing every generic name provided for fishes from 1758 to the present time, with possibly an index to the species as well, towards a new **Systema Naturae**.

A NEW SYSTEMA NATURAE (1758-1958).

The year 1958 will see the bicentenary of the publication of Linne's **Systema Naturae**, the basis of binomial scientific names and zoological nomenclature. I suggest that a fitting commemoration would be the publication of a new "**Systema Naturae**" to serve as a key to all the Linnean and later species of the entire Animal Kingdom, to serve as a milestone to mark our progress, and to speed us on our way. Because of the many thousands of different species of animals now known, the new **Systema** would be scarcely more than a list of names with references, along the lines of Sherborn's **Index Animalium** and Neave's **Nomenclator Zoologicus**, compiled by taxonomists who have specialized on various groups of animals. The proposed 1958 list would be as accurately compiled as humanly possible and might, I suggest, serve as a base for all future naming of species. Every name in the new **Systema** should be a **nomen conservandum**, and any name dug out from overlooked books or papers published before 1958 would have no more standing in scientific nomenclature than a pre-linnean polynomial has to-day. I welcome constructive criticism of this scheme, and offers of co-operation.

CENSUS.

There are probably well over 20,000 different species of fishes in the fresh and salt waters of this globe, referable to more than 600 families. Australia supports a rich and varied fish-fauna which has been studied by naturalists from the times of the early explorers to the present day. Probably the first catalogue of Australian fishes was C. P. Thunberg's **Fauna Novae Hollandiae** (Upsala, Sweden, 1822) which, however, listed only two sharks; actually quite a few of our fishes had been made known to science before the end of the 18th century.

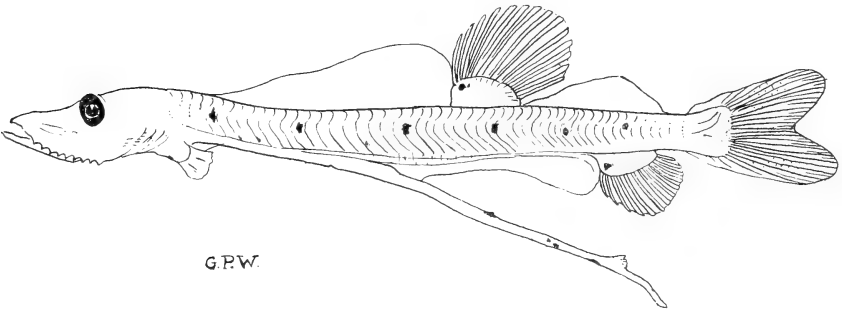
At the end of 1883, Sir William Macleay noted the total number of Australian fishes as amounting to 1,291 species.

In 1914, McCulloch wrote that there were about 1,840, the small increase being probably explicable by some species having been sunk

as synonyms of others, but he thought that a complete list of our fishes would exceed 2,000 (i.e., 10% of the estimated world total). McCulloch's manuscript list of Australian fishes numbered 1,905 species in 1920. In "A Census of Australian Fishes" (Austr. Mus. Mag., iii., 1927, p. 108), I estimated 2,150, and two years later McCulloch's **Check-List** was published with about that number of species.

During the ten years or so since the publication of McCulloch's work many synonyms have been recorded, but many new forms have been described. From my manuscript name-list of Australian fishes, I find the number of nominal species is now 2,157.

Probably when (if ever) all the deep-sea fishes off our Continental Shelf are known and when we have identified and catalogued all those little slivers of silver which are the planktonic larvae, we may find we have up to three or four thousand different kinds of Australian fishes. Even in New South Wales, where over six hundred different fishes are well classified, I have recently found that larvae, apparently plentiful in the plankton offshore, belong to genera, and **families**, so far **unknown from Australia**. Not only has nothing like their adult stages been caught here yet, but their very presence in our waters was quite unsuspected. The study of eggs and young fishes and their breeding grounds is very necessary to any fishing industry. Here, again, only the specialist with his microscope and literature can make sure identification.



A remarkable larval fish (*Astronesthes*) from New South Wales, less than one inch long, an addition to the Australian fauna, captured by the M.V. "Warreen".

HISTORICAL.

The history of Australian zoology has long appealed to me, and the section of it dealing with fishes (which we may perhaps term "Australian Fishtory" or "The March of Slime") may be briefly outlined here, since it is an important part of our study.

As long ago as 1606, the sailors on Torres' ships were the first white men to take notice of fishes anywhere near Australia. Then Carstenszoon, in 1623, having "encountered sharks, sword fishes and the like unnatural monsters" between New Guinea and Cape York, was delighted to find "plenty of delicious fish" from the Waterplaets, now believed to be the Mitchell River district, Gulf of Carpentaria, Queensland.

The Dutch seamen, with Willem de Vlamingh, on his visit of 1696-97 to Western Australia, observed a remarkable fish, about two feet long, with a round head and sort of arms and legs, and even something like hands. Perhaps this was an Angler Fish.

When Dampier paid his second visit to Australia, in the "Roebuck", 1699, he had aboard an artist who drew fishes and other animals. The engravings from these drawings, published in Dampier's "Voyage to New Holland", in 1703, are the first known pictures of Australian fishes. Bougainville noted a flying fish from a locality well eastward of the Great Barrier Reef in June, 1768.

Lieutenant James Cook, in the "Endeavour", 1770, noticed various fishes in Eastern Australia, and the manuscripts and drawings then made by Banks, Solander and Parkinson I have seen in the British

Museum. Cook's men brought the name Leatherjacket to Australia from the West Indies.

Marion du Fresne and Francois de Saint Allouarn noted some fishes from Tasmania and Western Australia respectively in 1772, the latter noting from Dirk Hartog's Bay, Western Australia, the poisonous toadfishes there. Captain Cook was poisoned by similar toadfishes in New Caledonia in 1774, but happily survived, so that on his third voyage, William Anderson and William Ellis were able to describe Tasmanian fishes in manuscript which I have seen in the British Museum. The earliest description of a Flathead dates from this period.

The First Fleet naturalists made paintings, some still in existence, of Sydney fishes, and made known such interesting species as the Port Jackson Shark, the Five-Fingers (now Morwong), Watt's Shark (Wobbecong) and Light Horseman (Snapper), and La Perouse's men caught nearly 2,000 "light-horsemen" in one day. The first published pictures of New South Welsh fish appeared in Phillip's "Voyage to



Ichthyologists in the times of Captain Cook.

Botany Bay", 1789, soon followed by White's "Journal" and a host of other natural history publications.

In Collins' "Account of the English Colony in New South Wales", we can read of the first fisheries enactments for the new settlement. Any modern visitor to Botany Bay can still see, though in diminished quantities, the identical species of fishes of which mention is made in the journals of Cook, Banks, Phillip, and the early French naturalists.

Of collectors in southern and Western Australia, I have no room to write, though the early French voyagers, like Baudin's men, deserve great praise, and the marine surveys by Flinders, P. P. King, and other Englishmen gave good results to ichthyology.

The overland explorers made known our fresh water fishes. Oxley mentions the Murray Cod; Mitchell includes drawings of catfish, cod and silver perch in his journal; Sturt, Cunningham and even Eyre mention the fish they gratefully ate. Many names of collectors, expeditions, writers on fish, and students who toiled through years of the nineteenth century could be listed. Royal Commissions, the Great Fisheries Exhibition, visiting expeditions, the introduction of trawling, and the establishment of museums and universities have had great

influence on our knowledge of Australian fishes. In recent years, the Taronga Park Aquarium, various Barrier Reef expeditions, and the work of such trawlers as the "Endeavour", "Thetis" and "Dana" have been of importance, whilst the patient labours of fisheries inspectors in various States should not be forgotten.

A milestone in our fisheries knowledge was the publication of the "Map of Fisheries" prepared by the Development and Migration Commission for the information of the members of the Australian Fisheries Conference, 1929. Later, the work of the Commission was taken over by the Council for Scientific and Industrial Research, which has already achieved excellent work with its investigation vessel "Warreen" and in its modern shore laboratory at the old Fisheries Department hatchery at Cronulla, New South Wales.

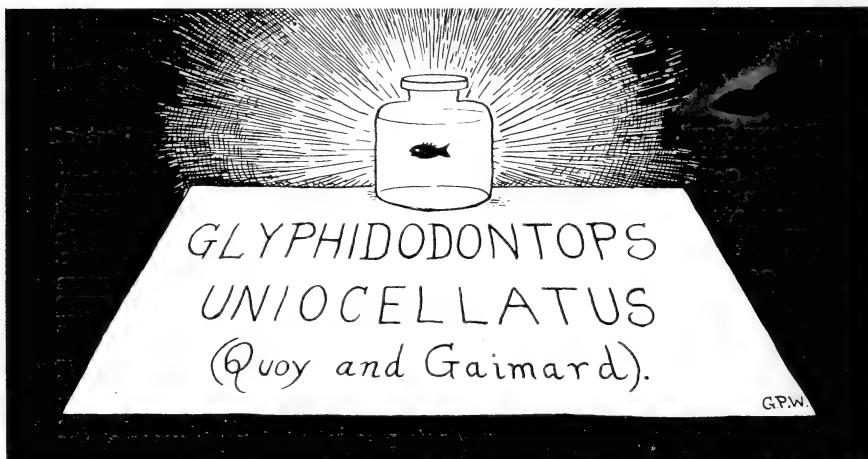
McCulloch's "Check-List of the Fishes Recorded from Australia", 1929-30, gave a list of our fishes, which, though modified by later accessions of knowledge, remains as a sure foundation for future work.

A word of praise is due to the press. Often the first notification that something is wrong with our fisheries comes to us from the papers. Matters can be ventilated, unusual fishes made more widely known. No student of Australian fishes can afford to ignore what the press has published, and many researchers have their files of important clippings. Study of these shows how some themes have been repeated without variation or amendment for years or furnishes a perspective view of what little progress has been made.

More than 100 authors, between the earliest times and the present day, have named new species of fishes from Australia, often in various foreign languages. Thus a bibliography of Australian fishes might list several thousand books and papers.

VERNACULAR NAMES.

I have never forgotten one day, when first I worked at the Australian Museum, and knew, if that were possible, even less than I do now about fishes, I came across a perfect little gem of a fish in a bottle. Although only about an inch long, it shone like a sapphire, and no butterfly seemed to me more beautiful. What was this delightful creature: surely it must have some special designation of its own. I inspected its label: "**Glyphidodontops uniozellatus** (Quoy and Gaimard)"—that was all! I sagged. No wonder 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



What's in a name?

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. Many confusing cases of mixed-up vernacular names could be cited from Australia but, in the "Handbook" now being written, a solution of all such problems will be attempted.

FISHES AND WAR.

Even the cold-blooded fishes have warmed mankind to war. Several "Battles of the Herrings" have engaged Britain with her continental neighbours through the centuries. For years now, Russia and Japan have had friction over fisheries in their northern waters, the Russians, if anything, having recently gained the upper hand. Even Alaska,* and her outlying islands have considered as hostile the invasion from the west of her Salmon waters.

Japanese ships have regularly fished in northern and north-western Australian waters but, so far, and, perhaps, fortunately, without stirring the local apathy. A Japanese research vessel, with freezing works and even an ichthyologist or two on board, visited the Northern Territory in recent years. I made enquiries, but have been unable to trace any scientific results from this visit.

Apart from a little friendly rivalry between the trawlers of Australia and New Zealand, there seems no likelihood of local quarrels over our fishes—at least for a century or two!

And what of fishes and the present war? War affects fisheries in several ways. Trawlers and other fishing vessels may be put to mine-sweeping, patrolling, or other duties. This gives the trawling grounds a rest and enables fish to recover a little from overfishing, and they may breed up again. It is impossible to say to what extent naval activities may affect fish by, for example, blowing them up with explosives. Such matters cannot be discussed during war-time, and lose interest afterwards, so that no data are forthcoming on this point, even from the last war.

One or two ways in which the study of Australian fishes has assisted the war effort may be of interest. Certain fishmongers have, for some years, foisted all sorts of fillets upon an unsuspecting public as "haddock", "bream", etc., when these have really been fillets of fish generally regarded as inferior, such as ludrick, morwong, small sharks, etc. Occasionally the men of His Majesty's forces have, in reply to the query, "Any complaints?" produced doubtful looking specimens of fishes served to them as food, and it has been the function (a very difficult one, sometimes), of an "ichthyological detective" to determine whether complaint was justifiable. Special studies of internal structure, chemistry of tissues, and the eye of a Sherlock Holmes for shreds of peritoneum or a few odd scales are necessities in this task.

Some camps, pestered by mosquitoes, have enquired as to what fishes might be introduced into tanks, streams or ponds to destroy the wrigglers or mosquito-larvae. In such cases, Australian fishes such as Blue Eyes (*Pseudomugil*), freshwater Sunfish (*Melanotaeniidae*) and Gudgeons (*Eleotridae*) have been recommended in preference to introduced species such as *Gambusia*, which, while efficient, may easily become a pest in our streams, like the alien Salmonidae, the Redfin or English Perch, and the ubiquitous Carp, to the detriment of the natural native freshwater life.

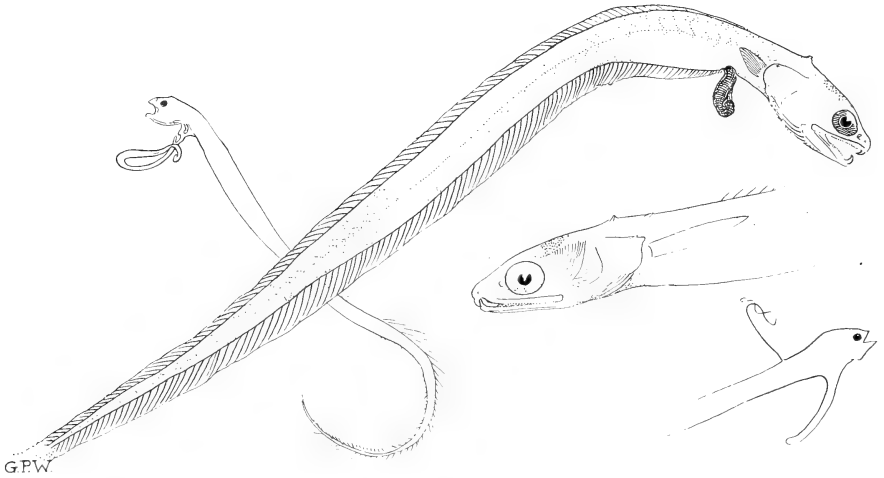
Certainly wars upset scientific research, which is as international as the Post Office. Australian ichthyology is still suffering setbacks from confusion due to the Franco-Prussian and the Great War, when scientists were working without reference to one another. Also our own work cannot be guaranteed as we would wish, since 1939.

CONCLUSION.

Let us roll away the clouds of war and look into the brighter future. In every State of Australia, students will be working in their laboratories and at sea, studying our fishes and the problems connected with them. They may predict good and bad seasons from

*Salmon are worth more than twice as much as gold to Alaska, £179 million as against £76½ million.

planktonic studies. Schools of fishes may be found by aerial reconnaissance or echo-sounding, surrounded by electric barriers and driven into nets, refrigerated on huge mother ships and transported by sea, land and air to wherever needed. Australia may fish from the equator to Antarctica and produce enough for herself, the South Seas, and some of the requirements of India and the Far East. Fisheries Legislation and price control may well be Commonwealth affairs and fisheries a major source of wealth to the nation.



Stages in the development of the Messmate Fish (*Carapus*), of New South Wales, showing absorption of the intestine and loss of dorsal spine.

Australia, the largest island or the smallest continent in the world, forms a compact mass, politically a united Commonwealth, but from the point of view of the naturalist, geologist, or hydrographer, a strange and ancient agglomeration. Washed by the waves of the Indian and Pacific Oceans, girded by the Great Barrier Reef and with her northern rivers snaking "by dredgerous lands and devious delts" into the Timor Sea, yet at the same time buffeted on the south by great rollers from Antarctica, is it any wonder that Australia's shores support a varied store of marine animals? We have marine deeps capable of submerging our mountain ranges, yet all of these hold fishes. There is not so rich a freshwater fauna (freshwater fishes constitute less than 5½% of our fish species), for Australia, compared with other continents, is parched, and drought-stricken, and the tenuous lines denoting rivers on our maps too often indicate long-dried beds.

Yes, Australia is a large country, she has one of the most varied marine fish-faunas in the world, but not enough is made of this vast heritage. According to the Book of Genesis, as soon as God made man, he gave him supreme power over the fishes: "And God said: Let us make man in our image, after our likeness; and let them have dominion over the fish of the sea". Let us, therefore, not neglect the study and scientific exploitation of our fishes, for Australia, besides being a large, is also a great country, and even "the fish of the sea" must be made to contribute to that greatness.

REPORTS OF SECTIONS.

AVICULTURAL SECTION.

Annual Report.

In submitting the annual report of this Section it is noted with pleasure that several new members have been enrolled and the attendance has compared favourably with that of previous years.

Owing to the incidence of war work, Mr. J. D. Whaling was compelled to resign from the position of Honorary Secretary. His resignation was accepted with regret.

Under the capable guidance of Mr. Roy Cooper, many members spent a most enjoyable day at the National Park Cabin. Several birds were observed feeding only a few feet in front of the Cabin, and quite a few nests were discovered in nearby trees. The Section is in the debt of Mr. Cooper for arranging and guiding such a successful party.

We were unfortunate in losing one of our most enthusiastic members, Mr. A. I. Ormsby, who has joined the A.I.F.

During the year, the following lectures were given:—

“Some Birds of Central Australia,” by Mr. Roy Cooper. This was a most interesting address, telling of an expedition to Central Australia and the birds observed there.

“Fairy Wrens of Australia,” by Tom Iredale. The lecturer gave a delightful talk, pointing out that aviculturists could help in furthering the knowledge of these beautiful birds.

Mr. Buckle delivered a most unusual address, giving figures showing the enormous amount of insect-life which birds destroy annually, and the incalculable amount of good following such destruction.

“With the Lyre Birds,” by Mr. C. Price-Conigrave, showed many difficult and unusual photographs of the Lyre Bird. Mr. Price-Conigrave expressed the desire that everyone would protect this wonderful bird which is so rapidly disappearing.

