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

FOR THE YEAR
1945-46



Price 1/-.

(Free to all Members and Associates.)

OCTOBER 30, 1946

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ROYAL ZOOLOGICAL SOCIETY OF NEW
SOUTH WALES

(Established 1879.)

Registered under the Companies Act, 1899 (1917).

PATRONS:

The Right Honourable Sir John Greig Latham, G.C.M.G.
Sir Philip Woolcott Game, G.B.E., K.C.B., D.S.O.

COUNCIL, 1946-47.

President: Frank Marshall, C.M.G., D.D.S.

Vice-Presidents: Garnet Halloran, B.Sc., M.D., F.R.A.C.S., F.R.C.S.
(Syd.), Edward John Lees Hallstrom, Albert Sherbourne Le Souef,
C.M.Z.S., and Emil Herman Zeck.

Honorary Secretary: Tom Iredale.

Honorary Treasurer: Phillip Shipway.

Honorary Editors: Tom Iredale and G. P. Whitley, F.R.Z.S.

Honorary Librarian: P. E. Lockie.

Members: Neville W. Cayley, F.R.Z.S., Norman Chaffer, Roy Cooper,
Aubrey Halloran, B.A., LL.B., K. A. Hindwood, C.F.A.O.U., Charles
F. Laseron, Keith Collingwood McKeown, F.R.Z.S., Noel Lee
Roberts, Theodore Cleveland Roughley, B.Sc., F.R.Z.S., Ellis Le Geyt
Troughton, F.R.Z.S.

Assistant Honorary Secretary: Mrs. B. Irving.

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

OFFICERS OF SECTIONS:

Avicultural Section.

Chairman: A. H. Brain.

Hon. Secretary: R. W. Stewart.

Budgerigar Section.

Chairman: H. Yardley.

Hon. Secretary: E. H. Hernfield.

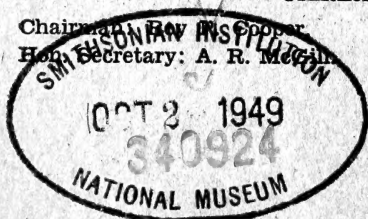
Marine Zoological Section.

Chairman: Mrs. L. H. Woolacott.

Hon. Secretary: Miss Winifred Crofts.

Ornithological Section

Chairman: Sir James Ramsay
Hon. Secretary: A. R. Merton



ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES

The Sixty-sixth Annual Meeting was held at Taronga Zoological Park, Mosman, on Saturday, 27th July, 1946, at 3 p.m. One hundred and eighty-two members and visitors were present. The Honorary Secretary (Mr. Tcm Iredale) read the

SIXTY-SIXTH ANNUAL REPORT.

Membership.—On 30th June, 1946, the members of all classes on the Register numbered 600, and included 1 endowment member, 4 associate benefactors, 7 honorary members, 37 life members, 325 ordinary members, 22 life associates, 3 honorary associate members and 192 associate members.

Eight members died during the year, eleven resigned and the names of eight were removed from the Register in terms of Article 9.

Council.—Twelve meetings were held, and the average attendance was thirteen. The difficult period, due to the death of the late Honorary Secretary, Mr. Hull, has been safely passed, mainly through the enthusiastic work of the President, Dr. Frank Marshall, with the excellent assistance of the Assistant Honorary Secretary, Mrs. Irving (better known to all the members as Miss Betty French). Mr. T. C. Roughley had leave of absence for three months when he visited America on behalf of the Government. All the members of the Council must be thanked for their regular attendance and valuable co-operation.

Deaths.—The most melancholy occurrence in the history of this Society was the death of our Honorary Secretary, Mr. A. F. Basset Hull, who might be termed the father of this Society and the friend of every member. This must be the first meeting for almost 30 years at which he has not been present in the flesh, but his presence will always be felt at every meeting of the Council and at the Annual Meeting. When he read the first address (he was the first President) he gave the roll call as 154 members; at the last meeting as Secretary the figures he read out were 589, a great achievement due mainly to his efforts and guidance. He lived for this Society and it is hoped the Society will progress as a living memory to the sound basis he has helped to provide.

The other deaths included W. H. Barklev, H. Burrell, W. Clegg, W. H. Drummond, W. T. Kirwan, W. H. Liewellyn, J. Powell, Sir Claude Reading, A. Sims, J. M. Speirs and Prof. J. T. Wilson, all of whose deaths are deeply regretted. A notice of Mr. Burrell's death appeared in last year's "Proceedings."

Sections.—These have held meetings as usual and the attendances at nearly every meeting have been satisfactory and generally increasing in number. The Marine Section now has its own cabinet for the display and study of shells and other marine objects.

Endowment Member.—Mr. E. J. L. Hallstrom has become the first endowment member, and his able assistance in every manner is also herewith gratefully acknowledged.

Honorary Members.—The Hon. Clive R. Evatt, K.C., M.L.A., now Minister, was elected an honorary member of this Society in recognition of his valuable support of all our aims, especially in the protection of the native fauna.

Finances.—These continue to improve as will be seen in the Balance Sheet herewith presented by the Honorary Treasurer.

Publications.—The "Proceedings" for 1944-45 was issued on August 31, 1945, but no part of the "Australian Zoologist" has appeared. This is entirely due to the disorganised state of printing, over which the Society has no control. For the special technical printing necessary there are very few firms competent to handle it, and these have so

much work ahead that we must await our turn. It is, however, hoped that as soon as possible an attempt will be made to catch up on this matter. Also the printing of the third edition of Mr. McKeown's "Australian Insects" has not been completed, and we have no copies of the second edition in hand. The first part of Mr. Whitley's "Fishes of Australia" is also practically sold out, and Mr. Whitley is now working hard on Part II, and hopes to get it into order for publication in the coming year, but here again the state of the printing world will govern its issue. It may be noted that Messrs. Angus & Robertson propose to issue a new and revised edition of McKeown's "Australian Insects" when the time is propitious.

Fellows.—As above noted the Fellows have suffered through the loss of Mr. Hull and Mr. Burrell, but three Fellows have been elected—Mr. L. Glauert, Director of the Western Australian Museum, the best informed authority on the fauna of that State, whose knowledge has always been generously handed to our members for incorporation in their works; Mr. Tarlton Rayment, of Victoria, a world authority on bees; and Miss Joyce Allan, Conchologist, Australian Museum, Sydney, for her valuable contributions to science.

Membership.—Negotiations have been concluded with the Trustees of the Taronga Zoological Park whereby this Society will control the issue of season tickets, with the number practically unlimited. This concession has been made in return for the Society waiving the balance of the rights in abeyance since the beginning of this Society.

Library.—This contains a number of valuable works, and it has been decided to purchase cases to care for them properly, and it is hoped a catalogue will be prepared so that the members will be able to see the works available. Also a better scheme of lighting has already been installed.

Building Fund.—This fund was successfully initiated at the last Annual General Meeting, when a sum was subscribed, and another appeal will be made. At the present moment there is great difficulty in securing a home or building, but when opportunity arrives, the Society must be in a position to grasp it. Therefore the matter is being kept in the forefront all the time.

The Honorary Treasurer (Mr. Phillip Shipway) presented the balance sheet (see pages 4 and 5).

The Hon. Daniel Clyne, M.L.C., Speaker of the N.S.W. Legislative Assembly, and Chairman of the Taronga Park Trust, moved the adoption of the annual report and balance sheet, upon which he congratulated the Society, but first he wished to signify the sympathy of himself and all the members of the Trust at the great loss the Society had suffered by the death of the late Secretary, Mr. A. F. Basset Hull. Mr. Hull had been a colleague on the Trust for many years, and had been of great assistance through his interest and industry and his ever-ready assistance in every matter to his colleagues. Otherwise it had been a year of achievement for the Society due to the enthusiasm of the members, a year of progress in scientific research, not spectacular but nevertheless of great value to science generally. Since the Zoological Gardens was inaugurated in 1884, and since the Trust was brought into being in 1916, there had been close co-operation between the two which had been very happy, and in the future with the benefit of unlimited membership suggested greater value to both in the problems still to be tackled.

An important and difficult problem related to rare and vanishing birds and animals, and it seemed very necessary that breeding sanctuaries should be developed in this country. Mr. Brown, the Secretary of the Trust, was now in Central Africa securing giraffes and zebras, lions and elephants mayhap also, for the Zoo. At the present time there are only two giraffes in Australian Zoos, one in Taronga and one at Perth, W.A. These are also becoming scarce in their native land, and it has become imperative to breed them in this land. There are great difficulties in the breeding of wild animals in zoos, as the parent is apt to kill the young soon after birth unless special individual care is taken. He suggested scholarships should be created in each State for

the study of breeding not only the rare members of the Australian, but also the rare and vanishing wild animals of other countries, so that the species can be kept alive in zoos. This should be a national responsibility subsidised by the Commonwealth, special enclosures to be created and special research students to be employed to watch the breeding. This would not really be an innovation, as certain phases of health are already under control and all animals have to be quarantined under the Health Departments of the various States. That such is possible has been shown elsewhere, the Whipsnade Experiment proving a wonderful success, and it must be done soon here, as through settlement our wild life was rapidly decreasing and numbers are vanishing, some already extinct. He hoped that this Society will co-operate in this aim, as it always has in the past, and he hoped to see the Society's own aim, of a Zoological House, soon fulfilled.