A superbly-coloured film of Taronga Park was shown by Mr. R. A. Patten. The renowned flora of the Park was used as a background for many of the animals photographed. Members were keenly appreciative of this wonderful film.

Mr. C. Camp related several reminiscences of outstanding and amusing episodes at Taronga Park.

An unusual and absorbing talk was given by Mr. Iredale on England, with particular reference to the unchanging habits of this brave race under varying and often adverse conditions. Excellent slides were shown depicting life in the Home Land.

For our annual meeting, held in June, Mr. Gregory Matthews, C.B.E., most generously consented to deliver a lecture. A rare knowledge of birds and a fine sense of humour combined to make an exceptionally interesting lecture.

The Aviary Notes have, as in the past, formed an important part of the meetings. These notes are found very valuable, as in this way members have an opportunity to discuss difficulties encountered during the month and obtain advice from their fellow-members.

In conclusion, we wish to thank the lecturers who so kindly gave their services, also the members whose attendance helped to make a most enjoyable year.

J. DAVIES, Secretary.

A. H. BRAIN, Chairman.

BUDGERIGAR SECTION.

Annual Report, 1940-41.

This summary of the work of the Section for the year 1940-41 includes its most interesting activities.

On Sunday, September 28, 1940, the Section held a most interesting exhibition at Taronga Park. This exhibition was for the purpose of

bringing before the public the evolution of the Budgerigar. Members of the Section between them co-operated in procuring the numerous varieties for exhibition. Each mutation in its order of appearance was carded and a short history of the exhibit given for the education of the public. The Taronga Park Trust assisted generously, and a considerable number of visitors viewed the birds. Fortunately, the day was favourable to a successful event, and the members spent a most enjoyable day.

A proposal that the members visit the Cabin at National Park for another outing was agreed to, and the visit was duly arranged for Sunday, November 24. Mr. Cooper kindly volunteered to escort the party from Waterfall Station. We were again fortunate as far as weather was concerned, and the day was spent in most enjoyable surroundings. The period of the year was not favourable to bird observation. Nevertheless, Mr. Cooper pointed out several interesting features of the location, and during the afternoon gave a talk on the History of the Cabin. The Section thanks Mr. Cooper for his interest.

The Annual Lawn Show of the Section was held on Saturday, April 26, at the residence of Mr. J. Hubert Fairfax, Edgecliff. This Lawn Show proved the most successful of any show held to date, the number of birds staged being 200. Mr. and Mrs. Fairfax again generously contributed to the success of the show, both as regards the supply of afternoon tea and financially. The special list for competition was a very fine range of trophies generally appreciated by all. The continuance of the competition for the Sydney Mail Miniature has been assured, due to the generosity of Mr. Hallstrom, who was good enough to sponsor the miniature for a further period of five years. We desire to thank Mr. Hallstrom for his interest.

As usual, the Table Shows and Judging Competition were continued throughout the year. Both events were productive of much interest and were given good support by the members. The winners for the year were as follows:—Table shows: Mr. H. Yardley, first; Mr. S. Maher, second. Judging Competition: Mrs. R. B. Browne, first; Mr. H. Yardley, second. The competition for the first three places in the judging was very keen, only 11 points separating the first three places. This, in a total points of 346, made the judging of the last few shows a matter of great interest.

The winner of the Sydney Mail Trophy for the year 1941-42 was Mr. H. Yardley. In conclusion, I wish to thank all members for their co-operation and assistance during the year.

FRANK BRENNAN, Hon. Secretary.
R. J. MURRAY, Chairman.

MARINE ZOOLOGICAL SECTION.

Annual Report.

In submitting this year's annual report, we find that our activities include very little of outstanding interest. Attendance at the monthly meetings varied from 10 to 20, showing a decline over the previous years; this we attribute to the present-day conditions.

Only one excursion was held—this was to Gunnamatta Bay, on Saturday, November 2nd, and was thoroughly enjoyed by all who attended.

A series of interesting illustrated lectures and exhibitions has been given as under:—

1940.—July 1st: Exhibition by members. August 5th: "Body Fluids of Fishes", by K. Cleland. September 2nd: "Collecting on the South Coast", by M. Ward. October 8th: "Life in the Depths of the Ocean", by I. Thomas. November 4th: Exhibition by members. December 2nd: Invitation to Chairman's home. Inspection of interesting and valuable collections.

1941.—February 6th: "Diatoms and their Role in the General Economy of the Sea", by Mr. K. Cleland. March 3rd: Lecture on

Special Exhibits, by M. Ward and G. P. Whitley. April 7th: "Early History of Macquarie Island", by G. P. Whitley. May 5th: "Macquarie Island Reminiscences", by C. Laseron. June 2nd: Annual Meeting.

During the past year interesting exhibits were frequently shown by Messrs. M. Ward, H. S. Mort, C. F. and J. Laseron. The Messrs. C. F. and J. Laseron were awarded the Society's diploma for their studies on shells.

In conclusion, your officers wish to thank those who assisted the Section throughout the year with lectures and exhibits.

HARRY B. LEE, Hon. Secretary.
MELBOURNE WARD, Chairman.

ORNITHOLOGICAL SECTION.

Annual Report.

The work of this Section was kept up enthusiastically throughout the year. The war was responsible for a 25% falling off in attendances and the Section lost several of its most enthusiastic workers. The secretary, T. Everitt, W. R. Moore and Jack Waterhouse went into the country's service. Alan Tubb and M. S. Sharland left us for other States, both going to Tasmania. The loss of Mr. Sharland, one of the oldest members of the Section, was particularly heavy, as he was most popular, and had held the position of secretary and chairman, and was a member of the Committee.

Following the resignation of Mr. Everitt from the position of secretary in August, the position was temporarily occupied by Messrs. Cooper, Sharland, and Keast, until at the annual meeting Mr. Keast was elected.

A very interesting series of lectures were given and individual workers made some notable trips. The lectures were as follows:—

1940.—July 19: "Mutton Birds and Petrels", by K. A. Hindwood and Tom Iredale. August 16: "Wading Birds", by Tom Iredale. September 20: "General Discussion", by members. October 18: "A Neglected Birdman", by Dave Leithhead. November 15: "The Economics of Birds", by J. R. Kinghorn. December 20: "Swallows and Wood Swallows", by M. S. R. Sharland.

1941.—January 17: "Waders and Shore Birds", by D. L. Serventy. February 21: "Cine Film Night". March 21: "Birds of the Five Islands", by R. P. Cooper. April 18: "Swamp Birds", by members. May 16: "Bird Watching", by N. L. Roberts. June 20: "Some Honeyeaters", by P. G. Gilbert.

Mr. Sherlock, of the Amateur Cine Society, very kindly came along in February and projected a Japanese bird film, together with several topical films of his own. After seeing the Japanese film, members decided that Australian bird photography was equal to, if not better, than that being done overseas.

In his interesting lecture, "Birds of the Five Islands", Mr. Cooper described a trip he made to the islands on December 14-15. Some of the photographs taken on this trip were published in the April issue of "Wild Life".

Mr. K. Hindwood made a trip to Cabbage Tree Island in mid-January to study the White-winged Petrel breeding. Mr. Chaffer recorded 138 species on a motor trip to the north coast of New South Wales, and Mr. J. E. Roberts reported on the Gould League Camp at Crookhaven and Cambewarra.

On 19th January a field outing was again conducted to Lion Island by Mr. Keast. A record number of 20 attended and observed the Wedge-tailed Shearwaters and Little Penguins. At the annual meeting, it was decided to hold frequent field days and thereby boost the membership of the Section. A syllabus of outings is being prepared for members.

J. ALLEN KEAST, Hon. Secretary.
PERCY A. GILBERT, Chairman.

SYLLABUS OF SECTIONAL MEETINGS, 1941-42.

Note: When the scheduled date for a meeting falls on a Public Holiday, the meeting is held on the next convenient date.

AVICULTURAL SECTION (Second Monday in the Month).

1941—

- July 14.—“Marine Life of New South Wales.”—By Melbourne Ward.
August 11.—“On the Importance of Going Fishing.”—By A. N. Colefax.
September 8.—Lecturette.—By Professor H. Priestley.
October 13.—“The Habits of Birds in relation to the rest of the Animal Kingdom.”—By A. S. Le Souef.
November 10.—“More of Taronga Park in Film.”—By R. A. Patten.
December 8.—Lecturette.—By Tom Iredale.

1942—

- January 12.—“Sea Birds of Islands adjacent to Sydney.”—By Roy Cooper.
February 9.—Lecturette.—By K. A. Hindwood.
March 9.—Lecturette.—By C. Price-Conigrave.
April 13.—Lecturette.—By N. Chaffer.
May 11.—“The Natives of New Guinea and collecting Birds of Paradise.”—By C. Camp.
June 8.—Annual Meeting.

BUDGERIGAR SECTION (Third Tuesday in the Month).

1941—

- July 15.—Table Show. Type only. Any variety.
August 19.—Table Show. Green. Any variety. A.O.V.
September 16.—Table Show. Blue. Any variety. A.O.V.
October 21.—Table Show. Grey-wing Blue. Any variety. Normal and 50% body colour. A.O.V.
November 18.—Table Show. Young birds. Unbroken cap. Rung or unrung. A.O.V.
December 16.—Members' Night.

1942—

- January 20.—Table Show. Clear-wings. Any variety. A.O.V.
February 17.—Table Show. Young birds ringed, 1941. A.O.V.
March 17.—Table Show. Self-coloured varieties, to include Lutine and Albino. A.O.V.
April 14.—Table Show. Cinnamon-wing varieties. A.O.V.
May 19.—Table Show. Any variety not provided for in the Standard of Perfection. A.O.V.
June 16.—Annual Meeting. Table Show. Grey-wing Green. Any variety. Normal or 50% body colour. A.O.V.

MARINE ZOOLOGICAL SECTION (First Monday in the Month).

1941—

- July 7.—“Invertebrates of Mount Irvine.”—By Melbourne Ward.
August 4.—“Poisonous Animals.”—By A. N. Colefax.
September 1.—“Experiences on a Volcanic Island.”—By Tom Iredale.
October 7 (Tuesday).—“Travels Abroad.”—By G. P. Whitley.
November 3.—Subject to be arranged.—I. M. Thomas.
December 1.—Subject to be arranged.—R. A. Johnson.

1942—

- February 2.—“The Place of Birds in Human Thought.”—By Mel. Ward.
March 2.—“Collecting on the Clarence.”—By Miss Joyce Allan.
April 6 (Tuesday).—“A Naturalist's Travels in England.”—By Tom Iredale.
May 4.—Exhibition Night.
June 1.—Annual Meeting. Chairman's Address.

ORNITHOLOGICAL SECTION (Third Friday in the Month).

1941—

- July 18.—“Some Remarkable Birds of the World.”—By A. S. Le Souef.

- August 15.—“Wild Nature in Poland.”—By L. de Noskowski.
 September 19.—“Psychological Aspects of Birds.”—By A. J. Marshall.
 October 17.—“Food of Birds.”—By K. C. McKeown.
 November 21.—Slide Night. Film taken on Eight-hour week-end camp-out to be screened. D. Leithhead to project Gould League film strips.
 December 19.—“About Birds.”—By Gregory M. Mathews.
- 1942—
- January 16.—“Sea Birds of Southern Australia.”—By Dr. D. L. Serventy.
 February 20.—Technicolour slide and film night. The latest developments in colour film, especially with regard to nature to be screened and explained.
 March 20.—“Parrot-like Birds.”—By Neville W. Cayley.
 April 17.—“Birds of the Simpson Desert.”—By H. O. Fletcher.
 May 15.—“Territory of Birds.”—By Tom Iredale.
 June 19.—Annual Meeting. “Birds of the Heath.”—By P. A. Gilbert.

RULES AS AMENDED.

To Come Into Operation on 1st July, 1941.

1. **General Fund.**—In order to carry out the objects of the Society, a General Fund is established, and the following moneys shall be paid into such Fund:—
 - (a) All unconditional cash donations and benefactions.
 - (b) The subscriptions of all Life Members.
 - (c) Such sums as the Council may from time to time appropriate from the balance standing to the credit of the Annual Income Account.
 2. **Annual Income.**—The Annual Income shall consist of:—
 - (a) All annual subscriptions paid by members and associates.
 - (b) Interest and dividends derived from investment of the General Fund.
 - (c) Payments for use of the Society's rooms.
 - (d) Such other income as the Council may from time to time determine.
 3. **Publications Fund.**—A Publications Fund is established for the purpose of providing for the preparation, printing, and publication of Handbooks to Australian Zoology, “The Australian Zoologist”, the “Proceedings” and other publications of the Society. This fund shall consist of:—
 - (a) Such sums as are expressly donated to the Fund.
 - (b) Any amounts received by the Society by way of Government grant.
 - (c) The net proceeds of sales of publications.
 - (d) Interest and dividends derived from any investments of the Fund.
 - (e) Such sums as the Council may from time to time appropriate from the balance standing to the credit of the General Fund.
-

BIRDS AND THEIR REFLECTIONS.

By K. A. Hindwood, Sydney, New South Wales.

Instances of birds attacking or being attracted by their images reflected in polished surfaces are not uncommon. In what may be called the usual or natural haunts of birds, there can be but few occasions when this could happen. The smooth, still surface of water is perhaps the only natural mirror likely to reflect in detail either a fixed or a moving object. A probable instance of a bird attacking its reflection in water is contained in the following note:—

There had been a fair amount of rain during the last few weeks, and the tank, belonging to one of the week-end cottages, was overflowing. The large round hole in the top was uncovered. A Magpie-Lark (*Gallina cyanoleuca*) perched on the top of the tank, and, after having a drink (?) fluttered right into the water, where it floated for an instant in the fashion of a Sea-gull. It did this two or three times, finally sitting on the surface of the water and fluttering its wings to splash itself. It did not, however, stay very long doing this, but came out of the water very quickly.—Geo. V. Scammell, Pittwater, N.S.W. (1).

When birds frequent the neighbourhood of houses or settled areas there must be many occasions when they see themselves, without recognition as such, in windows, tins, or other objects having the property of reflection.

Notes on this habit among birds have appeared in various journals, but the literature is so scattered that an exhaustive examination would be necessary before the published data could be treated in detail; often such notes appear as incidental matter in contributions on other aspects of ornithology. In the following pages I have gathered together some of these observations, listing them according to the species to which they refer. In addition, several unpublished notes, obtained from various sources, have been included.

BLUE WREN (*Malurus cyaneus*).

These attractive and diminutive birds have taken kindly to settlement, and are found in gardens wherever there is sufficient cover in the form of shrubs and undergrowth. Male Blue Wrens are very aggressive during the breeding season and will relentlessly fight rival males. I have been in a motor-car that has passed over two males locked in combat on a road: even this happening did not cause a cessation of hostilities. When the car was stopped and the birds approached they separated, but continued to fight in a nearby garden. Males kept together in an aviary will fight to the death.

An early note on "shadow" fighting in this species was published by Miss J. A. Fletcher:—

During November the actions of a pair of Wrens (*Malurus gouldi* [= *cyaneus*]) attracted some attention. Regularly every day for nearly a fortnight they would dash themselves against a small fixed window, the male bird becoming particularly excited in his efforts to get through. Several experiments were tried to see if it was their reflection in the glass they were attacking, or whether they were trying to catch flies. But neither of these seemed to be their object, and the mystery remained unsolved.—Wilmot, Tasmania. (2).

Other observations are given below:—

On several occasions last month (July), I noticed a female Blue Wren (*Malurus cyaneus*) fluttering like a moth at the window leading into our garden. She would then fly to a rose bush close by, where the male bird was sitting watching her. After she had been resting awhile she would fly straight back and repeat the performance. I sat inside the room close to the window watching her. But apparently in her excitement she could not see me, as she did not stop her strange antics. On another occasion I heard fluttering, so I quietly drew the curtains aside and watched her again. A Persian cat jumped on to the table in front of the window and watched her also, but even that had no effect. After sending the cat outside, I waited for the

bird to return to her mate, who was hopping about excitedly. I then pulled the top sash down silently. After a few minutes I closed the window again, when she evidently caught sight of it, for she came back and hammered away at the glass until she fell almost exhausted, with outspread wings, on the window-sill below, where she stopped for a few seconds before returning to her mate, who seemed greatly excited all the while. At first I thought the bird had mistaken the glass for space; but, if she was so anxious to come in, why not try when the window was pulled down? I have come to the conclusion that it was nothing but pure jealousy that caused her to fight so hard her own reflection.—Harry Burrell, Manilla, N.S. Wales. (3).

Hearing some taps at my window I looked up and saw a male and female *Malurus* flying at it. At first I thought that they were trying to catch a small sort of fly on the other side of the glass, but as they continued doing this for about a week, on and off, I think the male must have been trying to attack his image in the glass, especially as the small flies could not always be seen at the spot to which he flew, and when he changed his position in the twigs of a tree in front of the window he usually flew to a different spot. But against this was the fact that he always flew up about nine inches instead of horizontally forward. The female usually sits on a twig watching him, and very rarely flies to the window. On one occasion I opened the window, top and bottom. Twenty-eight times the male flew on to the top of it, looked into the room, and then hopped back to his mate, while the hen only did it twice. Each seemed frightened to go in without the other. At last the male flew in below and at a looking-glass placed on the window-sill. Then, flying up, he flew on to the inside of the window, and, dashing against the pane, had to be caught and placed outside.—J. Burton Cleland, Adelaide, S.A. (4).

At our old home in the Inverell district my bedroom window opened on to a garden and directly in front of the window, about nine feet away, was a mandarin tree, in which each year a pair of Blue Wrens nested. Immediately facing the window on the opposite wall was a very large mirror, in which, when the window—a hinged type which swung wide open like a door—was open, was reflected the whole of the mandarin tree. Father wren, while mounting guard over the sitting mother, would espy his reflection in the mirrored mandarin tree. Apparently thinking it to be an intruder, he would fly to the attack, and would flutter against the mirror, pecking savagely at his image until quite exhausted. This was a daily occurrence until the nesting was over, and was repeated every year. So intent would he be on the job that he would not desist, even when anyone entered the room, unless they went right up to him. Often I have lain on the bed less than six feet away and watched the whole performance.—R. Higgins, Waratah, N.S. Wales. *in litt.*

Last summer, the wrens built their little nest in an orange tree quite near the house. One morning I was busy with my house work, early, as usual, and I heard a tapping on a kerosene tin. The children had re-potted some plants, and I thought the empty tins had been left under the orange tree and the boughs moving with the wind were causing this tapping noise. However, this went on till mid-day, when I thought I would go and shift the tin. Imagine my surprise when I found it was the dear little father wren fighting "the bird" in the side of a nice new bright kerosene tin. I was so amused that I called the children out to see him. As he had been fighting from early morn I thought perhaps he had had enough for one day—so I threw the tin on the back of the truck and covered it with a chaff bag. Evidently he had an idea that his enemy wasn't far away, and in searching for him he discovered his reflection in the window in the back of the hood and he commenced fighting there. I covered the window later—still he searched about, and later on one of the children uncovered portion of the new tin. He lost no time in finding it out and went on with the fight, much to our amusement. For three weeks this war went on until at last I white-washed the tin, and that was the end of the tin war. Our back verandah is near the shed, and is done in with asbestos and



Male Blue Wren attacking his reflection in a motor car headlight casing. Wahroonga, N.S.W.

Photograph by K. A. Hindwood.

curtains. There is a mirror hanging on the wall and a little shelf under the mirror, where the tooth paste and tooth brushes live. The tooth paste had been left with the cap unscrewed off a new tube, too, as three days after he lost trace of the new tin—he discovered the bird in the mirror, and one day when I came home from the garden for lunch I couldn't make out what was all over the mirror and round the frame. My query was soon solved, when suddenly he returned and attacked the mirror ever so frantically. He had danced up and down on the tube of tooth paste, and it had oozed out and he had tramped it everywhere. It meant, then, covering that up. He was so interested in fighting that he took practically no notice of me, and I could almost pick him up anywhere.—M. E. Nott, Manilla, N.S. Wales. **in litt.**

Some years ago, when visiting a friend at Wahroonga, a suburb of Sydney, I was able to photograph a male Blue Wren attacking his image in the nickel-plated casing of a motor car headlight. The

same bird also attacked his image reflected in a highly polished chromium sphere used as a garden ornament. It was a ludicrous sight watching him vainly trying to obtain a footing on the smooth surface of the globe. Later, another pair of Blue Wrens, in the same district, was observed attacking their reflections in the headlight casings of a car. The male bird was much more persistent in his efforts than the female.

One male Blue Wren, at least, has provided the modus for a homily applicable to a human frailty. The memory of this martyr, *Bombastes furiosa*, so-called, who died seeking substance in its shadow, is commemorated in a delightful story, "The Besting of Bombastes", in *The Singing Garden*, by the late C. J. Dennis:—

The moon was at its full and, in the dead of night, we used to hear Bombastes the Balmy dashing his poor little body furiously against the pane, where the background of some darkened room made its glass doubly reflective.

We found him one morning below a window of the study, a pathetic little bundle of brown and brilliant sapphire, a ruby drop of blood oozing from the base of his bill telling how the end had come. (5).

MAGPIE-LARK (*Grallina cyanoleuca*).

Another bird much given to fighting its reflection is the Magpie-Lark or Peewee. At my former residence in Willoughby a male Peewee spent a goodly part of each day during the breeding season attacking his reflection in various windows of the house. Even when nesting had finished he used to fly at the windows occasionally. This bird was photographed from inside a room as he flew at the window-pane which he struck first with his bill and then his breast and feet. The whole action was very quick and needed an exposure of 1/500th second to stop any movement appearing on the negative. In this instance, and in other cases that have come under my notice, the birds soil the glass with saliva and excreta.

A Peewee has been observed to attack its image in the hub-cap of a motor car wheel:—

My motor car stood in the yard and the wheel hubs were particularly bright and shining. A Peewee kept approaching the wheel hubs and attacking its reflection. I frightened it away, but it later came back to the attack, and I was compelled to shift the car.—A. Sinclair, Maryborough, Queensland. *in litt.*

Another record of interest is this:—

At my cottage in Clermont, one bird [Magpie-Lark] woke me every morning by tapping at my bedroom window, and eventually knocked out the pane of glass—the putty in this climate getting very brittle and easily detached from wood, which shrinks. I cut away the branch of the vine the bird used to stand on, so he now visits another window, where a tank gives him a coign of vantage. —F. B. C. Ford, Clermont, Queensland. (6).

Some Magpie-Larks at least appear to remain paired after nesting is over and stay in the one locality throughout the year, though in the non-breeding season the majority assemble in roosting flocks at night. A pair of Magpie-Larks frequented the garden of Mr. Noel Roberts' home at Epping, near Sydney. Mr. Roberts has noticed that these birds remain paired and in the possession of territory during the winter; he has observed the male bird attack others of its kind, in one instance flying half-way across a large paddock to drive away another male. Mr. Roberts experimented by placing mirrors on the ground during June, 1940. The male bird attacked his reflection so persistently that the mirrors were removed. The bird would strike the glass with his bill, raise and lower his head, utter harsh notes, and then hop on to the top of the mirror, apparently looking for his supposed adversary; he would then "strop" his bill on the frame of the mirror. The female Magpie-Lark ignored her reflection which she must have seen as she ate food placed directly in front of the mirror.

Brief notes on other species in which this habit has been recorded are given below:—

BLACK-AND-WHITE FANTAIL (*Rhipidura leucophrys*).

A Black and White Fantail fights its own reflection in the window glass. It has been at it steadily from the beginning of



Male Magpie-Lark attacking his reflection in a window. Photograph taken from inside room at 1/500th sec. Willoughby, N.S.W.

Photograph by K. A. Hindwood.

November, and seems quite gay, though a trifle ragged. He shapes at its first thing in the morning, and is sometimes there till dark.—E. D. Barnard, Coomooboolaroo, Queensland. (7).

To which is added a later report apparently referring to the same bird:—

A little *Rhipidura tricolor* [= *leucophrys*] has been fighting his own shadow at the windows from the end of November to the

middle of March. We think he has since died of starvation as he waxed thinner and thinner daily, and never went away to get a decent meal. (8).

STARLING (*Sturnus vulgaris*).

I have been in the habit of putting oatmeal out on my bedroom window-sill (upstairs) during the cold weather. Early in January, this year, I heard a banging at the window, and saw that a Starling was hurling itself from the sill against the window-pane, apparently fighting its own reflection. On seeing me the bird ran along the sill, and then flew away. This occurred about 3 p.m. I left the room shortly afterwards and did not see or hear the bird again. Next morning I found a dead Starling on the same sill. I believe that it is not uncommon for birds to fight their own reflections, but I fancy it is seldom that the battle is fought to the death.—Kathleen Gough, Raford, Athenry, Co. Galway, Ireland. (9).

BLACKBIRD (*Turdus merula*).

Mr. Crosbie Morrison referred to notes he had had regarding the strange behaviour of Blackbirds which repeatedly dashed against windows. Mrs. Barrett stated she had noted this; the position of the windows ruled out the possibility that the bird was attacking its own image. Victoria. (10).

Mrs. Barrett did not state why it was that the window-pane did not reflect the image of the Blackbird. Providing the light in a room is less than that outside it, the glass should reflect an exterior object.

GREY BUTCHER-BIRD (*Cracticus torquatus*).

I have observed this species fly against the window of a verandah and of a shed at Willoughby, N.S. Wales; it did this repeatedly. That was many years ago, but I have no record of the date or the sex of the bird.

BLACK-THROATED, OR PIED BUTCHER-BIRD (*C. nigrogularis*).

Some years ago, Mr. A. H. Chisholm saw this species attacking its image in a window. Queensland. (in litt. 6/1/1940).

RUFOUS WHISTLER (*Pachycephala rufiventris*).

The same remarks apply to this bird as to the previous species.

YELLOW WARBLER (*Dendreica aestiva*).

In *The Book of Birds* there is a photograph of this American species perched on a twig and singing in front of a mirror. The caption reads: "A Yellow Warbler discovers his reflection in a mirror and challenges it to a duel". (11).

SMOOTH-BILLED ANI (*Crotophaga ani*).

The Smooth-billed Ani is an aberrant member of the Cuckoo family. It lives in flocks and builds communal nests, each colony defending a territory against strangers of the same species. While they recognise other members of the colony they are not acquainted with their own images and will fight their reflections in a mirror.

I put a mirror at the nest and two birds came on to the nest at once and started to **conk** and peck at the mirror. It puzzled them greatly, especially when they went round behind it. After I took it away they explored the place looking for it and finally went on to the nest.—D. E. Davis, Cienfuegos, Cuba. (12).

BIRDS OF PARADISE.

The writer has heard (and subsequently confirmed) that Prince Rudolph's Bird-of-Paradise (*Paradisaea rudolfi*) would display before a mirror. Hoping to get the same results with *Scelegelia* [= *S. wilsoni*, Wilson's Bird-of-Paradise] and in particular to get a good view of the back display, he presented a mirror before the cages of the latter bird. The result was, however, quite different to that hoped for. Both birds adopted an attitude similar to that of a displaying cock sparrow, but fluttering the wings much more rapidly. The specimen with the yellow nape attacked the image in the mirror, and made frantic efforts to get through the wires, squarking excitedly the while.

The second individual was frightened after the first occasion and merely hopped nervously from perch to perch. London, England. (13).

BUDGERIGAH (*Melopsittacus undulatus*).

Mr. J. Lappin, who resides at Campbelltown, N.S. Wales, has a tame Budgerigah. This bird has a cage but is allowed to fly about the house. When released from the cage it usually visits each room and eventually settles on a perch suspended between the base of a



Grey Thrush bringing a rose petal to its reflection.
Fisherman's Point, Hawkesbury River, N.S.W.

Photograph by Max. Lippmann.

mirror and a wicker chair. It moves along the perch until it is as near as possible to the mirror and its own image. In this position it will stay all day, apparently appreciating the solace of a fictitious companionship. Considerable difficulty was experienced in transferring the bird from this perch to its cage, until someone suggested an experiment with a shaving mirror. As soon as the Budgerigah settled on a finger it was shown its image in the smaller mirror and, so long as it retained its "companion" it made no attempt to fly back to the

other perch, and allowed itself to be placed in the cage. Apparently the spell of the image remains potent for this method of transfer is still used. (N. L. Roberts, MSS.)

INDIAN MYNAH (*Acridotheres tristis*).

Mr. Tom Iredale has recently (November, 1940), seen this introduced species pecking at its reflection in the windows of a house at Queenscliff, near Sydney, but not attacking the image.

MOCKING BIRD (*Minus polyglottus*).

In *Pix*, a Sydney illustrated weekly, there appears a photograph of a tame American Mocking Bird attacking its image in a mirror. (14).

ROCK WARBLER (*Origma rubricata*).

The following notes concern a pair of Rock Warblers that nested in the room of a house at Hazelbrook, Blue Mountains, N.S. Wales:—

One (presumably the hen) was quite infatuated with her reflection in a mirror, and spent hours on and off parading before it, scarcely taking time to get herself food. Presumably she rather tired of the mirror, but still visited it sometimes, and one day showed it to her lord and master and then there was trouble. (15).

GREY THRUSH (*Colluricincla harmonica*).

Grey Thrushes have for forty years been very tame and friendly, coming to hand to take crumbs. They have shown a special liking for butter. It is not an uncommon sight to find one or two birds unconcernedly helping themselves if a dish of butter should be left uncovered in the kitchen. We leave butter and crumbs outside for the birds.

Attraction to a mirror was first noted in August, 1937, when one very tame bird spent a lot of time inside the house and discovered the mirror on a dressing table. Unexplained deposits of insects, butter, crumbs and brightly coloured petals led to the discovery of a bird courting his reflection, frequently in full-throated song, but mainly in restrained warbling. Being shut out of the bedroom, the bird next found his reflection in the darkened bathroom window and soon had the window-pane and sill daubed with butter and litter. All this required so much attention that it was decided to furnish the lover with the mirror shown in the accompanying photograph. He comes back to it each spring. He mates normally and brings his mate to witness the show, but she has never shown any great interest—only occasionally does she join in the party, but neither bird shows animosity—the party is always friendly. It is amusing to see them sometimes hopping round behind the mirror endeavouring to find the "other fellow".—Max Lippmann, Hawkesbury River, N.S. Wales. MSS.

PEACOCK (*Pavo cristatus*).

Some interesting photographs of a Peacock fighting its image appeared in the Bulletin of the New York Zoological Society, together with these remarks:—

After a moment's hesitation he hopped lightly to the running board and made a closer inspection, thereby revealing the cause of his curiosity; it was his reflection on the polished surface of the door, and as it shifted with his movements his excitement arose tremendously.

His plumage ruffled, his eye sparkled . . . he launched himself into the air, struck the car a furious blow with his spurs, and, by the intensity of his action, was precipitated to the ground in complete confusion.

Having no faithful servitor to aid him, he pulled himself together and, without waiting to brush himself, dashed around the other side at top speed to seek his hated enemy, cutting the corners at a great pace, seeking this elusive foe that was forever out of sight.

When he had made about a dozen laps around the motor car his ambition cooled as his powers waned, thus bringing him gradually back to the reflecting point, where he again gave a perfect

demonstration of the law of physics that two solid bodies cannot occupy the same space at the same time. (16).

LYREBIRD (*Menura novae-hollandiae*).

Several unique photographs showing a male Lyrebird attacking his image in a large mirror have been taken by Mr. A. G. Campbell, of Kilsyth, Victoria. Three of these photographs were recently published in "Pix". (17).

Mr. Campbell states that the bird approaches the mirror and erects its tail in a fighting attitude (as shown in the accompanying plate); after some chattering, and curious low notes, it gives the well-known "blick-blick" call and then attacks its reflection with beak and claws. The full display before the mirror follows, after which the bird walks away. The whole performance may last about ten minutes and takes place very early in the morning, and only rarely. A photograph



Male Lyrebird attacking his reflection in a large mirror. Dandenong, Victoria.

Photograph by A. G. Campbell.

was taken of this bird at the mirror after he had moulted his tail (November, 1940) when he erected his tail coverts at his image.—Dandenong, Victoria.

In many of the instances quoted it seems that the birds recognise what they think is a rival in their own reflections, especially as these reflections appear just as aggressive as they are themselves. Several of the species mentioned maintain distinct territories in the breeding season, and here we see a reason for their actions. Generally, the male birds are far more determined in their efforts to drive away their apparent adversaries than are the females, who, in some species, take no interest at all in their reflections. The actions of the Grey Thrush can scarcely be explained in the same way. Presumably the bird was a male, as stated by Mr. Lippmann, and as such would recognise in his own image another male, but why should he court (?) his reflection with food and brightly coloured objects? Male Grey Thrushes have a black bill which is pale in the females, and the shaft streaks in the

feathers of the underparts are less pronounced in males. This species does not breed in colonies and pairs seem to have distinct breeding territories. I am not aware of any published observations on the reactions of breeding males to intruding males that would throw any light on the actions of the bird mentioned by Mr. Lippmann. The actions of the tame Budgerigah are in keeping with its known habits; these birds are much given to sidling up to their companions and touching bills and nibbling the feathers of the head.

The Indian Mynah was the only one of its kind seen in the district and it may have been seeking companionship when pecking (not attacking) its reflection.

There is considerable scope for experiment with species that do not inhabit settled areas and the neighbourhood of houses. I think it would be found that birds which maintain territories when breeding, as against communal species, would react in much the same way as in the majority of instances recorded. Even communal species, such as Babblers and Apostle-birds, may unite in an effort to drive away a seeming stranger, just as the Smooth-billed Anis did on seeing their images in a mirror.

My cordial thanks are expressed to Mr. Noel Roberts, who has kindly made available correspondence and a number of the references used in this article; also to Mr. A. G. Campbell for the splendid photograph of the Lyrebird, and to Max. Lippmann for his notes and photograph of the Grey Thrush.

References.

1. Scammel, Geo. V. *The Emu*, Vol. XXII., 1922, pt. 2, October, p. 152.
2. Fletcher, J. A. (Miss). *ibid.*, Vol. IV., 1904, pt. 1, July, p. 17.
3. Burrell, Harry. *ibid.*, Vol. VIII., 1908, pt. 2, October, p. 95.
4. Cleland, J. Burton. *ibid.*, Vol. VIII., 1909, pt. 3, January, p. 151.
5. Dennis, C. J. *The Singing Garden*, 1935, p. 158.
6. Ford, F. B. C. *The Emu*, Vol. III., 1903, pt. 2, October, p. 126.
7. Barnard, E. D. *ibid.*, Vol. I., 1902, p. 3, April, p. 147.
8. Barnard, E. D. *ibid.*, Vol. II., 1902, pt. 1, July, p. 28.
9. Gough, Kathleen. *The Irish Naturalists' Journal*, Vol. VI., No. 3, May, 1936, p. 75.
10. Morrison, Crosbie. *The Victorian Naturalist*, Vol. LVII., 1940, No. 3, July, p. 51.
11. *The Book of Birds*, Vol. II., 1937, p. 197, pl.
12. Davis, David Edward. *The Auk*, Vol. 57, 1940, No. 2, April, p. 187.
13. Winterbottom, J. M. *The Ibis*, Twelvth Series, Vol. IV., 1928, No. 2, April, p. 318.
14. *Pix*, August 3, 1940, p. 32.
15. Schleicher, R. *The Emu*, Vol. XXVII., 1927, pt. 2, October, p. 125.
16. *Bulletin Zool. Soc. New York*, Vol. XXVIII, No. 1, January, 1925, pp. 23-4.
17. *Pix*, June 14, 1941, p. 2.

NOTES ON SOME AUSTRALIAN LIZARDS.

By G. Longley.

1. The Breeding of the Blotched Blue-Tongue (*Tiliqua nigrolutea*).

I have had a number of this species of lizard for several years, but not until this last summer did I have any real success in breeding them. A very beautiful pair, each of which measured nineteen inches, absolutely refused to breed. However, about the 9th and 10th October, 1940, things looked promising, the males fighting continuously, and for a few days the vivarium was in a turmoil, food and water dishes being scattered in all directions. After a while everything settled down to normal.