The motion was seconded by Mr. E. J. A. Hallstrom, who also paid tribute to the great work done by the late Secretary, Mr. A. F. Basset Hull, and hoped that his wishes with regard to the building would soon be carried out. There was urgent need as, until the Society owned its own meeting-centre its progress would be much handicapped. If a Government grant, either of a building site or subsidy, could be secured and approval of a gift by himself, he would be glad to contribute largely to the fund. Mr. Hallstrom also pointed out that Mr. Clyne has assisted materially in the progress of Taronga Park, and was desirous of assisting the Society in its aim of a Zoological House, so that the Society could be assured of the support of the Trustees. He would like to see us assist the Trustees in their aim of a special establishment for the purpose of breeding and propagating rare birds and animals, as that is very necessary now that settlement is decreasing wild life at a disastrous rate.

The motion was carried by acclamation.

Six members of Council, who retired under Article 22, were re-elected by ballot, viz., Messrs. Norman Chaffer and Roy Cooper, Dr. Garnet Halloran, Messrs. A. S. Le Souef, Noel L. Roberts and T. C. Roughley.

On behalf of the President, who was prevented by illness from attending, Dr. Garnet Halloran delivered the Presidential Address (see page 6).

A vote of thanks for the address was moved by Mr. Ellis Troughton who stressed the urgent need for conservation of the Australian fauna and flora, illustrating his remarks with observations made on his recent visit to Mount Kosciusko as a member of a surveying party of scientists. Mr. Aubrey Halloran seconded, and the motion was carried by acclamation.

Mr. C. Laseron spoke on behalf of the Building Fund, giving details of its growth and urging further subscriptions so that, when the time be opportune, the Society will be able to go ahead without delay.

On behalf of the Society, Mr. R. Cooper conveyed thanks to the Trustees of Taronga Zoological Park for the privilege of holding the meeting in this room.

OFFICERS FOR THE YEAR 1946-7.

President: Dr. Frank Marshall, C.M.G., D.D.S.
Vice-presidents: Dr. Garnet Halloran, Messrs. Edward John Lees Hallstrom, Albert Sherbourne Le Souef, and Emil Herman Zeck.
Honorary Secretary: Mr. Tom Iredale.
Honorary Treasurer: Mr. Phillip Shipway.
Honorary Editors: Messrs. Tom Iredale and Gilbert Whitley.
Honorary Librarian: Mr. Percival Edgar Lockie.
Honorary Assistant-Secretary: Mrs. B. Irving.
Honorary Auditor: Mr. R. J. Stiffe, F.C.A. (Aust.).

ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES.
BALANCE SHEET AS AT 30th JUNE, 1946.

ACCUMULATED FUNDS.				ASSETS.	
	£ s. d.	£ s. d.		£ s. d.	£ s. d.
Balance at 30th June, 1945 ..	3,357 4 7		Furniture and Equipment, Etc.		1,245 4 1
Add: Surplus, Excess of Income over Expenditure for year:—			Investments (at face value)		2,060 0 0
General Account, £ 30/16/11; Publication Fund, £ 280/9/3	311 6 2		Commonwealth Savings Bank:—		
	<u>311 6 2</u>	3,668 10 9	General Account	25 18 0	
			Publication Fund Account	331 14 5	357 12 5
			Petty Cash on Hand		5 14 3
					<u>3,668 10 9</u>
			Building Fund Investments:—		
BUILDING FUND.			Australian Commonwealth Treasury Bonds	700 0 0	
Balance at 30th June, 1945	137 7 0		Commonwealth Savings Bank	17 16 1	
Add: Donations and Interest received for year	580 9 1	717 16 1			717 16 1
	<u>580 9 1</u>				<u>717 16 1</u>
					£ 4,386 6 10
					<u>£ 4,386 6 10</u>

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 June 30, 1946, 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 June 30, 1946, 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.),

Sydney, July 24th, 1946.

Hon. Auditor.

FRANK MARSHALL, President.

PHILLIP SHIPWAY, Hon. Treasurer.

PRESIDENTIAL ADDRESS

THE SOCIETY: THE PAST AND THE FUTURE.

By Frank Marshall, C.M.G., D.D.S.

Once again this Society has arrived at a turning point in its career, and before we look to the future it will be as well to trace its past, showing the advance made in the past 60 odd years.

It was in 1879 that a few farseeing men floated the idea of a Society for Acclimatisation in Sydney. There had been one previously, beginning in 1861 and petering out in 1869, but the present Society was not a continuance of the earlier one. There has been confusion, as it has been placed on record that the present Zoo traces its career to 1865 when it consisted of several animals kept by Mr. William Beaumont at Sir Joseph Banks Pleasure Grounds at Botany. There is nothing in our early records tying us up with that venture, and it may be pointed out that the original prospectus suggested that an Acclimatisation Society be formed. At the meeting someone may have indicated the distinct proposition, and at that meeting the resolution was "That the New South Wales Zoological Society be formed." There was a large meeting and events moved rapidly, as the prospectus was dated March 24, 1879, the meeting held on March 31, a committee formed, and rules drafted on April 7. W. C. Wentworth regretted that he could not take up the Presidency, and Walter Lamb was elected. The initial purpose of this Society was the "introduction and acclimatisation of song birds and game," and we have gone a long way since. For the purposes of establishing such, aviaries and keepers were necessary, and the City Council granted a site on the place then known as Billy Goat Swamp reserve, Moore Park, for the Society's operations as early as July 8, 1880. The membership fees were to be used for this purpose, and subscriptions were added to private amounts, which were increased by a Government grant of £500. Soon a Zoological Gardens was mooted and in a few years a small but attractive Zoo came into being, this being opened to the public in 1884; previously it had been the sole care of the members.

Year by year the Zoo became more popular and expanded, but there was a limit to its expansion in this locality, and the Society had to consider seriously its removal. In 1909 a Royal Charter was granted and the name became The Royal Zoological Society of New South Wales, and an appeal was made to the Government for a new site worthy of the city and its people. The Government accepted the proposal and offered several sites, including Victoria Park Racecourse, one at Maroubra, and one at Ashton Park. These were carefully considered by a select committee of the Council of the Society. On this committee was Mr. A. F. Basset Hull, a name ever to be remembered by this Society. The site favoured was one near Bradley's Head, known as Ashton Park, and this was granted to the Society, but it was then found that under the constitution of the Society it could not undertake the trust of this site and gardens, it not being a registered or corporate body. Therefore a new Trust had to be formed, composed of two Government representatives and five members of the Society, and this Trust took over the planning and construction of the new Zoo site which was named Taronga, a name now famous all over the world. The grounds were completed and the animals, birds and reptiles, with plant and fixtures, transferred to the Trust, while the Society was reorganised "To promote and advance the Science of Zoology" with many other minor details; the second being "To protect, preserve and study indigenous and introduced animals of Australia."

The Trust took over the whole care of the Zoological Gardens, and for its part the Society was allowed 250 members who were entitled to the privileges of admission to the Gardens and also given tickets to take friends. The Society was also allowed the right of study at Taronga with a meeting-house and care of the Library. Thus a close

co-operation of the Society and Trust was intended, and has been kept to this day. The Society, being thus freed of the responsibility of the Zoological Gardens, undertook the popularisation of zoology, one if not the chief worker being Mr. Hull, who became the first president of the new Society in 1917, and has been the most enthusiastic supporter until last year, when he passed away, full of ideas to the last, although he was in his 83rd year. It is hoped when printing affairs become settled to issue a Memorial Number in honour of our greatest member, who was the friend of all of us.

The Society continued the publication of a periodical called the "Australian Zoologist," which had been begun a few years before, and this is still continuing, being well known now all over the world. As a means of reaching the reading public interested in zoological matters, a project of illustrated handbooks was initiated, and a fund for that purpose alone was instituted. At the present time there appears to be a demand for such, but unfortunately the matter of getting them printed is a hindrance. Nevertheless good work has been done and better will, it is hoped, in the near future.

For the purpose of interesting students personally a number of sections have been brought into being, and these are doing their jobs well, and there is evidence of a revival now that the war days are gone. One of the last efforts by Mr. Hull was the development of a Building Fund so that the Society could be housed in its own building. Mr. Hull is specially mentioned as, though this latest appeal was actually introduced by another member, as long ago as 1919 Mr. Hull, then President, appealed for subscriptions for a Central Hall of Science which he estimated to cost £20,000. This appeal did not eventuate, but later the idea was reintroduced by another Society and resulted in Science House, which has departed a little from Mr. Hull's original idea.