On January 30, 1941, I isolated a female *Tiliqua nigrolutea*, by placing her in a small vivarium specially built for the purpose. This had a fairly roomy outer compartment, and also a darkened sleeping compartment, the latter being provided with plenty of sand, dried grass, bark and leaves.

On February 7, 1941, five young were born. Four of them each measured $6\frac{3}{4}$ in. which is very much larger than the commoner *T. scincoides* at birth. The fifth young one was much smaller, measuring $5\frac{1}{2}$ in. and appeared rather weak. This one was isolated and placed in an indoor vivarium with some young *Hemisphaeriodons* and *Geckos*. The four larger young ones were strong and healthy, and to show that no proof of this was lacking, one of them chewed my finger quite lustily as I was carrying them inside.

By Monday, February 17, 1941, the larger ones measured $7\frac{1}{2}$ in., but the fifth remained unchanged, and it was not until the month of May that this one showed signs of growing and improving.

March 8, 1941.—Measurements of the 4 larger ones were as follows:—3-8 in., 1-8 $\frac{1}{2}$ in. The fifth had only grown $\frac{1}{2}$ in. in the same period. The heads of all the Skinks were broad and their bodies bulky. The diet consists of finely chopped raw or cooked meat mixed with chopped garden snails (*Helix aspersa*), and also plenty of clean drinking water. During late April, sheets of glass were fitted behind the screen wire of the vivarium in order to retain the solar heat, and as the weather becomes cold every advantage is being taken of this heat. To date, the experiment has worked satisfactorily, and these four larger ones appear to be hibernating in the darkened compartment. (3rd June, 1941.)

2. Notes on the Bearded Dragon (*Amphibolurus barbatus*).

The Bearded Dragon Lizard, whilst being a most interesting and likeable reptile does not seem (according to my own experience) to thrive so well in the vivarium, as other lizards, particularly the Skinks. During the past $5\frac{1}{2}$ years I have owned four of these lizards, three of them adult specimens, and one, the last, about three-quarter grown. During the hot weather, when insect life was plentiful, they fed freely and seemed healthy and lively, but when the colder weather of winter set in they refused food and became languid, which was only to be expected, yet they would not hibernate, staying out in the open in cold dull days with ultimately fatal results. The following is a record of the period during which these lizards were in my possession:—

1— $\frac{1}{2}$ in.	Received ..	4/11/35.	Died ..	28/8/36
1— $\frac{3}{4}$ in.	" ..	21/9/36.	" ..	16/7/37
1— $\frac{1}{2}$ in.	" ..	4/12/36.	" ..	1/6/37
1— $\frac{1}{2}$ in.	" ..	25/10/40.	" ..	22/3/41

It will be noticed that three of the above died during the colder months, and the last died on a particularly cold day, following a dull and sultry day in autumn.

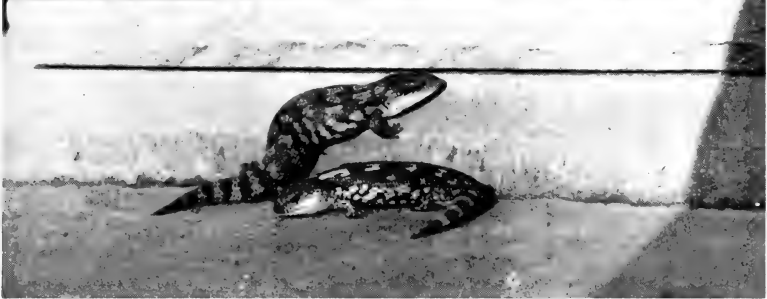
As regards habits, they are fond of sunshine, except when very hot. When first introduced into the vivarium they are usually aggressive, especially the males, which elevate the beard and charge with open mouth if a hand is introduced into the enclosure. After a while, however, if quietly and gently approached, like most wild creatures, they will gain confidence and very soon run up to take food from the hand; the greatest temptations being beetles, grasshoppers or cockroaches.

The diet is varied, consisting of all kinds of insects and their larvae,

1.



2.



3.



Figs. 1 and 2.—Upper figure, young hybrid (♂ *T. nigrolutea*; ♀ *T. scincoides*).
Lower figure, young *T. nigrolutea*.
Fig. 3.—Young *Tiliqua nigrolutea*.

Photographs by Miss Ella McFadyen.

including hairy or smooth caterpillars. I have not seen them eat meat, unless placed in their open mouths. Isopods are readily picked up with the tongue, but the strangest food for this type of lizard is the flower of the dandelion and also the leaves and seeds of the weed known as Cobblers' Pegs (*Erigeron linifolius*). The first time I saw a lizard eat dandelion flowers was when I fed some to the Shingle Back (*Trachysaurus rugosus*). On this occasion the female Bearded Dragon ran eagerly forward and commenced devouring the flowers. Later she would crop the heads off while they were held in my hand. I have not seen these lizards eat the leaves. The other plant, *Erigeron linifolius*, was just as readily eaten. The last specimen in my possession became particularly tame, and often ran out of the vivarium to catch beetles or spiders on the lawn. They drink water, but refuse milk, and are fond of staying out in a shower of rain, flattening the body while so doing, possibly to absorb some of the moisture.



Fig. 4.—Bearded Dragon (*Amphibolurus barbatus*).

Photograph by Miss Ella McFadyen.

3. The Eastern Water Dragon (*Physignathus lesueurii*).

During November, 1937, I received two of these lizards from Mr. W. Turner. At first they were very wild and nervous, rushing about the enclosure at the slightest noise or movement on my part. The larger one seemed inclined to bite, and, as a bite from one of these reptiles is rather severe, he was handled with care. However, I did receive some deep scratches upon my wrists, from the sharp claws attached to the digits of the powerful hind limbs. After a while they became more used to my presence, and by approaching quietly and speaking gently they gradually became accustomed to my voice. Confidence once being established, the rest was easy, and in a few weeks they would run towards me and take food from my hand. Whilst feeding them I often stroke their throats or the angle of their jaws, which they seem to enjoy, but they become uneasy if one tries to place a hand over the dorsal surface, and if picked up by this means some scratches are almost sure to result.

Being of arboreal habits, they are good climbers, and, as their name implies, they are good swimmers and fond of being out in the rain during the warmer months.



Fig. 5.—Adult Water Dragon (*Physignathus lesueurii*).

Photograph by Miss Ella McFadyen.



Fig. 6.—Near View of Adult Water Dragon (*Physignathus lesueurii*).

Photograph by K. A. Hindwood.

Food.—This consists of all kinds of insects such as moths, beetles, cockroaches, hairy or smooth caterpillars, the larvae of flies, slugs, and even live or dead mice. Besides this diet, they will readily eat fresh raw or cooked meat and sweet fruit, such as pears and bananas, if chopped. Whilst enjoying a varied diet, I have never, under any circumstances, seen them attack other lizards in the vivarium; not even any newly-born *Tiliqua*. Unlike the *Tiliqua* and allied species, I have never seen them eat snails (*Helix aspersa*). If leaf mould is disturbed in the vivarium, exposing isopods and insect larvae, etc., the dragons will run eagerly forward and pick them up by means of the tongue. Towards the end of last summer, some of the weed known as Cobblers' Pegs (*Erigeron linefolius*) was placed in the vivarium and the dragons devoured it with relish, and this was fed to them until their period of hibernation.

Towards the end of April, 1940, the smaller of the dragons became languid and refused food. He became very weak and died on May 4, 1940. A third, and rather larger dragon, was received on September 26, 1939, and this one grew very tame and would run out of the vivarium on to the lawn helping himself to the contents of the food dishes before they were placed inside. During very hot days the dragons prefer to rest on rocks or branches in the shade, where they may enjoy the warmth, tempered by a light breeze.

The remaining two dragons are about 24 inches in length, and are at present hibernating.

4. Record of a Pair of Pink-Tongued Skinks and Their Offspring (*Hemisphaeriodon gerrardii*).

The sequel in connection with the pair of Skinks which came into my possession on October 14, 1937, is rather interesting, and I thought it might be useful to record it here.

This pair and their brood were described in the "Proceedings", 1937-38, and the following is really a record of what happened to subsequent members of the family.

The original male was very thin and in poor condition when received, and, though given every attention and placed under artificial heat, died on November 10, 1937, and was taken to the Australian Museum. On the morning of December 27, 1937, a total of 18 young were born, and of these I collected 12 within the vivarium, and some days later with the help of my Cocker Spaniel I captured 5 more which had escaped through the wire-netting of the vivarium. Another which had escaped and which my dog discovered, eluded capture, and, as I did not see it again, I concluded that it had been taken by one of the marauding cats which are all too plentiful in this locality. However, the mystery was solved on November 25, 1938, when the mutilated body of the Skink was given to me. It had met with a violent death at the hands of two ladies, who lived nearby, and who thought that "it must be venomous". During the period of its freedom, this Skink had only travelled about 100 ft. from the vivarium.

January 29, 1938.—The mother and brood, with other Skinks, were photographed by Miss E. McFadyen and Miss J. Brandon.

July 6, 1939.—One young Skink died from cold.

November 2, 1939.—I received an adult male from Mr. W. Turner. This mated in the spring of 1940 with the original female.

November 11, 1939.—Another young Skink died from some unknown cause.

November 17, 1939.—A pair of young ones were forwarded to Mr. W. Turner.

November 23, 1939.—A pair of young were presented to Taronga Park Zoo.

December 31, 1939.—Two females of first brood gave birth to 11 young, of which one was dead and 5 were weaklings, and subsequently died. Remaining 5 were healthy.

January 14, 1940.—Another female of the first brood gave birth to 6 young, all healthy and vigorous.

February 29, 1940.—Another pair from first brood were presented to Taronga Park Zoo.

August 27, 1940.—One of No. 2 brood died.

November 6, 1940.—A pair of No. 1 brood were forwarded to Mr. Turner.

November 24, 1940.—A pair were presented to Mr. N. Goddard.

December 8, 1940.—One of No. 2 brood escaped. This one had a partly reproduced tail.

January 7, 1941.—I saw 2 young *Hemisphaeriodons* in the outer part of my largest vivarium. These undoubtedly were the young of the original female received, 14/10/37, and the male received, 2/11/39, as there were no other *Skinks* of this species in this enclosure. Two being an unusual number at a birth, the whole of the enclosure was carefully searched, including the two sleeping compartments, but without result. As none of the other occupants of the vivarium had ever been known to attack this species, I concluded that the rest of the brood had escaped through the $\frac{1}{2}$ in. mesh of the wire-netting. This proved to be correct, as on January 16, 1941, I collected another young one just outside the netting. Also on January 24, and February 1, 1941, with the aid of my Spaniel, another pair were collected from amongst a small pile of dried brushwood not far from the vivarium. At first this appeared to be the total, but a little later Mrs. MacFarlane, who lives next door to me, collected three more of the same species on the following dates, 11/2/41, 4/3/41, and 5/3/41. Thus, 8 young were accounted for, and a ninth was seen, but so far has eluded capture. This appears to be near the usual number of a brood. These 8 young were placed in a small glass-fronted vivarium and at present enjoying the benefit of artificial heat, are quite healthy and making good progress.

REVIEW.

The Molluscs of South Australia. Part II. By Bernard C. Cotton and Frank K. Godfrey. (Adelaide: Government Printer, 1940. 285 pp., 248 figs. Price, 7/6.)

This second part deals with Scaphopods, Cephalopods, Aplacophora and the Loricates. For the last-named the authors have used *Crepidopoda*, but their arguments for this usage are invalid and *Loricata* must be utilised. Continuing the vernacular, "*Chiton*" seems also unwise and *Loricata* is preferable, and, further, the *Aplacophora* are now correctly rejected from the Molluscan World.

With these hypercriticisms the remainder of the work can be accepted with very little fault-finding, and that is a great compliment in these strenuous, critical times. The Scaphopods are well treated and, as this group has hitherto been neglected, this basis must be welcomed by all workers. Good work has also been done in the compilation of the Cephalopod portion, though a slip is somewhat noticeable in connection with the intriguing *Spirula*, the "*Dana*" observations and collections having been overlooked. The Cuttle "*Bones*" are listed for the whole of Australia, and this interesting group is shown to be remarkably well represented in Australian waters.

The Loricates are well described and figured, but the source of many of their illustrations might have been acknowledged. The illustrations of the numerous fossil valves are novel and useful. This recognition of a large palaeontological Loricata fauna is of great importance, and when the numerous valves are systematically studied valuable results may accrue. The suggestions illogically proposed by Ashby have little real foundation at present, but the work of accumulating these valves is worthy of the highest praise.

As stated in connection with the first part, no similar work is available in any other State, and the authors are to be congratulated on the appearance of this second part in such times of stress, and the continuation of the work will be looked forward to by all who have seen this.

—T.I.

SOME NOTES ON AUSTRALIAN SPIDERS.

By N. L. Roberts.

So little is known of the habits and life-history of Australian spiders that I have thought it worth-while to contribute a few notes and observations, even although they are limited in scope.

Funnel-Web Spider in Colonies.

I have two records of the Funnel-web Spider (*Atrax robustus*) being found in colonies, the chief features of the habitat in each case being shade and dampness. There was no evidence of social activity, and it cannot be said that the spiders were even gregarious in the strict scientific sense of the term. All that can be asserted safely is that congenial conditions sometimes attract these large and dangerous spiders to settle in such close proximity that they form a colony in which each spider acts independently.

The first record is of a colony of approximately sixty spiders of various sizes which was located by a Mr. Bingham in his garden in the Hawkesbury district. The virgin soil, mixed with sandstone, had been enriched by the addition of some better soil and vegetable matter, and cuttings and roots of Stonecrop had been planted in a small patch a few feet square. Terracing and re-planning made it necessary to up-root this Stonecrop later. The ground under the plants was covered with an irregular powder-blue deposit caused by dampness or decayed vegetable matter, and when Mr. Bingham began to remove the stones a number of sleeve-like webs were revealed. Large and small Funnel-web Spiders were observed, lurking in the webs or moving about under the stones, the total number being about sixty, of which forty-five were counted. Four of the largest were placed in jars with perforated lids and are described by Mr. Bingham as "fearsome creatures with a pair of very active fangs resembling hooked gun-metal steel cutters". Some of the spiders were placed on a nest of meat ants, and, curiously enough, offered little resistance to the ants, which soon killed and devoured them.

It is asserted frequently that the Funnel-web Spider can jump, but as many attempts to induce captive specimens to do so have failed the question is not regarded as settled. Mr. Bingham refers to an encounter with a savage *Atrax* which he chopped out of an old hollow root and states that when a wide-mouthed jar was held in front of it, it jumped "several inches" at the jar, and, fortunately, into the mouth of it.

The second record of a colony is from Terrigal, where Captain A. J. Macarthur Onslow discovered one in his garden. "It was in a brick trench filled with broken rock", he writes, "at the end of a drainage pipe from the kitchen and laundry. The place was naturally damp and there was plenty of room among the stone and rock for the webs. I was removing the stone and laying a pipe instead and killed about 15 or 20 spiders (*Atrax*) in an area about 9 ft. x 2 ft. x 2 ft."

It is worth recording, perhaps, that the Funnel-web Spider seems to hibernate during the winter. In June last year I removed a heap of wood and discovered a large female *Atrax* snugly ensconced in a hollow under a sapling which was at the bottom. It was very sluggish, the life processes having slowed down apparently during the cold weather. Another female in a similar condition was discovered sheltering under a shasta daisy plant, which had formed a mat over the ground.

Red-back Spider and Lizards.

In January, 1939, I found two small lizards entangled in the web of the Red-back Spider (*Latrodectus hasseltii*). The spider, which was a large specimen, appeared to be biting one of the lizards when I came on the scene (about 8.10 a.m.) and a spot of blood was clearly visible. It is known, of course, that lizards and even small snakes have been caught in the web of the Red-back, but doubt has been expressed as to whether the spider is able to puncture the skin of its victims, which, obviously, is much tougher than that of insects. Any violent wriggle by the lizards sent the spider scurrying for shelter behind an ivy leaf, where she remained for periods varying from twenty minutes to an

hour before emerging again to examine her captives. The strength of the web was astonishing. The Red-back belongs to the family Theridiidae or Comb-footed Spiders. They do not possess a cribellum. The silk with which they envelop their prey is said to be derived from lobed glands which open through a large spigot on the posterior pair of spinnerets. The silk is combed out by a series of stiff hairs on the fourth pair of legs, and it was interesting to watch this combing action on the part of the Red-back. With three pairs of legs resting on the lizards she literally threw the silk around them, the long hind legs moving backwards and forwards with a deadly precision and rhythm. Several times she paused for a minute or two to bite her victims, but any vigorous struggle always sent her scuttling for shelter. She was in no hurry. The silk threads might have been steel, so futile were the efforts of the lizards to free themselves. By mid-day each lizard's tail had been lashed firmly to the side of its body and the helpless creatures were then dragged under an ivy-leaf.



A Red-back Spider injecting venom into Lizards tangled in her web.

Photograph by N. L. Roberts.

Chief points of interest were the strength of the web and the time required for the venom to prove fatal. In addition to the struggles of the lizards, the web had to withstand strong gusts of wind, one of which blew my hat a considerable distance. Venom usually acts more slowly on cold-blooded animals and, although the lizards were caught about 8 a.m. and bitten many times, they were still able to struggle at 6 p.m.

In a letter to Dr. V. V. Hickman, Hobart, describing the incident, I stated that the spider was feeding on the lizards. Dr. Hickman queried the statement, and I must admit the only evidence is that the spider remained on the lizards for varying periods, that blood was visible, and that the lizards had a hollowed-out appearance when I removed them from the web. None of this evidence is conclusive. McKeown, in an article in "The Emu" (Vol. XXXIX, p. 123) on "Bird-catching Spiders", quotes an account by Dr. E. Warren, of South Africa, of a spider feeding on a lizard. In this case the spider spread a copious

fluid over the tissues of its prey, kneading the whole body of the lizard, with the head, limbs, and tail into a "round wetness" in the brief space of an hour. The lizards entangled in the web of the Red-back certainly showed no signs of this preparation for digestion, the bodies, apart from the fang punctures and hollowed-out appearance, being quite normal. If the Red-back fed on them it must have been by the process of absorbing blood, and, as she was very rotund and well nourished, it would be difficult to confirm the fact of feeding merely by her appearance.