Now we have to look to the future without Mr. Hull's guidance, but we have his splendid example and it is hoped that his dreams may come true. What of the future? We can envisage a building wherein our meetings may be held with most conveniences such as a large meeting room, smaller committee rooms, our Library with its books properly encased with a catalogue available to all our members, with a reading room always open. It is hoped also that we may be able to publish a well illustrated popular periodical, probably in conjunction with the Trust, as well as our "Australian Zoologist," and the "Proceedings."

How can this be brought about with our present membership? It looks impossible from a glance at our Balance Sheet, but by means of an arrangement with the Trust in the future our membership becomes practically unlimited. As you know, our membership was limited to 350, and thus our resources were also limited, but now the limitation has been removed an effort will be made to increase materially our membership. As this is increased our efforts towards our optimistic aims will follow so that our future really depends upon you.

Probably our first work is to bring into order our Library. We have a large number of useful and valuable books which are available to members, and a catalogue is very necessary. Cases have been ordered so that, at least, they can be kept as befits their value.

REPORTS OF SECTIONS

AVICULTURAL SECTION.

Annual Report.

Having accepted the position of Honorary Secretary to the Avicultural Section of the R.Z.S. of New South Wales at the previous monthly meeting of the Section, my report must be somewhat cramped in consequence. However, I have to report that the attendance of members to the monthly meetings of the Avicultural Section leaves much to be desired in that direction, and is a very sad reflection on such a body as the R.Z.S. Is it that there might be more lectures from strangers to the members, or are the subjects lectured on throughout the year uninteresting, though the standard of the lectures has been of a very high order? The attendances have been most disappointing indeed, and most disheartening to the lecturer in each case. Why no interest? What is wrong, members? If we cannot find a remedy very soon there can only be one end to the Section, as sad as that may be to those of us who do attend regularly and try to keep the flag flying gaily. Perhaps if something were done by way of encouraging members to become keener observers of what is going on around them in the bird world generally, and in turn come along to the meetings and tell us all about it, and by so doing help to revive some of the dying interest and so bring new life and vigour to the Section. However, everything depends on you, the members, as to what happens early in the current year of the Section, so that our part of such a noble body as the R.Z.S. may pull its full weight in the very near future.

The Committee has in mind the matter of having printed a syllabus covering say, 10 meetings, so that members may be informed well ahead of each month's entertainment, and the subject, and so keep well informed as to what is in store for them.

During the year, members were entertained by the following gentlemen, viz.:—

Mr. A. I. Ormsby, "Snakes and Their Habits," he having brought along many live specimens.

Mr. Price Conigrave gave a most interesting and instructive lecture, "Walkabout With a Camera."

Mr. J. R. Kinghorn, of the Australian Museum, Sydney, entertained members one evening with a lecture on the "Reptiles of the South-west Pacific," which was most interesting and instructive.

Mr. R. P. Cooper, with the aid of some 50-odd photographic slides, entertained on another occasion. His subject covered the various classes of birds and water fowl, mountain birds, scrubland birds, swamp birds, lowland birds and sea birds on the islands adjacent to the mainland of Australia. The slides making up this collection as screened have been collected by Mr. Cooper from all the States of the Commonwealth, so members can readily understand why we, the regular members, are looking forward to members generally to evince a new interest in the work of the Avicultural Section of the R.Z.S. of New South Wales.

Mr. A. I. Ormsby has been appointed Publicity Officer to the Section, and he, too, looks to members to assist.

The Section regrets very much having to lose the services of Mr. J. Simons as Honorary Secretary through his having to relinquish the position owing to his work not permitting his continuance with the position; however, we are hopeful that he won't be lost to the Section altogether.

R. W. STEWART, Hon. Secretary.

BUDGERIGAR SECTION.

Annual Report.

The year ending June, 1946, has again proved a successful one for this Section, although there was a slight falling off in attendance and membership. Owing to industrial troubles meetings were not held in September and December, 1945.

Attendance at meetings.—The total attendance at the 10 meetings which were held was 120, representing an average of 12 per meeting, which is a slight decrease compared with the previous year.

New members.—New members totalled 9, as compared with 10 in the previous year; however, it was noteworthy that the majority of the new members were interested only in budgerigars and are, therefore, considered to be a greater asset to the section than those members whose interest covers all kinds of birds.

Lectures.—The following lectures were delivered during the year:

"Budgerigars"	Mr. T. McSwiggan
"Birds of Paradise"	Mr. T. Iredale
"Australian Wild Birds and Flowers" (colour films)	Mr. N. Chaffer

Mr. Chaffer's colour films of wild bird life were enthusiastically received, and our sincere thanks are due to him and to the other lecturers.

Table Shows.—Only two table shows could be held during the year. At the first show a bird exhibited by Mr. H. Yardley was considered to be the best, whilst Mr. Swinfield was the winner of the second table show, which was for young birds.

Tenth Annual Lawn Show.—The Annual Lawn Show, to which all members look forward with keen interest, was again held at the residence of Mr. and Mrs. J. Hubert Fairfax, and was opened officially by Mr. R. S. Maynard. There was an increase in the entries, i.e., 145 as compared with 123 last year, indicating a keener interest in budgerigar breeding and exhibition by fanciers. The war-time expedient of offering Savings Stamps, etc., as trophies had to be again resorted to, owing to lack of suitable trophies and lack of time in preparation for the show, due to industrial troubles previously mentioned. It is hoped, however, to offer more acceptable trophies at future Lawn Shows.

Principal interest centred in the "Elaine" Trophy, very kindly presented by Mr. J. Hubert Fairfax, to replace the "Sydney Mail" Trophy which had been won outright by Mr. H. Yardley in 1945. The conditions for the "Elaine" Trophy are similar to those for the "Sydney Mail" Trophy, excepting that it has to be won three times in succession by the one exhibitor, or four times in all—the winning bird, of course, to be bred by the exhibitor. Each year a miniature of the Trophy is to be presented to the winner. This year the winner of the Trophy was Mr. J. Swinfield, whose young grey cock-bird was considered to be the best bird in the Show, and automatically the best in the young bird classes. The best budgerigar in the open classes (for which the "Elaine" Trophy winner is not eligible) was Mr. H. Yardley's yellow cock-bird.

The Section is again greatly indebted to Mr. and Mrs. J. Hubert Fairfax for once more allowing the Section to have the use of their home for this Show, and thus present it amidst beautiful surroundings; also to Mrs. Fairfax for providing refreshments for exhibitors and visitors.

The Section is grateful, indeed, to Mr. E. J. Hallstrom for his very generous offer of a yearly Trophy of £25 for the Lawn Show. This amount will be awarded as follows:

- £10 for the winner of the "Elaine" Trophy.
- £10 for the Best Young Bird.
- £2/10/- for Best Old Bird (winner of "Elaine" trophy not eligible).
- £2/10/- for runner-up to Best Young Bird.

Our thanks are due to Mr. Hallstrom; it is felt that this magnificent offer will give breeders and exhibitors something to strive for.

The Section is once more grateful to Messrs. Murray, Scheers and Maher (Judge) for their able assistance in connection with the Annual Show.

E. H. HERNFIELD, Hon. Secretary.

MARINE ZOOLOGICAL SECTION.

Annual Report.

The year just ended has proved a very successful and enthusiastic one for the Section generally, increased interest in the snake and lizard field being most marked, and it is hoped to widen the activities of this group in the coming year. Not only has the membership increased considerably, but the popularity of the lectures with the general public has been most apparent as evidenced by the large number of visitors attending each meeting.

The opportunity is here taken of extending a hearty welcome to all new members and old members lately returned from active service.

Many interesting lectures of an entertaining and educational nature were delivered, and our thanks and appreciation are due to those good folk who have given us of their time and knowledge in this respect.

Each meeting has produced its quota of interesting specimens, mostly N.S.W. shells, but snakes, lizards and spiders have also been well in evidence.

We have also been fortunate in raising the necessary funds to purchase the shell cabinet referred to in the last Annual Report. Some very fine specimens have already been contributed by members, and judging by the enthusiasm displayed, which has necessitated the holding of monthly, instead of bi-monthly conchology meetings as anticipated, in order to label and classify the contributions, the next 12 months should see the cabinet well stocked. It is hoped that during the coming year it will be possible to purchase a glass show-case in which to exhibit the more colourful and spectacular of our specimens, and a subscription list has now been opened for this purpose.

The only disappointing feature of the year's activities was the very poor attendances at the few field days that were arranged. However, it is hoped that the cessation of hostilities and a return to more normal living will give fresh stimulus to this phase of the Section's activities.

The following is a list of the lectures given throughout the year:—

1945.—

2nd July.—“Life in the Mangrove Swamps,” Mr. Anthony Musgrave.