In November, 1937, I saw a Red-back Spider, whose web had been spun about eighteen inches above the ground in the angle between two walls, feeding on a centipede about three inches long. The body of the centipede had been curled up securely first by stout, silk threads.

Courtship and Mating of *Ixeuticus robustus*.

On October 30, 1939, about 9.30 p.m., I switched on the light in my bush-house and disturbed a dark-coloured spider which proved to be a male *Ixeuticus robustus*. It ran from the switch on to a large, irregular web in the angle between a window and a door-post. A female spider, considerably larger than the male, advanced a little and began "twanging" the threads of the web. The male, who was about three inches away, gave similar tactile responses, although not so frequently or vigorously as the female. After a brief interchange of these vibratory "messages", the male suddenly walked around the back of the web and up into the main funnel-shaped opening where the female moved to face him. Twanging was again resumed and the male, evidently not certain of his reception, retreated twice when the female advanced slightly. Gradually confidence returned, and he advanced until they were able to touch each other with the first pair of legs. The legs moved forwards and backwards more rapidly, as if the spiders were "sparring", until a stage was reached at which the female suddenly became limp, the legs retracting, and the body remaining inert as if supported only by the web. The male immediately advanced and applied the palps rapidly, after which he retreated through the funnel to the front of the web. The female soon became active again, took up a position on the web, and resumed the twanging movements. After resting a few minutes and drawing each palp several times through the chelicerae, the male returned to the funnel opening, where leg movements were again a preliminary to mating. The mating period was shorter this time, the female again going into what appeared to be a cataleptic trance. The male returned to the outer web and after an interval of about fifteen minutes retired to the edge of the web as if to get away. Almost immediately he returned to a position about two inches from the entrance to the funnel, where the female was resting motionless. An hour later he was still in the same position. The following morning there was no sign of him, but two nights later the remains of a freshly-devoured male were found in the outer web, the body being quite soft but only a shell. Whether this was her mate or the body of another male which appeared on the scene later I cannot say, but it appears that the peculiar psychic condition of the female in the act of mating is a necessary safeguard for the male and that any miscalculation on his part might easily prove fatal. All the courtship and mating activities took place in a period not exceeding fifteen minutes, but the period doubtless varies according to the receptive condition of the female.

The St. Andrew's Cross Spider.

I had under observation for some time six St. Andrew's Cross Spiders (*Argiope aetherea*) all of which had suspended their webs in a climbing rose bush against a fence. The colour scheme of this spider, in which golden yellow predominates, is very attractive. The body is marked transversely on the dorsal surface with three glowing bands, the intervening spaces showing white spots which make a most effective contrast. Silvery hairs cover the cephalothorax, while the ventral surface of the body has two curved yellow stripes.

The spider hangs head downwards in the web and the six under observation showed only the ventral surface, their position in relation to the observer being at the back of the web, the distance from the fence varying from a few inches to about a foot. Adult specimens have markings on each side, near the end of the abdomen, which closely

resemble eye-spots and with the spinnerets as a "nose" the pattern may have biological value. Similar eye-spots in certain insects have been described as "terrifying", but we are hardly competent to judge what colours or patterns are of significance to the spider's enemies, or what sensations of "fear" they experience, and knowledge of both these factors is implied in the term "terrifying". The markings gave me a very strong impression of a "face", and it is wiser perhaps to record the fact without trying to fit it into any theory.

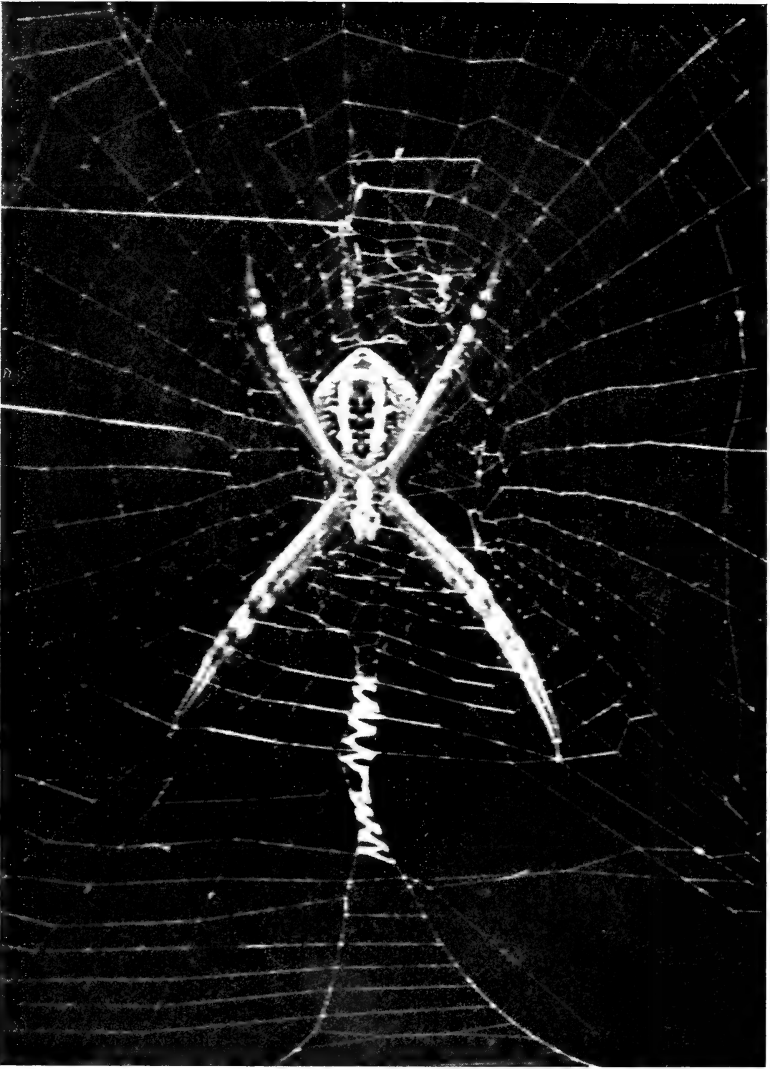
The head-downwards position in the web is invariable, and the



St. Andrew's Cross Spider. Dorsal view.

Photograph by N. L. Roberts.

spider can remain immobile for hours at a time, with legs held closely together in pairs. Only when some insect blunders into the snare, or when the web must be repaired, or a cradle woven for her eggs, does she abandon this posture. Always, by day and night, she must wait in this manner, the slave of an instinct on which she depends for that vital message: "Food in the Web". Such a life, so closely linked with the sense of touch, so inactive and invariable, is worlds apart from our human concepts, but it provides a solution for all the problems of this creature, who waits for food to come to her.



St. Andrew's Cross Spider. Ventral view.

Photograph by N. L. Roberts.

The St. Andrew's Cross Spider derives its name from two broad white ribbons of silk which intersect at the hub of the web. This cross, however, is not a constant feature. Of the six spiders under observation, only two had woven a cross and each was incomplete. One of these re-made its web and omitted the cross, while the other added a section. It seems curious that five out of six webs showed no sign of this feature when one remembers how stereotyped and perfect is the instinct which produces the snare proper. The webs of Australian spiders offer considerable scope for study. Taking the web of the St.

Andrew's Cross spider as an example, Professor Hickman suggests that the following points are worth investigating:—

1. Number of rays in each web.
2. Number of turns in the viscid spiral.
3. Nature of the "hub".
4. Nature of the cross. With which spinnerets is the cross made?
5. Variations in the structure of the web and the cross. (Examine as many webs as possible.)
6. Does the web of the male differ from that of the female?
7. Does the web of the young spider differ from that of the adult?
8. Does the position of the web relative to light, shade, wind, etc., have any connection with variations in the cross?

Egg-sacs were suspended near the fence, apart from the web, in a net-work of silk threads. They were shaped somewhat like a hammock and covered with a "lid" which can be peeled back with forceps revealing a mass of gelatinous, pale yellow eggs, each placed in position with mathematical precision and the whole resting on a layer of the finest pink silk. The sac itself is a dirty grey or rusty brown colour, and two which were opened contained parasitic wasp grubs. Viewing the symmetrical mass of eggs against its soft pink background, it seemed almost incredible that such an artistic result could be achieved by the automatic operation of silk glands and legs, the weaver probably never even glancing at her handiwork.

When threatened with danger, the St. Andrew's Cross Spider usually shakes her web vigorously—a device which is common to a number of species—the change from immobility to rapid movements probably surprising and alarming a bird or insect. This defence reaction, however, is not invariable. Sometimes the spider will drop immediately on a thread and at other times leave the web quickly for a suitable shelter.

I gladly acknowledge indebtedness to Professor V. V. Hickman, who read the manuscript and offered helpful criticism.

THE SOLITARY LORIKEET.

(*Phigys solitarius*).

By **Robert A. Patten, B.V.Sc.**,
Superintendent and Curator,
Taronga Zoological Park Trust, Mosman, N.S.W.

The Solitary Lorikeet is such a beautiful gift from Nature that possibly I may be permitted to describe briefly the colouring and plumage of the adult bird. The crown is very dark blue, the feathers long, fine and hairy in appearance; a band of pale green feathers on the nape and one of red feathers on the upper mantle; cheeks, breast and portions of the under wing coverts, crimson; abdomen purple to blue; rump pale green; tail short, green with a little orange near the middle base; bill yellow with a splash of orange near the tip of the upper mandible; feet salmon; length, $7\frac{1}{2}$ inches.

In May, 1939, I wrote to Dr. E. Hopkinson, of Sussex, England, seeking some information from the breeding records concerning the Solitary Lorikeet, and I was greatly surprised to learn from him that he had no record of this bird multiplying in captivity.

Through the courtesy of the Fiji Department of Agriculture, I was informed that "the Solitary Lorikeet is found in most of the islands of Fiji, being known there more commonly under the native name of 'Kula'. Its natural food consists principally of nectar and fruit, particularly soft, sweet berries. It nests during the month of September in hollow trees, the number of eggs being three or four, oval and white in colour".

Early in 1938, a friend in Suva very kindly donated to Taronga Park a number of these birds. Considerable care and attention to detail was necessary to acclimatise and rear them in Sydney during the first twelve months after arrival. However, we were fortunate in so far as we suffered no losses.

The birds were eventually transferred to a roomy aviary providing plenty of direct sunlight in the flight; the retreat adjoining was well sheltered against the cold southerly and westerly winds.

The birds soon settled down and became charming exhibits, due not only to their brilliant plumage, but also to their friendly habit of climbing on the front panel of netting of the aviary within a few feet of the admiring public, who were thus able to view the birds at close quarters.

Late in the 1939 season, we erected a number of breeding aviaries, each having a flight of 25 ft. x 5 ft. x 7 ft. high, and a pair of the lories was transferred to one of them. I endeavoured to procure some of the giant bamboo from New Guinea for nesting purpose, but unfortunately without avail, so a hollow log 1 ft. 6 in. long was hung in the flight.

Early in October it was noticed that the birds were taking an interest in the nesting log, as they frequently were seen going in and out of the nest. However, it was not until October 16 that one egg was seen.

On November 13 the birds appeared excited and unsettled, and an inspection of the nest revealed that egg was broken with the young dead inside the shell.

Unfortunately, during the incubation period, a number of picnickers carried out their organised sports nearby, and I suspect that this was responsible for upsetting the birds, as from that time onwards the hen and cock would often be in the log together, and on other occasions the nest would be deserted, while both birds were flying up and down the length of the flight. So nervous did they become that whenever the keeper entered the aviary, if one bird happened to be in the log, it would immediately leave it.

Naturally we were disappointed, but realised that additional time was necessary for the birds to accustom themselves to the new surroundings.

As the 1940 season approached, we were very anxious that everything possible should be done to induce these lorries to multiply. The food supplied consisted of the following: A mixture of Mellin's Food, sweet condensed milk, a few drops of fresh tomato juice, Marmite (a vegetable extract), and water; fruit (apple, banana, pear, pawpaw); greens (lettuce and freshly cut lucerne).

On August 14, 1940, a nesting log 1 ft. 6 in. long with an inside diameter of 6 in. was hung in the flight but placed under cover from the rain. On the morning of September 2, an egg was found broken in the pond; this was a rather depressing start.

However, on September 23, one egg was laid in the log. After our previous experience, we did not think it advisable to intrude by making another inspection until October 2, when we were delighted to find two eggs present. On October 21 one young bird emerged from the shell; unfortunately, the other egg was not fertile.

On October 28 the young bird resembled a ball of white fluff, and on November 5 it was covered with grey coloured down. Four days later it was noticed that growth was remarkably rapid. The nest, however, was becoming extremely dirty and foul, due, no doubt, to the type of food consumed by the parents.

On November 12 it was possible to detect the development of the pin feathers, coloured red and green, and on November 18 more colour was evident, but the dirty condition of the nest was now causing us some anxiety. Fearing, however, that our intrusion might have unfortunate results, we decided to leave well alone and not to interfere with the log.

On November 23 the feathers were more vivid in colour, the nape being covered with dull green feathers. On December 2 the breast and sides were the last portions to be clothed.

The bird appeared to be ready to depart from the nest on December 9, but it was not until the 21st that it actually left the nesting log and flew into the flight. This was a most remarkable thing, as the length of time from hatching was almost nine weeks.

Both parents assisted in rearing this young bird, but it was very noticeable that on some days only the nectar was partaken of, the fruit remaining untouched.

In reviewing the breeding of this lorry, it was a constant source of worry to find the nesting log in such a filthy and insanitary condition; at times the young bird was actually standing in a liquid slime of excreta which would later become firm again. The astonishing thing, however, was that throughout the long period in the nest, the young bird remained quite clean and eventually left it in excellent condition.

The immature bird differed from the adults in that the mandibles were a slate colour (adults yellow with orange at the tip), the feet grey or putty in colour (adults salmon), the red band on the upper mantle narrower and duller, and the eye of the young practically black throughout, whereas in the adults the iris is yellow and the cornea brown.

During February, the immature bird could be seen gradually taking on the remaining colouring of the parents, namely, the beak, legs and eyes, but at the time of writing this article (second week in March, 1941) the red band of feathers on the upper mantle was still not so pronounced as on the adult.

So quiet did the birds become later on in the season that it was not an uncommon sight to behold them drinking the nectar as it was being poured from the keeper's jug into their food basin.

As an exhibit, the Solitary Lorikeet is a most charming and attractive bird. It is active, friendly and very fond of light rain showers; during these changes in the weather it generally is to be seen displaying on the wet netting or hanging on to any small twigs protruding through the roof of the enclosure.

THE VERNACULARS OF MELOPSITTACUS UNDULATUS, SHAW.

By P. A. Gilbert, Lakemba, N.S.W.

The law which operates in the fixation of words, known to philologists as the "Genius of Language", seems to have had full sway in the formation of the word **Budgerigar**.

Whilst the scientific synonymy of the Brown Thornbill (*Acanthiza pusilla*) may be a record for an Australian bird, the vernacular names and their various spellings of *Melopsittacus undulatus* probably constitute a record for popular names.

The following informative paragraph is a quotation from Professor J. B. Cleland's article on "The History of Ornithology in South Australia" which appeared in "The Emu", Volume 37, page 41. Sturt, in his "Narrative of an Expedition into Central Australia", II., appendix, p. 40, 1849, gives "**Bidgerigung**" as the native name for the **Budgerigar** of to-day. Professor E. E. Morris, in "Austral English", p. 61, considers the latter spelling as more correct etymologically than **Betcherrygah**. He gives the first use of the word as being by Leichhardt, in 1847, with the spelling **Betshiregah**, and the next by Gould in 1848, who used **Betcherrygah**, the name given by the natives of Liverpool Plains. Sturt does not state which natives employed his term; they may have been those of eastern New South Wales.

In Newton's "Dictionary of Birds", the following explanation occurs under "**Budgerigar** (spelling doubtful), a corruption of **Betcherrygah**, given by Gould as the native name of the pretty little Australian Parrakeet, *Melopsittacus undulatus*, that is now so favourite a cage-bird. Its name has of late been still further corrupted into **Beauregard**". (1896).

Taking **Betshiregah** as a native name in use about 1847, a spelling of interest which appears to be another corruption, is quoted in a letter dated July 12, 1850, in the "Life and Letters of T. H. Huxley", Vol. 1, p. 78, the spelling being **Bougirigards**. As Huxley was in the vicinity of Sydney for several years, it is reasonable to assume that **Bougirigard** was the popular name about 1850.

Budgerigar is one of the oldest spellings, and now the most popular in aviculture, of the corrupted group. In an edition of Cassell's "Household Guide", published about 1870, that spelling is used along with another vernacular, the **Australian Striped Parrot**. From then to the present time it occurs frequently in avicultural literature. No doubt earlier publications exist which contain this spelling, but I have not been able to search them.

In Australian Ornithology, **Warbling Grass Parrakeet** and **Budgerygah** appear more commonly in the standard works and check-lists, than other vernaculars. **Betcherrygah** is freely used in the earlier volumes of "The Emu", but latterly **Budgerygah**, which appeared in G. M. Mathew's 1920 Check-List, and adopted by the 1926 R.A.O.U. Check-List Committee, now predominates.

I noticed in an English horticultural publication that a hybrid **Cymbidium** orchid has been named "Budgerie Gar".

Occasionally I have seen **Budgerigar** contracted to **Budgee** and **Budgie** in newspaper advertisements, many of the "small" aviculturists using it also in the spoken language. It seems quite likely that the "Genius of Language" may eventually abbreviate **Budgerigar** to **Budgee** in the opposite manner to that in which omnibus was reduced to 'bus.

In one American publication I have noticed the spelling, in two different places, which may be typographical errors, of **Budgerigars**, while in "The Emu", **Betcherrygah** has occurred.

The following descriptive and fanciful vernaculars, although widely used, have been gleaned mainly from dictionaries and ornithological publications.