6th August.—“Snake Stories and Superstitions,” Miss Ella McFadyen.

3rd September.—“Deep Sea Diving,” Mr. E. Hellings.

2nd October.—“Life of the Antarctic,” Mr. C. F. Laseron.

6th November.—“Rare Shells of N.S.W.,” Mr. T. Iredale.

10th December.—“Marine Pests in Sydney Harbour,” Mr. R. A. Johnson.

1946.—

4th February.—“Marine Life in Captivity,” Mr. Camp.

4th March.—“Miles Away from the Sea,” Mr. Mel. Ward.

1st April.—“Shell Fish Without Shells,” Miss Joyce Allan.

6th May.—“Ice Ages,” Mr. Oliver Chalmers.

3rd June.—“Australian Snakes in Captivity,” Mr. A. I. Ormsby.

WINIFRED CROFTS, Hon. Secretary.

ORNITHOLOGICAL SECTION.

Annual Report.

Although nothing of any exceptional nature can be included in a review of the Section's activities, it is pleasing to be able to report continued interest, improved attendance and keen discussion during the year. With one exception—the December meeting having had to be dispensed with owing to the lighting restrictions at that time—regular monthly meetings were held during the 12 months.

The following is a summary of lectures, etc., delivered:—

1945.—

- 20th July.—General discussion: Subject, "Robins."
- 17th August.—"Bits about Bikes, Buggies and Birds," Mr. Jack Jones.
- 21st September.—"Birds of Paradise," Mr. Tom Iredale.
- 19th October.—"Life in the Ramu and Markham Valleys, New Guinea," Major H. Burgh.
- 16th November.—Screening of Bird Films, Mr. Noel Griffiths, Rural Bank.

1946.—

- 18th January.—Film Slides of Three R.A.O.U. "Camp-outs," Mr. Norman Chaffer.
- 15th February.—"In Quest of Birds," Mr. Roy P. Cooper.
- 15th March.—Screening of Bird Films in Colour, Mr. Norman Chaffer.
- 26th April.—"Activities of the Australian Museum," Mr. J. R. Kinghorn.
- 17th May.—General Discussion. "Thornbills and Allied Species."
- 21st June.—Annual Meeting; "Bird Protection and Public Education," Mr. J. E. Roberts.

The quality of the films and educational value of the lectures and discussions as shown above, were of high standard and listened to with eagerness by the members. The thanks of the Section are hereby recorded to all those who assisted towards that success.

The average attendance for the year was 35, an encouraging increase over previous figures. The attendance of 72 at the March meeting was the highest recorded at any meeting for over 10 years, and taxed the seating capacity of the lecture room.

Only one organised field-outing was held. A full day to Upper National Park on November 4, when nine members enjoyed a nice day and several ornithological records of interest were made. Although the attendance was somewhat discouraging, an attempt is to be made during the next 12 months to organise further outings to interesting centres, and the details of these are included on the syllabus for 1946-1947. However, until field-glasses can be readily obtained by most of the members the best results from such organised outings can hardly be expected, for correct identification and the real value derived from field-study makes the use of binoculars almost a necessity.

Visitors were present at most meetings and amongst those to whom the chairman extended words of welcome were the following: Dr. Frank Marshall (President. R.Z.S.), Dr. Baht (India), Capt. Sanderson, Lieut. Bitton (R.N.V.R.), Mr. Frank Cope (member of British Trust for Ornithology) and Mr. G. H. Barker (Qld. Branch Sec., R.A.O.U.). A number of members who were active in the armed forces for some years have now returned and been gladly welcomed back to membership. It is encouraging that their enthusiasm has been maintained during their extended absence with the services.

Educational articles and photographs of interest have been compiled by some of our members and published in "The Emu," "Wild Life," and other journals during the year. These describe aspects of field-study carried out by individuals. A visit was made by a few

members to Melbourne for the Annual R.A.O.U. Conference; a small party went to the Barrington Tops; and another to the Five Islands during the past 12 months; there were, as well, individual holiday trips to interesting localities.

Mr. K. A. Hindwood was elected for a further term as President of the Royal Australasian Ornithologists' Union, an honour received enthusiastically by his many friends in the Section. After successfully fulfilling the office of chairman for two years, Mr. J. E. Roberts relinquished the position at the annual meeting and Mr. Roy Cooper, vice-chairman during that time, was elected to senior office.

During the year, support was given to Canterbury Council in its attempt to create an island sanctuary for bird-life in Cook's River, but the matter was finally deemed as impracticable by the engineers. The Council, however, gave its whole-hearted support towards the protection and fostering of bird-life within the areas under its jurisdiction.

The following were elected officers for 1946-1947:—

Chairman: Roy P. Cooper.

Vice-chairman: W. R. Moore.

Secretary: A. R. McGill.

Assistant Secretary: J. A. Keast.

Committee: N. Chaffer, R. Gannon and J. Waterhouse.

ARNOLD R. MCGILL, Hon. Secretary.

SYLLABUS OF SECTIONAL MEETINGS, 1946-47.

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).

1946.—

September 9.
October 14.
November 11.
December 9.

Owing to conditions over which we have no control, no set Syllabus has been drawn up for 1946-47, but speakers' names will be published in the "Poultry, Birds, etc.," column of "The Sydney Morning Herald" on the Saturday previous to the meeting night.

1947.—

January 13.
February 10.
March 10.
April 14.
May 12.

June 9.—Annual Meeting and Members' Night.

BUDGERIGAR SECTION (Third Tuesday in the Month.)

1946.—

September 17.—General business. Discussion of Annual Lawn Show.
October 15.—Mr. G. Longley—"Snakes and Lizards."
November 19.—Table Show: Young Birds.
December 17.—Mr. C. W. Camp—"New Guinea Birds."

1947.—

January 21.—Mr. E. J. Hallstrom—"Black Cockatoos and Macaws."
February 18.—General Business. Final arrangements for Annual Lawn Show.

March 18.—Mr. C. G. Gostelow: Films—"Barrier Reef."

April 15.—Mr. R. Cooper: Slides—"Australian Birds."

May 20.—Mr. N. Chaffer: Colour films—"Australian Birds."

June 17.—Annual Meeting. Mr. T. Iredale—"Birds of Paradise."

MARINE ZOOLOGICAL SECTION (First Monday in the Month).

1946.—

September 2.
October 7.

November 4.—Mr. G. P. Whitley—"Fisheries Research in Western Australia."

December 2.

1947.—

January 6.
February 3.
March 3.

Subject matter of lecture will be advertised in "The Sydney Morning Herald" on the Saturday preceding the meeting.

April 8. (Tuesday).

May 5.

June 2. Annual Meeting.

Special study nights for the Conchology Group are arranged as desired by members, mostly the second Monday in alternate months.

ORNITHOLOGICAL SECTION (Third Friday in the Month).

1946.—

September 20.—"Some Birds of the Sydney District," by K. A. Hindwood.

October 18.—Bird Films, screened by Mr. Noel Griffiths, Rural Bank.

November 15.—"Antarctic Birds," by Mr. C. F. Laseron.

December 20.—"Some Birds of the Pacific Islands," by A. S. Le Souef.

1947.—

January 17.—"Birds of Lord Howe Island," by Tom Iredale.

February 21.—"Experiences Amongst Birds in the Middle East," by Jack Waterhouse.

March 21.—Bird Films in Colour, screened by Norman Chaffer.

April 18.—"New Britain and its Bird-life," by J. Allen Keast.

May 16.—"Some Unsolved Problems," by Major H. Burgh.

June 20.—Annual Meeting: Chairman's Address, by Roy P. Cooper.

1946.—

Ornithological Outings.

September 8.—Cronulla-Marley. Leader: A. Acworth.

November 10.—Nepean River. Leader: H. Burgh.

1947.—

February 2.—Lion Island. Leader: A. Keast.

April 6.—Heathcote-Waterfall. Leader: G. Gadsden.



The late A. F. Basset Hull

—Freeman & Co., photo

A. F. BASSET HULL.

The Years of Nestor.

It was usual among the Greeks and the Latins, when they wished a long and happy life to their friends, to wish them to see the years of Nestor. The passing on September 22, 1945, of Mr. Arthur Francis Basset Hull, our secretary, was a grave blow to our Society, for, like Nestor of old, with whom he had been compared, Hull "distinguished himself by eloquence, address, wisdom, justice, and uncommon prudence of mind."