Betshiregah and its Corruptions.—Betshiregah (1847), Betcherrygah (1848), Bidgerigung (1849), Bougirigard (1850), Budgerigar, Budjerigar, Budgerygah, Budgerigah, Budgereegah, Beauregard, Boodgereeg-gar, Budgee, Budgie.

Popular Vernacular Names.—Undulated Parrakeet, Warbling Grass Parrakeet, Warbling Grass Parrot, Australian Striped Parrot, Australian Love Bird, Love Bird, Shell Parrot, Shell Parrakeet, Scallop Parrot, Zebra Parrot, Little Green Parrakeet.

No doubt other spellings and names could be added to the list if one had the time to search for them.

In the Australian Encyclopaedia, under Aboriginal Languages, S. H. Ray remarks: "Phonology.—There is no uniform system of orthography. Most of the earlier grammars adopted a system based upon Italian vowel-sounds and English consonantal-sounds; but in later works, and in a great majority of the vocabularies, words are spelled in all sorts of ways, without any indication of the sounds attached to the letters". It seems that plenty of scope exists for researchers in philology to place the origin of anglicized aboriginal names on a more secure foundation. Although etymologists appear to favour the pronunciation of **Bud-ger-i-"gar**, the spoken accentuation is definitely drifting towards **Bud-er-i-'gah**.

OBITUARY.

Edwin Ashby.

One of the most enthusiastic naturalists in Australia passed away when Edwin Ashby was called to rest. He was in his eightieth year, having landed in Australia some 56 years previously for his health's sake!

A man of boundless energy and almost boundless interests, he concerned himself with many groups of natural history. Well-known as a keen amateur ornithologist, he was also interested in the peculiar group of molluscs now known as Loricates but formerly as Chitons. However, he was perhaps better known as a plant lover, accumulating native plants in his grounds until he boasted of perhaps the best private collection in Australia.

Throughout his long life he was always bustling, and his enthusiasm and facile tongue will be long remembered by his friends. Perhaps his greatest fault was this intense activity, as it led him to rapid conclusions, which more reasoned judgment compelled him to reject, but he continued working always. There will be a lot of work that will become valuable when careful study sorts out all his writings. His last work was on fossil Loricates, and he has placed on record an almost incredible number of species.

His enthusiasm as an ornithologist is commemorated in the genus **Ashbyia**, and many specific and subspecific names, while among the Loricates, **Ornithochiton ashbyi**, a rare and beautiful species was named for him, before he began his own numerous papers on that group.

Although domiciled all his Australian life in South Australia, he travelled widely throughout Australia, collecting in almost every State. He was a life Associate Member of this Society, and a portrait and list of his Loricata papers to 1927 appears in the Monograph of the Australian Loricates.

"TEDDY THE KOALA"

Who Lived From 1914 to 1920.

By Marie Gwyn.



TEDDY.

From a photograph by the
Late W. H. Broadhurst.

The pet koala, which I reared and owned for six years—1914 to 1920—was a native of Queensland.

He was found by a friend in the Samford Mountains, about 24 miles from Brisbane. At this time the koalas were fairly plentiful in these mountain ranges—or rather in the wooded gullies. Even then my friend was worried at the numbers of koalas that were being shot for their skins—Sundays being the slaughter days. Many houses in the district, where my friend lived close to these ranges, had bedside rugs and car rugs of koala skins. The fur stands stiffly upright, giving a good deep pile like a carpet, which does not wear out in patches as other animals' skins, but wears down evenly and, of course, is a delightful deep grey shade. I admired several of these bedside rugs and was offered sufficient skins to make one. I declined the offer and asked for a tiny baby koala instead.

My friend found Teddy near his mother on a Monday, so the

mother must have been shot on Sunday. He was very young and my friend told me he was probably afraid or unable to climb back to the trees he occupied with his mother. The mother must have been badly wounded and died. Later, the baby was left alone and without warmth of his mother or her method of feeding him.

I brought him to my home in Brisbane (I was on a holiday) and quickly set to work and cut a young sapling with a good fork right at the top for Teddy to sit in or sleep in. I had him then about three days, and he had not eaten any leaves, but seemed very weak and crying softly to himself, and was very cold. I got about a teaspoonful of good brandy, diluted it with luke-warm milk and poured it down his throat. About an hour after Teddy improved, became warmer and not so weak, and eventually, after more milk, climbed to the top of his pole and curled up and went to sleep until morning.

I gave him milk and brandy again, and continued all day at intervals with the warm milk only. After a time Teddy learned to drink and would come down from his pole on the verandah and look to see if there was anything in the saucer for him. So we kept it well supplied always. For fear it might go sour in the saucer, we substituted Nestle's Gold Medal milk, diluting it with luke-warm water, using a teaspoonful of condensed milk to an old-fashioned thick breakfast saucer. If on occasions it was not to his liking, he would upset the contents, but if to his liking (measurements as quoted), he would drink the lot. He used about a tin or a little more a week at the time of his death, when I had had him for six years.

The gum leaves around Brisbane were not satisfactory. I could not find anyone to advise me where to find leaves for a koala, as so few people there had ever seen one.

At that time the Greek and Italian fruit shops and restaurants in Queen Street, Brisbane, and the Valley would give £1/1/- each for young koalas. It was very cruel to see them die of starvation like that. They gave them wrong leaves or no leaves, trying to get them to eat apples, etc.

I, at last, asked my friends in the Samford Ranges, who gave me the koala, to procure suitable leaves and bring or send them in by train once or twice a week, and so I overcame the food difficulty that way. I brought Teddy by train in a large cardboard hat box to my home at Ashfield, N.S.W., when he was about six months old. Even then he was a large size. My father told me he had seen hundreds in the bush when he was a surveyor in his young days—that would be about 60 years ago.

My father was a great help, as he was an experienced bushman and loved our animals and native flora. He made tiny seats of deal board, and put in the branches of the Camphor Laurel and Camellia and Loquat trees in the garden. He tied about 3 yards of picture cord to a tiny puppy collar around Teddy's neck, and that is how we kept him from straying over the next fence or roaming too far. On one or two occasions he did get away to the tallest and largest trees in the district. We had to get a sailor to go up to the very top tiny branches, where Teddy had perched himself and place my father's old felt hat over Teddy's head. This always acted to bring him down the trunk quickly. He hated anything covering him, except a few gum tips.

If anyone experienced with koalas reads this they will know it is difficult to get a koala to let go his grip on a limb, but try the old felt hat trick and keep holding it over the koala's head the whole time he is descending a tall tree and he will travel very fast to the bottom.

Teddy became a great pet with my father and all the family. On cold winter evenings, when we had a good fire, we would bring Teddy into the dining room. He would bite the hem of my skirt until I picked him up and rocked him to sleep in my arms. We always had music in the evenings, singing with piano and violin. Teddy seemed to enjoy it. I used to waltz to piano and violin with Teddy in my arms, and he never moved or appeared afraid. I also used to amuse small relatives at their parties by blacking my face and dressing as an aborigine and waltzing and jumping about with Teddy in my arms. In this dance I used two possums (also from Queensland) which were great pets. We would all dance in front of a bonfire, myself, Teddy and possums—really they were chasing this way and that to catch up with Teddy and myself. By zig-zagging across the lawn in my dance it gave a

very fine effect with the glow of the fire at the back and further still the tall dark trees. As soon as I finished dancing the two possums, "Glad" and "Billy Hughes" (who knew their names), would take a flying leap up my back and on to my shoulders, where they would stay until time to go back to their cage, or rather large wire-netting enclosure.

Teddy, the koala, had wonderful hearing and scented dogs and was afraid of them and nervous at their bark. At this time we were without a house dog, and we decided not to have one on Teddy's account. But Teddy was better than a watch dog as regards myself. He seemed to hear me or scent me when I was a good way from the house. It was a large old-fashioned property, the house standing back over two hundred yards from the street. Yet Teddy knew when I was to come from the gate up the path. He would descend the tree and pull on his cord and "henk" until I came up and unfastened his collar. He made straight for his saucer, waiting under a small kitchen table, always with condensed milk ready for the possums or himself. If, however, the saucer was empty, or the mixture too weak, Teddy would grab the saucer between his teeth, rattling it, or would upset whatever was in it. If he managed to get loose he always went first to the saucer in the kitchen for his condensed milk. If not anywhere handy he would gallop up the hall until he found me. I was sometimes lying on my bed. He would climb up and fuss about and bite at the bedclothes until I got up and gave him his milk or leaves, or picked him up. Sometimes on his afternoon run he would hunt around in the dug-up soil and the cabbage bed and eat small pieces of soil. He often searched for a few minutes, roaming here and there, or dug the ground until he got what he was looking for.

We never found out for what it was that he needed the soil or what it contained for him. Teddy and myself collected over £50 last war for various funds, standing outside picture shows with a collection box, Teddy holding and eating a small branch of gum leaves, on top of which a tiny Australian flag was attached and a notice—"It's my flag and yours, too. Help me keep it flying". The money used to pour in. The difficulty was the traffic jam we caused in the city streets. Wherever I carried Teddy, people followed, all asking questions and wanting to stroke Teddy. He grew nervous, so I had to discontinue carrying him aboard trams and trains. We did not own a car in those days.

In 1920 I went to Suva, Fiji, to be married, and I had to leave Teddy at my old home with my father, who by this time loved Teddy as much as I did.

I knew he would be well looked after, as father would bring leaves from everywhere for Teddy to supplement our own trees in the garden, of which Teddy was very fond. The tree is still there. I saw it last week, but do not know the variety of gum tree it is. The trees that most of Teddy's meals were made from grew then, and they were large trees, in Pacific Parade, Dee Why, N.S.W. There were three on the left-hand footpath going towards the Ocean Beach, Dee Why. To-day only one old stumpy one remains, of these three beautiful trees. It can be seen from the Narrabeen 'bus, as it is quite close to the Pittwater Road end of the Parade.

My father called these trees by the bushman's name for them of these days, viz., "Swamp Mahogany". Teddy loved these trees and thrived on them, and grew very big.

After three weeks of my absence in Fiji, Teddy died. Whether from fretting for me or from a bowel complaint from eating wrong leaves when hungry (while my father was ill for a week) we do not know, but we all have a happy memory of a dear little Australian koala, who for long years was one of our family.

It makes me very happy to know that the efforts of many of our citizens are bringing forth results in the protection of koalas and of native animals to-day.

Where to-day will you find or see a lovely black possum? Yet in 1914 I saw a good many in the bush near Southport, Queensland. Even in Wahroonga, and here at Narrabeen, there are plenty of possums being killed by baits, because they jump from trees on to the roof to make a noise or raid the pantry fruit shelves. This is cruel and can be stopped, as I stopped the jumping by placing food such as bread soaked

in milk, sprinkled with sugar, on an old plate near where the possum jumps to the fence. Maybe a cat will get the bread and milk first, or a rat or night bird, before the possum's arrival, but if you place apple skins or a banana or a small sweet potato tuber, or a piece of cake, the possum will get what is left over.

The tree in my old home garden at Ashfield could be visited by anyone interested in koala food trees. There was nothing at all on the mountains at Katoomba from the station to Echo Point that Teddy would eat. He cried and cried, so I had to jump in the train and take him with me to Ashfield, secure his leaves at home, and travel back. He was all right when he got suitable leaves.

Note:—Mrs. Gwyn's narrative is just another of the increasing evidences of the adaptability of the Koala to domestication, and a further refutation of the oft-repeated (but erroneous) assertion that the Koala "does not drink".—Ed.

KOALAS AND ARTIFICIAL FOODS.

By A. F. Basset Hull.

I have frequently advocated experimentation in artificial feeding of Koalas in order to obviate the difficulty of obtaining sufficient supplies of their natural food. This, of course, applies to Koalas kept in captivity in Zoological Gardens or other similar institutions.

Numerous cases of Koalas having survived for years in captivity—in one case for sixteen years—have been placed on record, and one is given above in detail by Mrs. Gwyn. Recently, instances of Koalas in their wild state coming into contact with settled areas, and eating foods other than Eucalyptus leaves, have been brought under my notice. Here is a copy of a letter I received from Mr. H. Ruskin Rowe, a well-known architect of Sydney. He writes under date 30th September, 1940:—

"Dear Mr. Hull:—Following up our conversation with reference to the food that Native Bears eat, I have noticed frequently at Avalon, where there are a number of Bears, some of which are fairly tame, that they come around my house and fight with the possums for almost any scraps of food such as lettuce, and banana peelings, which they are very keen on. I have definitely seen several Bears very keen on these banana peels. This taste, whether recently acquired or not, I do not know, but I was amazed to see them eating these things, as I understood they would only eat Grey Gum leaves. I have 50 acres of land around me on which there are plenty of Grey Gums, so they are not hungry for this natural food.

"On one occasion a Bear was seen eating scraps of tomato.

"The possums down at Avalon eat all house refuse, except meat."

Another instance is reported from Mona Vale, where a resident stated that Bears came on to his verandah and ate bread and honey, which he kindly provided for them. They also invaded the laundry, and drank water containing blue, used in washing.

These cases only add to numerous other records of Koalas not only eating, but thriving on artificial foods, and drinking pure and adulterated water, milk, and other liquids. Yet there are some who claim to be authorities on the subject, who state that the Koala does not drink, and will not eat anything but Eucalyptus leaves.

LIST OF MEMBERS.

As on August 1st, 1941.

Note.—Unless otherwise specified, members are residents of the State of New South Wales.

Members will oblige by notifying the Honorary Secretary of any change of address.

PATRONS.

His Excellency the Governor of New South Wales, the Lord Wakehurst, K.C.M.G.

Air Vice-Marshal Sir Philip Woolcott Game, G.B.E., K.C.B., D.S.O., Langham House, Ham Common, Surrey, England.

ASSOCIATE BENEFACTORS.

Albert Littlejohn, 9 Young Street, Sydney.

Walter and Eliza Hall Trust, Box 130 C.C., G.P.O., Sydney.

Gustavus Athol Waterhouse, D.Sc., B.E., 39 Stanhope Road, Killara.

FELLOWS.

Barrett, Charles, C.M.Z.S., "Maralena", Maysbury Street, Elsternwick, Victoria.

Burrell, Harry, O.B.E., "Yarrenbool", 141 Darley Road, Randwick.

Cayley, Neville W., 11 Beresford Road, Rose Bay.

Chisholm, A. H., "The Herald" Office, Melbourne.

Dakin, Professor William John, The University, Sydney.

Hindwood, Keith A., Wingello House, Angel Place, Sydney.

Hull, Arthur Francis Basset, M.B.E., Box 704, G.P.O., Sydney.

Iredale, Tom, "Solander", Queenscliff Road, Manly.

Mathews, Gregory Macalister, C.B.E., Parliamentary Library, Canberra, A.C.T. (or Boreena Avenue, Wahroonga).

Musgrave, Anthony, Australian Museum, Sydney.

Roughley, Theodore, Cleveland, B.Sc., Fisheries Department, Chief Secretary's Department, Sydney.

Troughton, Ellis Le Geyt, Australian Museum, Sydney.

Turner, Dr. A. Jeffries, Wickham Terrace, Brisbane, Queensland.

Ward, Melbourne, 20 Wylde Street, Potts Point.

Waterhouse, Gustavus Athol, D.Sc., 39 Stanhope Road, Killara.

Whitley, Gilbert Percy, Australian Museum, Sydney.

HONORARY MEMBERS.

Buchanan, Robert, c/o Mrs. J. Edgar, Randwick.

D'Ombraïn, Dr. E. A., 5 Mackenzie Street, Lindfield.

Dunbabin, Thomas, 22 Raglan Street, Mosman.

Hull, A. F. Basset (see Fellows).

Johnston, Professor T. Harvey, The University, Adelaide, South Australia.

Lyell, George, Gisborne, Victoria.

Sherborn, Dr. Charles Davis, British Museum (Natural History), London.

Stiffe, R. J., 350 George Street, Sydney.

LIFE MEMBERS.

Baxter, Mrs. D., "Clyde", 35 Station Street, Crow's Nest.

Bryce, Ernest John, 47 Nelson Road, Killara.

Buckle, Frank, 104 Hunter Street, Sydney.

Coles, Clifford, Millions Club, Rowe Street, Sydney.

Crommelin, Miss Minard, "Warra" Sanctuary, Pearl Beach, Woy Woy.

Dangar, R. H., "Turee", Coolah.

Dellow, Walter Joseph, 32 Alibone Street, Ashfield.

Dixon, Robert Craig, J.P., 33 Hunter Street, Sydney.

Dixon, Sir William, "Merridong", 586 Pacific Highway, Killara.

Foreman, Dr. Joseph, "The Astor", 123 Macquarie Street, Sydney.

Halloran, Aubrey, B.A., LL.B., Bull's Chambers, 28 Martin Place, Sydney.

Hallstrom, E. J. L., 26 Ryan's Road, Willoughby.

Hordern, Sir Samuel, "Babworth House", Darling Point, Edgecliff.

King, Sir Kelso, K.B., Mercantile Mutual Insurance Co., 117 Pitt Street, Sydney.
 Minell, Mrs. Dorothy Ebsworth, 20 Wylde Street, Potts Point.
 Monticone, Dr. Charles Albert, Box 2058, G.P.O., Sydney.
 Murray, C. Stuart, Box 2427 MM., G.P.O.
 Musgrave, Anthony (see Fellows).
 Nash, Albert Edward, 8 Alt Street, Waverley.
 Spain, Col. Alfred, V.D., 16 Spring Street, Sydney.
 Spring, Robert Alexander, "Woodford", St. Elmo Street, Mosman.
 Todman, R. G., "Merdin", 328 Edgecliff Road, Edgecliff.
 Troughton, Ellis Le Geyt, Australian Museum, Sydney.
 Turner, W. H., 28 Queensbury Road, Penshurst.
 White, Alfred Henry, Belltrees, Scone.
 White, Arthur George, c/o A. E. Ebsworth, Union House, Bligh Street, Sydney.
 Whitley, Gilbert P. (see Fellows).
 Zeck, Emil Herman, Box 36A, G.P.O., Sydney.

ORDINARY MEMBERS.