Many of us used to say that Hull was the Royal Zoological Society, so great were his labours in its interest. He had built it up in prestige and membership, and probably in other ways known only to himself, so that in 40 years' association he knew almost every member personally and none disputed his presiding over the Society's destinies. So much the more, then, do we miss our versatile, silver-haired secretary in dapper grey suit, seated behind the sheaf of correspondence at his table. Crisp in his manner yet courteous withal, Hull was never too busy to weigh a problem, to share a joke, or shed some light from his vast experience on any matter under debate. For almost a quarter of a century he graced the office of secretary and he was the best of all editors. Mr. Hull was elected President of our Society from 1917 to 1919 and, appropriately, in our jubilee years 1928/9 and 1938/9, and he was also a Fellow. The Royal Zoological Society intends to issue later a special Hull Memorial Volume in honour of its doyen; meantime, for the sake of record, a few notes on the life of our late friend are set down here.

The late Arthur Francis Basset Hull was born at Hobart on October 10, 1862, and educated at the High School there. He chose a legal career and was admitted Barrister-at-Law in Tasmania. Later, he came to New South Wales and was employed in the Postal Service, when doubtless he laid the foundations of his unrivalled knowledge of postage stamps and fiscals. From 1903 to 1921, he was clerk in charge of legal matters in the Department of Mines, Sydney. His interest in natural history was primarily that of a collector, but broadened later to include many aspects of zoology and fauna conservation. His activities in circles outside the scope of zoology were too many to enumerate.

He was world-famous as a philatelist, having written the standard text-books on early Australian stamps. All his work was literally **written**, in courtly penmanship, and composed clearly and fluently so that few, if any, alterations had to be made. No typewriters and card-indexes could replace his methodical memory and skill. Hull was an able Latin scholar, as befitted a barrister of repute, but he was also a numismatist, the author of a book of verse, and, in his younger days, a chorister. He served on the councils of several learned societies and was for many years a Trustee of the beautiful Taronga Zoological Gardens and Ashton Park. Mr. Hull's work for the Royal Zoological Society speaks for itself in every phase of its varied activities. He was also President of the Royal Australasian Ornithologists' Union in 1919 and 1920. President of the Linnean Society of New South Wales in 1925, a Corresponding Member of the Academy of Natural Sciences, Philadelphia, a Fellow of the American Ornithologists' Union and Honorary Ornithologist of The Australian Museum. Of all his honours, he treasured most the M.B.E.

Not only was he the peer of his colleagues in ornithology and conchology, but the counsellor and friend of the most junior naturalists who, to the last, found him up-to-date and alert, instead of tedious or dated as might have been expected from his years.

Hull confessed to being an "omnivorous collector" and visitors to "The Eyrie," overlooking Manly, would be shown his stamps, birds' eggs, mounted skins, land and marine shells, books, portraits, medals, coins or any other things of mutual interest. Philately, ornithology and conchology were his recreations from law, real estate, mining, or other business, and he illumined them with his love and application. But

Basset Hull was no "fossil," and we never considered him an old man. His close friend and colleague, Tom Iredale, has well said, "He died young in his 83rd year."

The after-effects of rheumatic fever in his boyhood caused Mr. Hull to rely on a stick when walking, but this did not prevent him from pluckily undertaking what must have been very exhausting field work. Thus, he landed on the slippery granite islets of the Recherche Archipelago through the treacherous seas of that part of Western Australia; he hobbled over the coral reefs and rocks of Queensland, Lord Howe and Norfolk Islands, and New Caledonia in search of his specialty, the Loricata molluscs or "chitons" which he monographed with Iredale. His first interest in these animals had been aroused one day, 40 years ago, when he was amazed to find 14 species in a single rockpool at Freshwater, New South Wales. In later years, his beautifully mounted and labelled collection of Loricates was famed throughout the world of conchology, and a duplicate set formed the basis of the Australian Museum's collection of those shells. He was very interested in the breeding-places of rare sea birds, landing on various islands off the eastern Australian coastline to seek their nests. He also collected specimens in many parts of his native Tasmania, visiting some places which even to-day are not easy of access.

Several species of animals and at least one genus (*Bassetina*) were named in his honour. So far there is no *Hullia* or *Hulliornis*, but it is anticipated that such generic names will be erected out of respect to him and his zoological work.

Basset Hull was the Royal Zoological Society and we feel that he will always be an integral part of it, as, confidently facing the future, our Society cherishes the memory of one who spent his years of Nestor so faithfully and well.

—G.P.W.

SIDNEY W. JACKSON.

One of the most remarkable personalities connected with Australian natural history has passed away. He had been a Life Associate Member of this Society for many years and, although his name is not so well known to-day as in former years, yet it deserves honour. He first became well-known about 40 years ago as the owner of a large egg collection and, when this was purchased by H. L. White, Jackson accompanied the collection as keeper and remained so until White's death. The collection passed to the National Museum of Victoria, and everyone referring to it must admire the great patience taken by Jackson in labelling every specimen in beautiful copperplate handwriting. But as a collector he was probably unique in Australia's history as, interested originally in birds'-nesting, he took notice of everything in the bush and accumulated specimens in every group. He became especially interested in land mollusca and his collection of these, which is also in the National Museum, Melbourne, would be an excellent memorial without his other collections. His contemporaries were amused at his personal vanity in labelling his collections, but truly they were worthy of vanity, and will be praised when his failing is long forgotten. He contributed an account of his career to Gregory Mathews who published it, abbreviated, in the "Austral Avian Record" (v., p.110, 1927), from which it may be noted that Jackson was born in Brisbane, June 12, 1873, so that he had passed his 73rd milestone when he died in Sydney on September 30, 1946. He was a pioneer nature photographer in Australia, whose excellent pictures still bear comparison with modern work. A full obituary notice is to appear in **The Emu**.

—T.I.

AERIAL OBSERVATIONS ON FISH SCHOOLS.

By Gilbert P. Whitley.

Mr. Stanley Fowler, Senior Research Officer of the C.S.I.R. Division of Fisheries, who has done a great deal of aerial reconnaissance for fish schools in Australia in the last 10 years, invited me to accompany him on a flight from Perth to the western shores of the Great Australian Bight and elsewhere in Western Australia to see the large congregations of fish which he had observed on May 20, 1945. I deeply appreciated the privilege afforded me when Mr. Fowler arranged with the R.A.A.F. for me to fly with him as an extra civilian passenger. The flight was expected to last from three days to a week, and took from Wednesday, May 30, to June 5, 1945, inclusive, the route being Perth, Albany, Busselton and Naturaliste Reefs, Albany, Esperance, Cape Arid, Esperance, Western Bight, Esperance, Perth.

The aircraft crew consisted of three R.A.A.F. men who later worked in conjunction with us in north-western Australia, viz.: Flight-Lieutenant Geoffrey H. Ellis (pilot), Warrant Officer W. J. Blomeley (signals), and Corporal L. G. Matthews (fitter).

We left Perth for Guildford at 10 a.m. on Wednesday, May 30, and were airborne at 1120 hours in a R.A.A.F. Anson aircraft. We flew at about 2,400 feet over the Darling Ranges at about 100 air knots (about 115 m.p.h.). After some time, we did not know to within 20 miles or so, where we were, as the countryside was so featureless, but we made for a siding near a racecourse. There, by banking at a steep angle, we read the station name "Moulyinning," some miles due east of Wagin, from which we plotted a fresh course, intending to make for Esperance. By 1305 hours, we came to Lake Grace, a huge expanse of salt lake country, with its causeways fine as a spiderweb from our height. Then we reached timbered or vegetated country which stretched away to a blue hazy horizon to meet the low grey clouds. We flew through a fine drizzle for many miles over utter wilderness. Banking from side to side trying to see, below the murk, some recognizable feature in the featureless landscape, we eventually came out somewhere near Ravensthorpe. The weather was thickening, thick cloud was down to ground level, and we were not quite sure of our position so decided to dodge the gathering rain-clouds and at 1405 hours identified Pingrup Station and, instead of going on to Esperance, changed course for Albany. We could only carry enough petrol to keep us flying little more than four hours or 400 miles or so, therefore we could not "stooge around" indefinitely, but had to time things to find an airstrip ready for the journey's end. There is no aerodrome between Albany and Esperance. The distant shapes of the Stirling Ranges loomed up and a rainbow over the port wing kept us company as we flew along. 1435 hours: big lakes towards bases of the Stirling Mountains, the latter very old eroded domes, of which Mr. Fowler took some photos. Results of bushfires were notable. Next Limestone Head appeared in the distance, then Many Peaks, Oyster and Princess Royal Harbours and other well-known Albany landmarks.

We flew over the sea off Limestone Head, covering in a few minutes as much seaway as would take hours in a boat. I saw what seemed about 60 gannets dispersed over the water, but Mr. Fowler estimated there were 40 in the flock. Our altitude was about 500 feet and schools of fish could be clearly seen coming to the surface away from our banking aeroplane. About 20 schools appeared near one islet, some schools equal in area to the islet (Seal Rock)* itself. Other schools of fish were sounding.

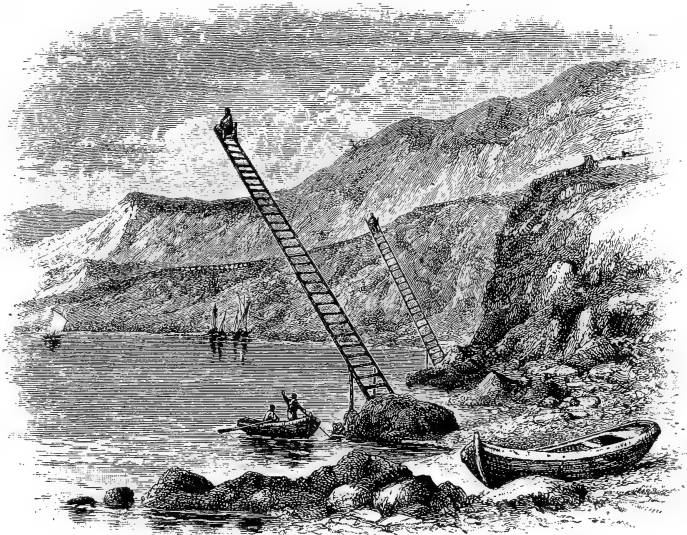
Eighty gannets formed another concentration in King George's Sound. Some of the birds could be clearly seen to be diving and emerging from the water. Michaelmas Island with its great rocks and lighthouse, recalled by earlier sharp-fishing experiments thereabouts.

*The area of Seal Island, King George's Sound, is approximately five acres, calculated from air photographs, according to the Department of Lands and Surveys, Perth, W.A.

Then we returned to Albany, very picturesque from the air, nestling between the two rounded mounts, and at 1535 hours landed on the aerodrome inland. Refuelled, then off again into a south-east wind whose speed was estimated at some 12 to 15 knots and which was bringing up the "white horses" and the rain. Two groups of birds were sitting on the water, 80 and 200 strong respectively, near Seal Rock, while others were flying, skimming over the sea. All appeared to be gannets. The sea was a leaden blue in the late, dull afternoon, as we flew over Michaelmas and Breaksea Islands. Schools of fish, considered by Mr. Fowler to be mackerel, were still about the island (Seal Rock) where seen before and the disturbed birds were flying. All the gannets were white, none in the brownish immature plumage. From an altitude of 200 feet, individual fishes, extremely numerous, in the schools, could be seen shirring the surface in several directions as they plunged along.

We flew back over the red roofs and drizzled streets of Albany, to land by 1645. At the aerodrome, no wind was perceptible. It is noteworthy that it most likely would be from an aerodrome that weather prospects would be issued, certainly not from out at sea, where conditions may be very different, as we had seen to-day. Therefore, weather forecasts may not accurately reflect conditions for observing schools of fishes out to sea. A new perspective is opened up by low-level flying, a new field in ornithology and general natural history, whereby numbers of birds and quantities of fish may be assessed in relation to area of land, extent of coastline or volume of water; furthermore, the state of sandbanks, closure of bars to the rivers and estuaries and other topographical features of importance to fisheries can be quickly assessed.

It would be interesting to compare the scope of vision of, say (1) a white man walking along a beach and seeing a few fish in the surf; (2) an aborigine similarly placed and seeing more with his sharp eyes and wild experience; (3) a man on horseback, who can see fish much clearer than one at the water's edge; (4) a man at the masthead of a boat; (5) a tern or gannet "spotting" from its flight so many feet over the water; (6) a person in an aircraft (aeroplane, helicopter or balloon) at moderate heights. In Mediterranean countries they had



The first "aerial observers": men on ladders "spotting" tunny schools in the Bay of Preluca.

—From G. L. Faber, Fisheries of the Adriatic, 1883.

Off Sicily, fishermen snooze in the sun while a prototype of the modern "aerial spotter," 60 feet or more above, keeps a lookout for the fins of swordfish.

—After E. W. Gudger.



ladders elevating "fish spotters" many feet in the air over cliffs, and in Queensland and New South Wales, shoals are still first descried from cliff-tops, but it is only in the last quarter of a century that aerial spotting has been proven to be of worth in Tunis, Europe, Russia, America, Australia, Japan, etc. Off the Sydney metropolitan bathing beaches, aerial patrols have done excellent work in watching for sharks.† Yet weather and visibility might conspire against success and many attempts might have to be made before favourable results from any one locality were forthcoming.

Early on Thursday, May 31, we swung the aircraft around in a circle on the ground and checked the compasses. At 0823 we were airborne and in five minutes were about 400 feet over Middleton Beach. Seventeen gannets were seen flying, then others, but an exact count was impracticable from where I was sitting, as the aircraft's wings obscured some of the scene and a bank or turn might screen half the world from view. I could see reefs and sandy bottom between Seal Rock and Breaksea Island, about ten fathoms below the surface.

How it thrilled me to fly over the neck of land behind the razor-back leading to Bald Head. Darwin, Vancouver, and other famous men had **walked** over this district, but none of them—and probably no other civilian at any time—had seen it as I did now!

How interesting to see Salmon Holes Beach and Vancouver Rocks, scenes of my earlier fisheries work under uncomfortable conditions, without being seasick. Here was a terrible, rocky coastline with surging surf and swell, but, as yet, no "white horses." We flew to Eclipse

†On December 22, 1928, for the first time in history, an airman was employed to keep a lookout for sharks at the Dee Why (New South Wales) surf carnival. No sharks were seen that day. A week before, however, another airman was able to warn surfers at Narrabeen of the presence of sharks. A policeman is said to have reprimanded him for having flown too low over bathers, but on being taken up and shown the sharks, withdrew the charge.

Some reports on the Shark Patrol appeared in "Sydney Morning Herald," May 6, 1936, and in Whitley, "Fishes of Australia," 1940.

Island in a few minutes; on my last visit here I was sick ten times between mainland and island, and the voyage took a long day. There were four gulls in a cave on the west end, but no seals could be seen, though we banked steeply and I recognised many landmarks. Of course, the ti-tree and scrub concealed any petrels which may have been there. One or two more gulls rose up and there was a very heavy swell and surf on the weather side. Conditions were unsuitable for observing surface schools of fish, if such were there. Vancouver Rocks were awash.

The wind appeared to be freshening from the south-east and the bows of a steamer leaving Albany dipped and plunged for many feet into the rough sea. The black wingspread and white body of an albatross were discernible.

We flew due south, miles out to sea at about 750 feet. Low, grey rainclouds partially masked the dimming land and the swell increased, forming long striations on the ocean, white-capped waves becoming more numerous. Two vivid streaks of silvery-steel water marked where the sun struck the sea ahead. Below, the big waves rolled majestically. At about 20 miles from shore, we turned and ascended to 1,800 feet, spiralling into clouds and sunshine like some fantastic yellow vulture; then, with screaming engines, descended to a homeward course, bumping through clouds and rain. No visible marine life. Back thus to King George's Sound, over the streaked granite of Bald Head, westward along the coast, past awful precipices and headlands, overland to Frenchman's Bay and back to Albany at 0945. But the rainclouds were too thick and low for us to see the aerodrome, so off we went on another "flip" over the west end of Princess Royal Harbour, across a long sandy ocean beach with a broad lacerity of heavy surf. Here were cleft headlands and the wild rockery of the rarely-flown-over south-western coastline. The weather having made our proposed trip to Esperance impracticable we decided to go west instead. Some clouds were lower than the frowning cliffs, and surf spouted up in plumes many feet in height.

In a bay, probably Torbay, schools of fish were seen and over them were circling the dark and light forms of the albatrosses. In one area was a school of "porpoises" breaching and spouting. Further on, a mob of white birds (gannets) was sitting on the water. Next, another group of 21 birds. Port Hillier loomed up in front, lagoons appeared inland. Past the point were albatrosses, which flapped their wings a good deal. Schools of fish were visible in many places shadowing and dappling the water all around us. We were nearing Point Irwin. I had to hold on to, or take off my glasses when peering out of the open window because of the strong slipstream. Curiously enough, I had little or no fear of height, although amongst mountains, for example, I would be quite incapable of looking over such an awful drop. In the sunshine, the schools of fish shimmered the sea-surface, silvery and live. Terns flapped around, too. I took half a tablet of lycosine to counteract squalmishness.

Over Saddle Island, off Nornalup, we flew low to see mutton-bird burrows in the sandy soil. Because the presence of various sea-birds is linked with fish occurrences, observations such as this are part of a sustained search during fishery flights. Such noise, such colour, such excitement! This was truly a "conducted tour," for we flew wherever we wished, to see all we wanted. It was 10.36 o'clock. No birds or fish schools were then visible (the former being almost an infallible index of the latter). But there were a few terns off the next headland.