Alexander, I. A., 34 Coolong Road, Vaucluse.
 Allan, Miss Elizabeth May, "Vergemount", Gilliver Avenue, Vaucluse.
 Allan, Miss Joyce K., Australian Museum, Sydney.
 Alt, Jack, 9 Whiting Beach Road, Mosman.
 Anderson, Dr. C., Australian Museum, Sydney.
 Andrews, Ernest Clayton, 4 "Kuring-gai", 241 Old South Head Road, Bondi.
 Andrews, William C., 38 Kameruka Road, Northbridge.
 Archer, H. R., Walton, 14 Buena Vista Avenue, Mosman.
 Arnott, F., Colonial Sugar Co., O'Connell Street, Sydney.
 Atkinson, J., 4 Thompson Street, Mosman.

Baas, Otto Hermann, 18 Bridge Street, Sydney.
 Banks, Gordon D., 16 Spring Street, Sydney.
 Barker, A. F., 42 Blair Street, Bondi.
 Barnett, Marcus S., King Street, Berowra.
 Baron, George, Bank of N.S.W., George Street, Sydney.
 Barrett, Frederick William, Scottish House, 17 Bridge Street, Sydney.
 Barrie, W., 15 Blair Street, Bondi.
 Bartlett, Miss Violet Artah, 98 Prince Albert Street, Mosman.
 Beckett, Dr. Leonard Sothern, B.D.S., M.D.S., B.M.A. House, 135 Macquarie Street, Sydney.
 Bennett, Leslie William, 90 Hill Street, Leichhardt.
 Berney, John Alan, 25 Clanalpine Street, Mosman.
 Best, Godfrey Jacob Marshall, 2 Vaucluse Road, Rose Bay.
 Beswick, G. H., St. James Buildings, 107 Elizabeth Street, Sydney.
 Biber, Samuel, 426 George Street, Sydney.
 Blenkarn, G. G., Phillip House, Phillip Street, Sydney.
 Bloch, Eugen, 1 Burrawong Avenue, Mosman.
 Blow, Walter Russell, 11 Silex Road, Mosman.
 Blume, Miss E., Flat 4, 124 Spit Road, Mosman.
 Boyd, Mrs. Howard, "Mandalay", Dee Why Parade, Dee Why.
 Brain, A. H., 28 Alibone Street, Ashfield.
 Brettnall, George G., Alex Cowan & Co., 37 York Street, Sydney.
 Briton, Alfred James, "El Pasajero", Junction Road, Wahroonga.
 Brodziak, A. A., 8 Spring Street, Sydney.
 Browne, R. B., 113 Pacific Highway, Hornsby.
 Buckland, Sir Thomas, "Lyndhurst", Stanley Road, Hunter's Hill.
 Bullen, Errol, 7 Burrabirra Avenue, Vaucluse.
 Burrell, Harry, O.B.E., "Yarrenbool", 141 Darley Road, Randwick.

Campbell, T. G., c/o C.S.I.R., Box 109, Canberra, A.C.T.
 Campe, A. C., 50 Sydney Arcade, King Street, Sydney.
 Campe, Mrs. A. C., 50 Sydney Arcade, King Street, Sydney.
 Catchlove, F. S. L., 15 Prince Albert Street, Mosman.
 Catt, John Ward, "Tomah", Church Street, Carlingford.
 Cayley, Neville W., 11 Beresford Road, Rose Bay.
 Chaffer, Norman, 1 Roslyn Avenue, Roseville.
 Chisholm, Harry John, 3 Thompson Street, Mosman.
 Clark, Dr. Ernest D., 749 Military Road, Mosman.
 Clark, Roland C., 33 Kardinia Road, Mosman.

Clayton, Charles, 60 Wyong Road, Mosman.
Clegg, Walter, 98 Spofforth Street, Cremorne.
Cohen, Sir Samuel S., 11-13 Bond Street, Sydney.
Coles, Kenneth Frank, 83 Victoria Road, Bellevue Hill.
Comins, Francis, 48 Prince Albert Street, Mosman.
Comtesse, Capt. D. L., Tug "Hydra", Goat Island, Sydney.
Cooper, Roy P., 14 Third Avenue, Willoughby.
Cormack, Ossian Roy, 3 Effingham Street, Mosman.
Cornford, William Henry, "Greyls", Queenscliff Road, Manly.
Cousins, W. G., Angus & Robertson, Ltd., Sydney.
Cowlshaw, George Keith, 612 Military Road, Mosman.
Cridland, Frank, O.B.E., 10 Barrack Street, Sydney.
Crowley, Valentine, 18 Clanalpine Street, Mosman.
Cunningham, Harold Joseph, c/o State Crown Solicitor, 237 Macquarie Street, Sydney.

Dakin, Professor William John, Zoology Department, The University of Sydney.

Davidson, Charles Robert, Fay's Limited, Liverpool Street, Sydney.
Davies, Miss Joan, 16 Dent Street, Botany.
Deakin, Dr. John Edward Ferdinand, "Vindoro", Military Road, Mosman.
Denne, David Richard, 25 Woodville Avenue, Wahroonga.
Dewhurst, Norman, Box 478 AA., G.P.O., Sydney.
Dickson, Dr. J. S., 50 Bradley's Head Road, Mosman.
Doak, Dr. F. W., 114 Belmont Road, Mosman.
Dovey, John Whitsed, "Lynwood", Roseville.
Duff, Miss Elizabeth E., 474 Burwood Road, Belmore.
Duncan, Grantley A., cr. Cooyong and Pittwater Road, Terrey Hills, via Chatswood.
Dunlop, William John, 14 Johnston Street, Chatswood.
Dunster, Miss C. A., 48 Stanhope Road, Killara.

Eccles, Alfred Edward, 31 Prince Albert Street, Mosman.
Edwards, Edward Oliver, Cummins Road, Menangle Park.
Eipper, Miss E. M., 28 Thompson Street, Mosman.
Enright, W. J., West Maitland.
Evans, Arthur Phillip, 88 Muston Street, Mosman.
Evans, Dacre Fitzherbert, 5 Silex Street, Mosman.
Evans, Joshua, "Edenglassie", 2 Thompson Street, Mosman.
Everitt, Theo Athol, 36 Letitia Street, Oatley.

Fairfax, John Hubert, "Elaine", Edgecliff.
Fairfax, John, & Sons, Ltd., Hunter Street, Sydney.
Faviell, M. C., Perpetual Trustee Chambers, 33 Hunter Street, Sydney.
Fitzhardinge, Miss Julie G., "Redhill", Pennant Hills.
Francis, Miss Leila Manu, 14 Prince Albert Street, Mosman.
Francis, Neville H., 14 Prince Albert Street, Mosman.
French, Miss Betty, 2 Havilah Street, Chatswood.

Gatliff, Henry Ernest, 82 Raglan Street, Mosman.
Gilet, Maurice L., Box 62 C.C., G.P.O., Sydney.
Goldfinch, Gilbert M., 43 Jenkins Street, Chatswood.
Gould, Henry, 1 Ellamatta Avenue, Mosman.
Graham, Albert Nelson, Department of Mines, Sydney.
Grahame, Mervyn Ernest, Technical High School, Lithgow.
Green, R. Rae, 5 Whiting Beach Road, Mosman.

Hall, Thomas E., c/o A. Hall & Co. Pty., Ltd., 366 Pitt Street, Sydney.
Halloran, Dr. Garnet, 143 Macquarie Street, Sydney.
Hargreaves, Andrew Richardson, 28 Gordon Street, Mosman.
Harrison, Frank, 41 Bradley's Head Road, Mosman.
Hart, Lavington B., 4 Athol Flats, Rickard Avenue, Mosman.
Hawke, Douglas Osborn, "Bronte", Ruby Street, Mosman.
Hawley, John, 85 Surrey Street, Darlinghurst.
Hawley, Joseph William, 4 Castlereagh Street, Sydney.
Hayes, D. J., 1 Watkin Street, Rockdale.
Heath, Albert Edward, Shell House, 2 Carrington Street, Sydney.
Henderson, John Alexander, "Yeronga", 18 Prince Albert Street, Mosman.
Heyde, Charles William, Raleigh Park, Kensington.

Hill, A. C. W., 115 Pitt Street, Sydney.
 Hill, C. F., Taxation Department, Castlereagh Street, Sydney.
 Hindwood, Keith Alfred, Wingello House, Angel Place, Sydney.
 Hirst, Edward, 104-114 Clarence Street, Sydney.
 Hockings, Arthur Thornton, Box 1761, G.P.O., Sydney.
 Hooke, R. W., 34 Thompson Street, Mosman.
 Hordern, Anthony, 12 Spring Street, Sydney.
 Hordern, Lady, "Babworth House", Darling Point.
 Houston, Hugh James, 42 Bradley's Head Road, Mosman.
 Howie, Sir Archibald, Box 2116 L., G.P.O., Sydney.

 Iredale, Tom, F.R.Z.S., "Solander", Queenscliff Road, Manly.
 Iredale, Mrs. T., "Solander", Queenscliff Road, Manly.

 Jarvis, R. O., 20 Prince Street, Mosman.
 Johnston, Claude, 3 Major Street, Mosman.
 Johnston, Cyril D., 10 Little Street, Mosman.
 Johnston, Peter Robert, 10 Little Street, Mosman.
 Jones, Chas. Lloyd, c/o David Jones, Ltd., Sydney.
 Juchau, Percy James, 13 Macquarie Place, Sydney.
 Judd, Everard, 24 Bradley's Head Road, Mosman.

 Kelly, Thomas Herbert, 39 Hunter Street, Sydney.
 King, Ambrose, 116 Croydon Road, Croydon.
 Kinghorn, J. Roy, Australian Museum, Sydney.
 Kirwan, W. J., Angus & Robertson, Ltd., Sydney.

 Laseron, C. F., Royal Arcade, Pitt Street, Sydney.
 Lawson, Albert Augustus, Harden Road, Artarmon.
 Lee, H. B., 2 Darley Street, Darlinghurst.
 Leithhead, David, 9 Royal Street, Maroubra.
 Le Souef, Albert Sherbourne, C.M.Z.S., 3 Silex Street, Mosman.
 Lewis, George Owen, c/o Tooth & Co., Kent Brewery, Sydney.
 Llewelyn, Arthur Stuart, 131-33 Pitt Street, Sydney.
 Llewellyn, William H., "Ashley", 20 Prince Albert Street, Mosman.
 Locke, Dr. Keith Morgan, "Warminster", New Canterbury Road,
 Petersham.
 Lockie, Percival Edgar, 67 Hampton Court Road, Kogarah.
 Longley, G., 17 Bronte Street, Bronte.
 Lovett, Percy Walter, 1 Ellamatta Avenue, Mosman.

 Macanish, Miss L. Leigh, Box 3709 SS., G.P.O., Sydney.
 MacCulloch, Dr. H. T. C., "Hillcrest", 76 Boulevard, Lewisham.
 McFadyen, Miss Ella, 24 Kenilworth Road, Lindfield.
 Macgregor, Geo. V., 34 Burrawong Avenue, Mosman.
 MacKenzie, Keith L., Cremorne Club, Cremorne.
 MacKillop, F. C., "Cumbrae", Ellamatta Avenue, Mosman.
 MacKillop, J. A., F.R.G.S., "Orana", No. 38, The Grove, Mosman.
 McLaren, Sir John Gilbert, 19 Redmyre Road, Strathfield.
 McMaster, Sir Frederick Duncan, "Dalkeith", Cassilis.
 McPhee, Duncan, 499 Bourke Street, Darlinghurst.
 Maher, James, 47 Bradley's Head Road, Mosman.
 Mallard, Henri N., Harrington's Pty., Ltd., 386 George Street, Sydney.
 Marks, L. W., 34 Bradley's Head Road, Mosman.
 Marr, Sir Charles William Clanan, Telegraph Road, Pymble.
 Marshall, A. J., 152 Penshurst Street, Penshurst.
 Marshall, Dr. Frank, C.M.G., "Harley", Macquarie Street, Sydney.
 Maston, William Harold, 21 Jamieson Street, Granville.
 Mathews, Gregory Macalister, C.B.E., Parliamentary Library, Canberra,
 A.C.T. (or Boreena Avenue, Wahroonga).
 Mellor, Walter L., "Stamford", 437 Forest Road, Penshurst.
 Middleton, James Thomas, 15 Thompson Street, Mosman.
 Mills, George Newnham, 14 City Road, Sydney.
 Milsop, W., Union Bank, 377 George Street, Sydney.
 Mitchell, Karl A., Yorkshire House, 14 Spring Street, Sydney.
 Moodie, Lieut. Walter, 59 Braeside Street, Wahroonga.
 Moore, Harold Hamilton, 8 McIntosh Street, Gordon.
 Moore, William Robert, 12 Kywong Avenue, Pymble.
 Morgan, Frederick E., Snow, Elliott Pty., Ltd., 77 York Street, Sydney.
 Mort, Harold S., 13 Milner Street, Mosman.
 Moxham, Sir Harry, 175 Macquarie Street, Sydney.

Murphy, Rev. Peter J., Blessed Sacrament Presbytery, 59 Bradley's Head Road, Mosman.

Murray, R. J., 34 Thornley Street, Marrickville.

Muston, H. J., 13-15 O'Connell Street, Sydney.

Packer, Lewis, "Melita", Milton Avenue, Mosman.

Palmer, Joseph Smith, 19 Brady Street, Croydon.

Palmer, Lynton Edward, 96 Pitt Street, Sydney.

Patrick, Capt. James Robert, Scottish House, Bridge Street, Sydney.

Patten, R. A., 132 Archer Street, Roseville.

Pearson, Richard Browning, "Quantambone", Brewarrina.

Percy, Dr. C. E., 6 Thompson Street, Mosman.

Perry, Leonard John, 16 Bradley's Head Road, Mosman.

Plowman, Claude, 8 Marathon Road, Darling Point.

Pockley, Dr. Eric, Avalon Parade, Avalon Beach, N.S.W.

Pointon, Mrs. A., "Yantara", St. Elmo Street, Mosman.

Pollock, Ernest Frederick, "Te Whare", Carrington Avenue, Strathfield.

Pomroy, Richard Osborne, c/o Lawrence & Hanson, 33 York Street, Sydney.

Powell, John, 17 Thurlow Street, Redfern.

Pratt, Frederick W., 7 St. Elmo Street, Mosman.

Prior, Miss E. M., 30 Bradley's Head Road, Mosman.

Prior, K. J., 44 Bradley's Head Road, Mosman.

Purser, Dr. Cecil, "Ascot", Grosvenor Road, Wahroonga.

Rabone, Harold Richard, Box 1282 J., G.P.O., Sydney.

Ramsay, John Simeon Pearson, "Kalia", Gale Street, Woolwich.

Raves, Victor Sydney, 92b Pitt Street, Sydney.

Reading, Sir Claude, 13 Trelawney Street, Woollahra.

Richardson, Harold R., 181 Clarence Street, Sydney.

Robbins, Rev. Samuel Raymond, The Parsonage, Beecroft.

Roberts, Mervyn Lloyd, 43 Hannah Street, Beecroft.

Roberts, Noel L., Prudential Assurance Building, Martin Place, Sydney.

Robertson, S. G. Helston, Ellamatta Road, Mosman.

Robson, Robert William, Union House, 247 George Street, Sydney.

Rofe, T. E., Eldon Chambers, 92 Pitt Street, Sydney.

Rogers, William James, 12 Bradley's Head Road, Mosman.

Ross, Professor Ian Clunies, Veterinary School, The University, Sydney.

Ross, Miss Jean, 5 Stanton Road, Haberfield.

Ross, William Lyle, 4 Fairlight Crescent, Manly.

Roughley, Theodore Cleveland, B.Sc., F.R.Z.S., Fisheries Department, Chief Secretary's Department, Sydney.

Roy, T. M., Box 891, G.P.O., Sydney.

Rush, V. G., 18 Gordon Street, Mosman.

Russell, George Ernest Archer, "Archer Russell", Collaroy.

Russell-Jones, Mrs. Arthur, 52 Ourimbah Road, Mosman.

Sagar, H., 1 Simpson Street, Mosman.

Sands, Colonel R. S., 374 George Street, Sydney.

Scammell, George V., 7 David Street, Mosman.

Shellshear, Prof. J. N., 14 Raymond Road, Neutral Bay.

Sherlock, James Augustus, Box 826 G, G.P.O., Sydney.

Shinder, David, 58 Bradley's Head Road, Mosman.

Shipway, Phillip, 133 Pitt Street, Sydney.

Shirley, Miss D., 47 Wolseley Road, Mosman.

Simpson, W. H., 2 Effingham Street, Mosman.

Sims, Albert, 58 Pitt Street, Sydney.

Smith, Mrs. Amy S., Box 45, P.O., Lithgow.

Spain, Ian Alfred Hamilton, 170 Kurraba Road, Neutral Bay.

Speirs, John McAllister, 19 Hale Road, Mosman.

Spiegel, Henry, 11 Bradley's Head Road, Mosman.

Spring, David A. H., St. Elmo Street, Mosman.

Stephen, Alfred Ernest, Union Club, Sydney (Box 1158 H.H., G.P.O., Sydney).

Stephenson, John Hunter, 4 Ranger's Road, Cremorne.

Stephenson, Morris, 2 Martin Place, Sydney.

Stewart, Professor J. Douglas, The University, Sydney.

Stinson, E. R. D., 8 Prince Albert Street, Mosman.

Storey, A. G., 7 Lennox Street, Mosman.

Tait, George Edward, 35 Moruben Road, Mosman.

Tanner, Charles, Glen Davis, Capertee.

Teece, Richard Clive, K.C., 182 Phillip Street, Sydney.
 Thomas, John, Shellharbour.
 Thompson Harold, Dr., M.A., D.Sc., "Aquaforte", Ischia Street,
 Cronulla.
 Thornthwaite, Ormond Robert, 17 Raglan Street, Mosman.
 Tomkins, E. J., Mitchell Street, Enfield.
 Trevenna, G., 52 Nicholson Street, Chatswood.
 Tweedie, Bishop M., D.D., The Manor, Iluka Road, Mosman.

Vickers, Edward Russell, 9 The Corso, Manly.
 Vickery, Arthur, 4 Bridge Street, Sydney.
 Vickery, Ottomar George, The Coal Cliff Collieries, Ltd., 16 Barrack
 Street, Sydney.
 Von Drehnen, Otto, "Wyuna", Buena Vista Avenue, Mosman.