The pungent scent of the eucalypt forest was very strongly wafted into our noses, even at 500 feet elevation. A wrecked ship (hardly more than fore-castle and bowsprit) lay on a sandy beach. We circled around it and Mr. Fowler photographed it, also a large barren island (Chatham Island). The circling and banking brought on squalmishness again, with dire results. Five gannets appeared. Then about 200 albatrosses, sitting on the water. The birds were a good indicator, for next we saw more schools of fish. One very big school was breaking water, splashing in various directions, and attended by birds. Here,

however, I was airsick, off West Cliff Point and the adjacent beaches. The number of schools of fish was uncountable and there were large and small schools in the area about us. Our altitude varied from 200 to 300 feet, so that even the "small" schools might have been large from a closer view. Long experience and testing would probably be necessary before one could assess quantities accurately, but there could be no doubting the magnitude of the fish occurrence. Using a cumbersome, cannon-like aerial camera, Mr. Fowler photographed some shoals shimmering in the path of sunlit waters. Hundreds of shoals appeared around and from their disturbance, consisted of fair-sized fish. But the evolutions and manoeuvring necessary to see them made me sick again. In contrast to my emptiness, one albatross appeared to be too fat and full to rise from the water. The grey shapes of the fish themselves were visible in a school, equal in area to, or perhaps rather bigger than, the shadow of our aircraft, which, being about 19 by 14 yards, gave some standard of measurement.

So, westward ho, past numerous low sandy islets, reefy shallows, and a mainland eaten away by the Southern Ocean, where a heavy swell still rolled. Around Point D'Entrecasteaux, more birds, clear sunny weather. Eighteen more white birds on the water. Fourteen more gannets. Schools of fish may have been nearby but were not visible until we went well out to sea off the south-western coastline towards the Alouarn Islands. We flew over these, most of them being bald rocks. Then past the lighthouse at the Leeuwin and the great surf and large vegetated islands nearby, and Cathedral Rock. It was noon. No birds or fish were visible just here; inland, a vast plateau. The hyoscine was taking effect now and I felt more calm and settled. We passed the Margaret River, apparently closed by a sandy bar. When we approached Yallingup from the south west and west, schools of fish were again evident, some of them very big and crescent-shaped, the convex side generally shoreward, this shape of the schools perhaps due to the fish being chased by enemies. Two albatrosses flew about, probably unable to see very far as they seemed to be missing the fish, plentiful as these were. With his Leica camera, Mr. Fowler photographed many clear and dark schools west to north-west of Yallingup. A few more albatrosses seen. The sea was plentifully blotched with shoals up to Cape Naturaliste, over the tip of which (a sloping sandhill with stones at the base) we flew. Clear shallow water lay immediately to the north of the Cape, over which wheeled the spokes of the spent surf, but the schools of fish remained in the Indian Ocean water. To save time and petrol, we flew straight to Busselton over the bluish-green shallows and darker reefs over which I had tried for sharks before. Some further schools of fish appeared again just south and west of Busselton, where we landed at 1255 hours.

On refuelling our aircraft and ourselves, we took the C.O. out to sea at 1410 and saw the schools again, passing tide-rips and calm "slicks," and skimming Cape Naturaliste once more to see the many schools off Yallingup. In addition to the usual gannets and terns and albatrosses, a large brown bird like a Skua or Nelly flew past. At 1445 we were over the wicked Naturaliste Reefs, awash under heavy surf. Earlier this year it had taken me four empty days and nights to go from Bunbury to these reefs and back. This afternoon we also flew to opposite the south end of Lake Clifton, had a good look at Bunbury, in whose previously long dry game reserve there was now water enough for ducks, and at 1540 landed at Busselton. One and a half hours to cover what had once involved me in weeks of sea-journeying!

Next day, Friday, June 1, we were airborne at 0740 from Busselton. Very calm sea. Sunny. Many "small" schools of fish were spotted immediately after leaving the jetty and a few small white birds were flying low. Then no fish or birds were observed until after passing Cape Naturaliste. The Indian Ocean was a dull leaden blue with a sort of matt surface. The Yallingup schools of yesterday, if here still, were not visible. Six birds were sitting on the waters, others flying: these were albatrosses evidently waiting for the fishes to rise. We skirted the coastline at 0815 and saw the patches of green grass which

had been planted on sandhills to curb erosion. We flew low over the waves: 0 feet according to the barometric altimeter and a loud "peep peep" persistently warned us, above the engines' roar, that our under-carriage was still retracted. Practically no seaweed or jetsam was seen on the beaches. At 0825 we saw Hamelin Island and a burnt-down jetty nearby. At 0830, we were over the Leeuwin and, once round the corner, seaweed was noticed strewn along the beaches. Past the bar of the great Blackwood River, the water of the Southern Ocean was roughened by about a 12-knot wind. A long surf-beach extended and from 600 ft. I noted five dark birds and some white birds circling over the water; four gannets were seen. We flew along the enormous surf-beach, which doesn't seem to have a name but which may well be a tourist attraction in the future or form an emergency landing-ground. The Warren River poured brown, peaty-looking water into the surf. The prevailing wind had drifted sand over the hillsides and barred the Meelup River. A large number of albatrosses was waiting for fish. At 0910 we were at Point d'Entrecasteaux and flew low over an island just off the point to see the mutton bird burrows thereon. Gulls and two black oystercatchers flew up as Mr. Fowler photographed the island. On another nearby island about one thousand terns flew off. A third island had large mutton-bird holes very distinct in clear areas amongst the vegetation and gulls flying over or standing on the beach, every bird being clearly visible.

At 0935, circlets of white foam resolved themselves into the playgrounds of two whales, probably hump-backs, splashing and spouting. The tail of one or the other would protrude from the water and wave or wag several times before splashing under again, and a white margin to the flukes was visible from the dorsal surface; or the whale sometimes fell right over backwards. Truly, a wonderful sight to see such bulky objects just sporting around.

Again we encountered the wreck on a beach well outside Nornalup and I noted the tide was higher around it to-day. Then we saw a school of 25 to 30 "porpoises" in the surf alongside, all headed west, their graceful forms rising and falling or turning over sufficiently to show their light ventral surfaces. The aircraft had to be skilfully manoeuvred in huge circles to get them in range for eye, camera and cinema. A sudden, sickening dip of our wing and snap! they're taken!

We passed the rugged coast and islets off Irwin's Inlet at 1010 hours, cloud increasing; no schools of fish seen. We worked out to sea through grey low clouds then back to near Wilson's Inlet. Knapp Head had been scorched bare by old bush fires. The rain and clouds thickened, visibility was poor indeed, and we landed at Albany at 1111 hours.

Fisheries Inspector J. E. Munro said there were thousands of mackerel being caught there then, and that the true pilchard (i.e., *Sardinops neopilchardus*) had been off Albany since February.

On Saturday, June 2, we were airborne from Albany at 0743. Mists hung in the valleys. By Middleton Beach, the sea was calm, and we flew over Seal Rock and the razorback behind Bald Head. There was a big surf and the wind had evidently a different direction and force from that in the more sheltered King George's Sound. Some gannets and terns were seen at Bald Head. Taylor Inlet was barred. The "stern and wild" scenery was indescribable; pale sunshine, mountains, creeks and sea, headlands and islands with mists and clouds. There were two boats at Two People Bay and the sight of only two boats was notable when there were no boats, no people, over so many hundreds of miles. We soon left them behind, as was also soon passed a brilliant double rainbow on the starboard wingtip. In a corner of a little cove next to Cheyne Beach, a school of "salmon" or kahawai (*Arripis trutta*) was milling around and in their midst, very plain, were two large sharks, apparently grey nurses (*Carcharias arenarius*). As the aircraft manoeuvred a few miles around for a second look, great schools of other salmon were clearly seen streaking through the breakers of Cheyne Beach, and a whale was sighted offshore. The schools of salmon were never still and changed their outlines every moment: slipper-



A school of Kahawai being attacked by sharks, Cheyne Beach, W. Australia

Aerial photo by S. Fowler, Fisheries Division, C.S. & I.R.

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shaped, oval, or lens-shaped, the clusters of big fish were scattered over considerable areas. Whilst individual fish were visible, they were uncountable as, moving all the time, they covered such areas and were in so many layers of depth that "hundreds of thousands" of fish was the only estimate that could, weakly, be made. At one time, I noted that the salmon milled in an anti-clockwise direction and over them flew gulls worried by our aircraft. I roughly estimated at least 50,000 fish in the smallest of the schools seen. On returning to the cove, it seemed as if the two sharks were systematically halving and quartering the salmon school, but this was apparently a fortuitous arrangement. As the sharks slowly scythed their passage through the mass of fish, the salmon left a clear area of water around each shark and reunited when it had passed, slowly, sculling its tail from side to side and with the extensive pectorals held out as flat planes. A third shark, in the breakers, was approaching the feast. Not always did the salmon move anti-clockwise, and sometimes they dispersed radially. An occasional large shark or porpoise was seen along Cheyne Beach, but Mr. Fowler said sharks were not nearly so common here as in south-eastern Australia, a factor which might explain the negligible number of shark tragedies in Western Australia. We saw six sharks to-day. One, in a school of salmon, was making repeated savage snaps and rushes at the fish.