Walker, Egmont Palmer, "Colebrook", Bellevue Road, Double Bay.
 Walters, Miss Sheila, 92 Carlingford Road, Epping.
 Ward, Melbourne, F.R.Z.S., "Pasadena", Cross Street, Double Bay.
 Warren, John Donald, 56 Redan Street, Mosman.
 Weaver, Charles Herbert, 21 David Street, Mosman.
 Westerweller, Walter Lawrence, "Womponia", Gunnedah.
 Weymark, John N., 26 David Street, Mosman.
 Wheelwright, A. H., "Rosedale", Narrawa, via Crookwell.
 Whitley, P. N., 43 The Crescent, Mosman.
 Whitley, Mrs. P. N., 43 The Crescent, Mosman.
 Wiburd, James Carvosso, 16 Moruben Road, Mosman.
 Wilcox, A. C., 3 Prince Albert Street, Mosman.
 Williams, Amos E., Wyoming, Glenbrook Road, Cooma.
 Wright, Harold James, P.O., Box 9, Auburn, N.S.W.

Yardley, H., 10 Great North Road, Five Dock.

HONORARY ASSOCIATE MEMBERS.

Chisholm, Alex. H., F.R.Z.S., "The Herald" Office, Melbourne, Victoria.
 Malloch, Dr. J. R., 5635 North 8th Street, Arlington, Va., U.S.A.
 Mathews, Gregory M. (see Fellows).

LIFE ASSOCIATE MEMBERS.

Agar, Professor W. E., The University, Melbourne, Victoria.
 Barkley, William Henry, C.B.E., Redan Street, Mosman.
 Berney, F. L., c/o Messrs. Archer Bros., Gracemere, Rockhampton.
 Campbell, John Honeyford, O.B.E., I.S.O., 336 Chapel Street, Ottawa,
 Canada.
 Director, Dominion Museum, Wellington, New Zealand.
 Ellis, Ralph, Jr., 2420 Ridge Road, Berkeley, Calif., U.S.A.
 Finlay, Dr. Harold John, Geological Survey Office, Wellington, C.I.,
 New Zealand.
 Hardy, G. H. H., The University, Brisbane, Queensland.
 Hill, Gerald F., Box 109, G.P.O., Canberra, A.C.T.
 Hopkinson, Dr. Emilius, C.M.G., Balcombe, Sussex, England.
 Houston, J. K. S., 274 Church Street, Parramatta.
 Jackson, Sidney William, c/o J. S. P. Ramsay, 55 George Street North,
 Sydney.
 Morrison, Philip Crosbie, M.Sc., 9 Maroona Road, Brighton, S.5. Victoria.
 Moss-Robinson, Leslie H., Exon Vale, Narara.
 Oldham, R. V., Port Moresby, Papua.
 Thackway, A. E. J., "Wyomine", Albyn Road, Strathfield.
 Thomas, Andrew David, 12 Clifton Avenue, Burwood.
 Wilkinson, John Wrixon, Wood Street, Warwick, Queensland.
 Williams, Godfrey Herbert, Aberpergwyn, South Wales.
 Wilson, Professor James Thomas, 24 Millington Road, Cambridge,
 England.
 Wright, Phillip A., "Wallamumbi", Armidale.

ASSOCIATE MEMBERS.

Aguilar, Miss Grace, The Block, 428 George Street, Sydney.
 Albury, A. J., 5 Lenthall Street, Kensington.

Barnett, Percival E. B., "Bescot", The Crescent, Chatswood.
Barrett, Charles, "Maralena", Maysbury Street, Elsternwick, Victoria.
Barrett, Sir James, 105 Collins Street, Melbourne, Victoria.
Berney, Mrs. Wendy, 25 Clanalpine Street, Mosman.
Bernhard, H., "Finchley", 1 Rosedale Avenue, Manly.
Boardman, W., B.Sc., Australian Institute of Anatomy, Canberra, A.C.T
Border, A. J., Box 1839 K., G.P.O., Sydney.
Brandon, Miss F., "Heagren", Cowan Road, St. Ives.
Brennan, Frank, 22 Collingwood Avenue, Earlwood.
Brookes, Albert E., 11 Lake Road, Takapuna, Auckland, New Zealand.
Browne, Mrs. R. B., 113 Pacific Highway, Hornsby.
Brownlee, Philip Arthur, 21 Ebsworth Road, Rose Bay, Sydney.
Bruce, Mrs. E. J., 47 Nelson Road, Killara.
Butters, Miss Elizabeth, 28 Toxteth Street, Glebe.

Camp, Charles, 7 Heydon Street, Mosman.
Cayley, Neville C., 11 Beresford Road, Rose Bay.
Chaffey, C., 72 Mowbray Road, Willoughby.
Clark, J., National Museum, Russell Street, Melbourne.
Clarke, A. E., 4 Elsham Road, Auburn.
Clarke, Frank O., 41 Crump Street, Mortdale.
Clarke, J., 41 Crump Street, Mortdale.
Clarke, Spencer, 41 Crump Street, Mortdale.
Cleggett, Elsie Mabel (Miss), 9 Hill Street, Coogee.
Cleland, Professor J. Burton, The University, Adelaide, South Australia.
Cleland, Kenneth Wollaston, 66 Ashley Street, Chatswood.
Cohen, M., 31 Piccadilly Arcade, Sydney.
Colefax, Alan, University of Sydney.
Coleman, Mrs. Edith, Walsham, Blackburn, Victoria.
Cuttriss, T., 41 McKern Street, Campsie.

Dexter, E. A., 32 King Edward Street, Rockdale.
Dibbs, Mrs. George, 26 Dalhousie Street, Haberfield.
Dingeldei, Walter Leslie, 12 Elder Street, Lambton.
Dixon, Keith M., 1 Borambil Street, Wahroonga.
Dummett, Stephen, 7 Wellington Street, Arncliffe.

Empson, H. C., 30 Darval Street, Crow's Nest.
English, Miss Kathleen M. I., March Street, Yass.

Farrin, W., 130 Ninth Avenue, Campsie.
Ferguson, Thomas L., "Rancliff", 60 Ocean Street, Woollahra.
Fleay, David Howells, c/o Sir Colin Mackenzie Sanctuary, Badger
Creek, Healesville, Victoria.
Forbes, Dr. Arthur Duncan, Nyngan.

Galley, Ronald Mitchell, 31 Arthur Street, Lavender Bay.
Gannon, Gilbert Roscoe, "Bushlands", Livingstone Avenue, Pymble.
Gannon, Mrs. G. R., "Bushlands", Livingstone Avenue, Pymble.
Gilbert, Percy A., "Dacelo", Colin Street, Lakemba.
Goddard, Mervyn Thomas, 47 Cary Street, Marrickville.
Golding, Miss M., 2 Broderick Street, Balmain.
Gostelow, E. E., 86 Consett Street, Concord West.
Graham, W. F., 53 Barton Street, Kogarah.
Gray, H. W., 33 Elliott Street, Balmain.

Hargreaves, A., 9 Addington Avenue, Ryde.
Hargreaves, E., 9 Addington Avenue, Ryde.
Harvey, P. F., 7 Pacific Street, Clovelly.
Hayck, Leo Benoni, 35 Royal Street, Maroubra.
Herd, F., 66 Villiers Street, Rockdale.
Hindwood, Mrs. K. A., c/o K. A. Hindwood, Angel Place, Sydney.
Hummerston, P., 805 New South Head Road, Rose Bay.
Jervis, Thomas Henry, 74 Roseville Avenue, Roseville.
Jones, Lawrence Joseph, 23 Black Street, Vaucluse.
Jopling, Miss M. W., Public Library, Sydney.

Keast, Alan, 313 West Botany Street, Rockdale.
Kennedy, Colin, "The Rockie", 97 Cremorne Road, Cremorne.
Kennedy, Miss Grace, 61 Avenue Road, Mosman.
Knights, Miss Nellie E., 147 The Boulevard, Strathfield.

Laseron, John, Australian Military Forces, Darwin.
Law, Miss L. E., 39 Middle Harbour Road, Lindfield.

Leek, W., 51 Pacific Avenue, Waitara.
Lowe, Mrs. Norman E., 56 Bradley's Head Road, Mosman.

McCulloch, Miss Daisie, 387 New Canterbury Road, Dulwich Hill.
McDonald, R. W., 16 Holterman Street, Crow's Nest.
MacDougall, William Alexander, Box 280, P.O., Mackay, Queensland.
McGrath, Reginald.
McKellow, Miss Nellie, 70 Caledonia Street, Bexley.
McKeown, Keith, Australian Museum, Sydney.
McKie, Rev. E. Norman, St. Columba's Manse, Guyra.
MacKnight, K. H., 10 O'Connell Street, Sydney.
McNeill, Frank A., Australian Museum, Sydney.
Maher, S., Sir Joseph Banks Road, Bankstown.
Mann, John S., Biological Section, Lands Department, Sherwood,
Brisbane, Queensland.
Marriner, Herbert Richard, 83 Woodland Street, Balgowlah.
Marshall, John M. J., 27 Paul Street, Waverley.
Marshall, L. R., 13 Mary Street, Leichhardt.
Mayer, Frederick W. S., c/o R. P. Mayer, Box 27, P.O., Condobolin.
Messmer, Mrs. C. A., 64 Treatt's Road, Lindfield.
Millgate, Miss A., 223 Forest Road, Arncliffe.
Mitchell, J. M., 37 Hertert Street, Dulwich Hill.
Molloy, Mrs. G., 113 Correy Avenue, North Strathfield.
Moore, Mrs. Victoria May, 8 McIntosh Street, Gordon.
Mulholland, P., Primula Street, Lindfield.

Nicholas, E., 19 Edinburgh Road, Willoughby.
Nicholls, Walter Dunbar, 12 Cook Street, Lewisham.
Northmore, Sir John, Judge's Chambers, Supreme Court, Perth, W.A.
Nubling, Erwin, 9 Mt. Pleasant Avenue, Normanhurst.

Oliver, Arthur W. L., P.O. Box 1628, Central Post Office, Kowloon, Hong
Kong.

Oliver, Dr. W. R. B., 26 Ventnor Street, Seatoun, Wellington, New
Zealand.

O'Neill, Miss Constance M., 530 New South Head Road, Double Bay.
Ormsby, Anthony Irwin (On Active Service).

Palmer, John W., Milner Avenue, Hornsby.
Pariser, Dr. Kate, 10 "Chevron", 128 Francis Street, Bondi.
Parkinson, C., 29 Mitchell Street, Crow's Nest.
Paul, Hector George, c/o H. Jockel, Matthews Chambers, The Corso,
Manly.

Peall, Mrs. Oscar, "Oare Pennings", Wiltshire, England.
Peir, P. A., 49 Gloucester Street, Rockdale.
Peterson, Miss J., 97 Lyons Road, Drummoyne.
Pope, Miss Elizabeth, 36 Kameruka Road, Northbridge.

Rayment, Tarlton, "Bow-worrung", Bath Street, Sandringham, Victoria.
Ridley, D. M., Vale Avenue, Dee Why.
Roberts, J. E., 35 Shaftesbury Avenue, Burwood.

Schwebel, S., 8 Wellington Road, Undercliff.
Sears, Miss C., 40 Towns Road, Rose Bay.
Seaward, William Trotman, "Myala", Scone.
Serventy, Dr. D. L., c/o Marine Biological Laboratory, Cronulla.
Sharland, Michael, "Melrose", Hamden Road, Hobart, Tasmania.
Sharpe, J. H., 1 Moore Street, Campsie.
Short, F. W., 23 Dalton Road, Mosman.
Sidney, E. J., 30 Dudley Avenue, Bankstown.
Smith, Miss Myra, 118 Sydenham Road, Marrickville.
Smith, Miss Vera Irwin, "Loana", Mount Morris Street, Woolwich.
Smythe, William Edward, 51 Crow's Nest Road, North Sydney.
Stach, L. W., Australasian Petroleum Co., Port Moresby, Papua.
Statfield, Fred., 6 Balfour Road, Rose Bay.
Steeles, C. E., 70 Bayview Street, Undercliffe.
Steeles, E. C., 136 Homer Street, Earlwood.
Stowar, A., 8 Chisholm Street, Auburn.
Summerley, Miss, 26 Dalhousie Street, Haberfield.

Tancred, P. H., 10 Hardy Street, South Ashfield.
Thomas, I. A. M., University, Sydney.

Thomas, James Francis, Tenterfield.
Trevitt, Ernest A., 32 Rutledge Street, Eastwood.
Trewartha, F. J., Lane & Trewartha, Ltd., Wolfe Street, Newcastle.
Turner, Dr. A. Jefferis, F.R.Z.S., Wickham Terrace, Brisbane, Queensland.

Wardrope, C., 31 Elliot Street, Balmain.
Watkins, G. W., Hansard Staff, Parliament House, Sydney.
Webber, J., Milburn Road, Miranda.
Weeding, Rev. Benjamin J., Box 45 Eudunda, South Australia.
Weston, Miss Mary, 27 The Avenue, Hurstville.
Whaling, John D., 13 Donnelly Street, Balmain.
White, Miss Hilda M., 39a Elizabeth Bay Road, Elizabeth Bay.
Whiteley, A., 21 East Crescent, Hurstville.
Wills, J. R., 49 Ross Street, Parramatta.
Wines, William, Box 48AA., G.P.O., Sydney.
Wise, Miss Mary L., P.O., Box 53, Sale, Victoria.
Wood, W. J., 61 Milson Road, Cremorne.
Woods, S. W., 17 Antwerp Street, Bankstown.

Zoological Board of Victoria, Royal Park, Parkville, Melbourne, N.2,
Victoria.

Royal Zoological Society of New South Wales

MEMBERSHIP.

(The Society's year commences on 1st July.)

Class.	Amount of Subscription:
Associate Member	0 5 0 per annum
Ordinary Member	1 0 0 " "
(Members joining after 1st January in any year pay one-half subscription.)	
Life Associate Member	2 10 0 in one sum
Life Member	10 0 0 " "
Honorary Member	} Elected for services to Australian Zoology or to the Society.
Honorary Associate Member	

TITLES.

(Conferred by the Council)

Fellow	} For distinguished services to Australian Zoology.
Associate Benefactor Contribution of	
Benefactor	" " £500 " "
Endowment Member	" " £1,000 " "

PRIVILEGES.

Members of all classes may attend all meetings of the Society and its various Sections. Every Ordinary member receives a free pass to Taronga Zoological Park and Aquarium, and twenty tickets each year, admitting 20 adults or 40 children to the Park only.

APPLICATION FOR MEMBERSHIP

should be addressed to the Honorary Secretary, Box 2399 MM, G.P.O., Sydney, accompanied by a remittance of the amount of subscription. The number of Ordinary Members is limited to 350, and should there be no vacancy at the time of application, the applicant will be registered as an Associate Member, and shall take precedence in accordance with the date of his admission to Associate Membership.

PUBLICATIONS.

The Australian Zoologist.

A Journal containing papers relating to the Zoology of Australia. Published at irregular intervals. Subscription to ordinary members elected prior to July 1, 1933, 1/- per annum; ordinary members elected after June 30, 1933, and all associate members 2/6 per annum.

Vol.	Parts.	Date.	Pages.	Plates.	Price.
					(unbound).
					£ s. d.
I	8	1914-20	256	19	1 0 0
II	4	1921-22	172	45	0 12 6
III	8	1922-25	362	41	1 0 0
IV	6	1925-27	362	49	1 0 0
V	4	1927-29	362	41	1 0 0
VI	4	1929-31	394	32	1 0 0
VII	5	1931-33	398	23	1 0 0
VIII	4	1934-37	346	19	1 0 0
IX	1	1937	82	11	0 3 0
"	2	1938	112	8	0 4 6
"	3	1939	163	10	0 10 0
"	4	1940	96	8	0 7 6

Note.—Single parts of any volume may be obtained at published prices, less 20 per cent., to members or associates. Prices may be ascertained on application to the Honorary Secretary.



3 9088 01405 8325

PUBLICATIONS—Continued.

Australian Zoological Handbooks.

The Fishes of Australia, Part I, "Sharks and Rays", by Gilbert P. Whitley, F.R.Z.S. 280 pp., and over 300 illustrations. Price, 7/6. Postage: Australia, 5d.; British Possessions, 7d.; Foreign, 11d.

(Note: "The Fishes and Fish-like Animals of New South Wales" is out of print.)

A Monograph of the Australian Loricates, by Tom Iredale and A. F. Basset Hull. 168+xiii pp., 21 plates and portrait. Price 5/-. Postage: Australia, 5d.; British Possessions, 9d.; Foreign, 1/6.

Bibliography of Australian Entomology, 1775-1930, by Anthony Musgrave, F.E.S., 380+viii pp. Price 10/-. Postage: Australia, 6d.; British Possessions, 9d.; Foreign, 1/6.

Australian Spiders and Their Allies, by W. W. Froggatt, F.R.Z.S. Price 2/6. Postage: Australia, 1d.; British Possessions, 2d.; Foreign, 3d.

Proceedings, published annually, free to all members and associates.

CONTENTS.

	Page.
Sixty-first Annual Report	1
Balance Sheet	4
Officers, 1941-42	6
Presidential Address: "The Study of Australian Fishes", by Gilbert P. Whitley, F.R.Z.S.	7
Reports of Sections—	
Avicultural Section	15
Budgerigar Section	15
Marine Zoological Section	16
Ornithological Section	17
Syllabus of Sectional Meetings	18
Rules as Amended	19
Birds and Their Reflections, by K. A. Hindwood	20
Notes on Some Australian Lizards, by G. Longley	30
Review: The Molluscs of South Australia, Part II	35
Some Notes on Australian Spiders, by N. L. Roberts	36
The Solitary Lorikeet, by Robert A. Patten, B.V.Sc.	42
The Vernaculars of <i>Melopsittacus undulatus</i> , Shaw, by P. A. Gilbert.	44
Obituary: Edwin Ashby	45
"Teddy the Koala," by Marie Gwyn	46
Koalas and Artificial Foods, by A. F. Basset Hull	49
List of Members and Associates	50