We flew at about 50 feet over the sea and saw schools of mackerel offshore. Two large brown birds and gannets were seen at the north end of Cheyne Beach. Seals scampered like bears on Haul-off Rock, some had buffy-coloured chests.

Hundreds of Black Swans, their white feathers glistening, flapped up from a great lake beyond Cape Riche. At 0935 we approached Roe Rocks, really three islets. On top of the biggest island were two large male hair seals with corn-yellowish manes. How did they climb the precipitous sides of their plateau? At 0940 we saw more salmon schools, appearing rather like giant submarine smoke-rings, over the beaches of Bremer Bay. The bar of the big estuary was closed. We flew over a peninsula and Doubtful Island—then a very long sandy beach with barred estuary and rivers. Out at sea were more schools of mackerel and a school of porpoises.

Pale brown seals were above and on the sides of an island from which hundreds of gulls flew up. Culham Inlet was barred. Reefs around Hopetoun looked as if they should support plenty of crayfish. A great school of salmon was seen some six miles east of Hopetoun near the barred Jerdacuttup Lakes. At 1035, at a place called the Twelve Mile, another big salmon school darkened the water. Now the sandy beach was spoilt by the intrusion of exposed rock-ridges which would tear any seine-net; hitherto beaches had mainly been sandy. At 1040 we were abreast of the westernmost islands of the Recherche Archipelago and we visited Figure of Eight and several other islands before landing behind the pink and blue lakes inland from Esperance at 1130.

At 1255 we were aloft again, over Caitup, flying due east over salt lakes and extensive plains. Westward of Cape Arid Mr. Fowler saw a young gannet. Five brumbies loped conspicuously over an extensive drift of sand inland. In Sandy Bight at 1340 it was decided that weather conditions were not suitable for observations so we turned back after examining several flat islands to see mutton-bird burrows. No mutton birds were seen. One island had about thirty seals on it, of various sizes, with buffy chests and light brown bodies (rich brown in some, grey in others)—and two black oyster-catchers. At Middle Island, we flew over a large carmine-coloured lake and saw on a neighbouring beach the bows of the "Penguin" wreck. Thanks to hyoscine, taken in time, I felt no squalmishness to-day. More seals were observed on other small islands—and what a surf! Wind and sea had made, so any schools of fish which might have been here had sought the depths. On another island, a pair of Cape Barren geese stood, stolid as dodos. On the seaward face of Wedge Island we looked into a strange cave, eaten by the sea out of the beetling granite: it was like an ogre's mouth.



Some of the shoals of surface fishes in the western part of the Great Australian Bight.

Aerial photo by S. Fowler, Fisheries Division, C.S. & I.R.

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Next we flew over and around Mondrain Island (which I had visited on January 23, 1944, when it was ablaze from end to end). The far north, north-west and southern parts were not affected by the fires which I reported in *The Emu* (vol. XLIV, 1944, p.6; see also Fowler, *ibid.*, 1945, p.334) but the majority of trees (mallee) on the island were still grey and dead. Mr. Fowler noted, however, a good deal of recovery in the vegetation since his flight here on September 27, 1944.

At 1433 we passed the tip of Cape Le Grand, looked at Woody Island and landed at the Esperance aerodrome at 1510 hours.

Sunday, June 3.—Several barracouta (*Thyrsites atun*) had been caught off the Esperance jetty. The stomach of a female in roe (length to caudal fork 32 inches) contained the body and tail of a mackerel (*Scomber australasicus*), a whole horse mackerel (*Trachurus novaezealandiae*—a new record for this area), and four small digested fish, probably anchovies; there were only a few worms outside of the gut posteriorly. These stomach contents were preserved, as they probably indicated the composition of the fish schools, which may also have contained true pilchard (*Sardinops*). Other barracouta (male 32½ in., male 38¾ in., and female 33½ in.) were mature but had empty stomachs. All of the above-mentioned species are first-class food fishes.

At 1045 we were again airborne, bumping under cumulus clouds, course due east. At 1145, over the sea west of Israelite Bay some small clusters of fish, regarded as mackerel, were almost immediately seen. We flew over the Eastern Group of islands, many of which were low granite, but there were a couple of high hills with low vegetation above the waves' reach. However, some of the islets were bare, lifeless rocks. One had about 35 of the sulphury-fronted seals on it. There were some aimlessly scampering seals on several islands, but by no means "thousands" of them. Also a few oystercatchers and Cape Barren geese were seen.

At 1215 schools of fishes were beginning to ruffle the surface of the calm sea. Here and there they emerged, in smallish-looking patches at first, then, in three minutes, large schools appeared as well. In five minutes there were innumerable schools all around the aircraft. From low altitude the individual fish could sometimes be distinguished. We worked north and north-east of the Eastern Group. On all but the hazed peripheral margin of the horizon, the sea clearly showed schools of fish, visible from a very wide angular range as we flew along (from lines of vision between at least 10 deg. to 75 deg.) or from directly below to a very great distance laterally when the aircraft banked or dipped. The sky was overcast and there was some greyish haze so, photographically, but not optically, conditions were not ideal. Five gannets were seen. I tried to count the fish schools but lost count time after time amongst the hundreds visible through each of the twenty panes of the Anson at any moment over the immediately surrounding sea-area. Thus, at a moderate computation, 3,000 schools were visible at once and these gave place to as many others within one minute (the actual time taken to pass a smooth slick on the surface). At 1235, I considered that after twenty minutes we had probably passed 60,000 schools of fish along the strip of, say, fifty miles over which we had flown. Another gannet—then two more—were seen, but the absence of predators was remarkable. There were schools of fish like ropes and skeins, others in ill-outlined masses; there were, I estimated, 1,000 schools ahead at one view. For half an hour now we had been surrounded by fish schools, so there were probably hundreds of thousands of schools, each with thousands of fish, and this, Mr. Fowler said, was only a fraction of what he had seen a fortnight ago. He considered there were mackerel and true pilchard schools here to-day. A few porpoises were also seen. The fish were steady at the smooth surface and might therefore be netted. In whichever direction we flew, the fish appeared. A school of porpoises, about six of them breaking water at a time, splashed and scurried its way, doing negligible damage. A solitary dark animal was seen but not identified. Then 70 or 80 gannets appeared in a flock with one young one flying over the sea. At 1305, we flew over open sea towards Point Culver (250 feet of elevated

coastline), approximately due south of Naretha on the Trans-Australian railway. Still thousands of schools of fish were apparent as we approached the light grey, blotched, and longitudinally banded limestone cliffs. Skeins of light, calm slick, perhaps lines of convergence of currents or limits of tidal turbulence, seemed particularly favoured by school fish whose dark forms edged the pale bands of the streaks themselves. Gannets, too, tended to work along or near these streaks. But time was pressing, our petrol had to be conserved, and we were far from any aerodrome. At 1320 we turned back from near Point Culver. There were very little talus or undercuts in the perpendicular limestone. Our easternmost longitude was 124 deg. 40 min.

Homeward we flew, some six to ten miles offshore, still passing the miraculous draughts of fishes, "the shoals of them like continents" as Carlyle said to Ruskin. At 1345, we had had one and a half hours of such, and no signs of diminishing. A few minutes afterwards, however, many of the schools had gone down, and the gannets sat on the water and rested. The wind was now increasing, there were white caps on the waves. By 1400 hours, opposite the Eastern Group, it was hard to see any schools. We circled over the broken jetty and roofless, ruined telegraph station at Israelite Bay and headed for home over country streaked and scoured by bush-fires. We landed at Esperance aerodrome at 1510 hours.

Mr. P. C. Stewart gave us two horse mackerel (*Trachurus novaezealandiae*). Next day, June 4, we secured a fine 11-inch mackerel (*Scomber australasicus*), which was photographed and preserved with our other specimens. Also caught from Esperance jetty were several snook (*Sphyaena novaehollandiae*), one of which had L. lat. 129 and L.C.F. 19½ in.; also a garfish (*Reporhamphus melanechir*.) Strong south-east winds. Sea rough.

Tuesday, June 5. Airborne from Esperance 1015, flying at 7,000 ft. above clouds, very cold outside. At 1245 we saw a wedgetailed eagle about 2,000 feet above sea level over the Darling Ranges about abreast of Rockingham. At 1310 we landed at Guildford, and were driven to Perth. We had flown about 29 hours or 3,000 nautical miles on this very wonderful and unforgettable trip.

From time to time, doubts have been expressed as to whether there are large quantities of fish in Australian seas. In this case at least, one may, I think, write, with due apologies to Heron-Allen's delightful "Barnacles in Nature and Myth" (1928, p.24): ". . . We prove the contrary thereof by a notable example, shown before our eyes. Master . . . was with us in the Isles, giving his mind with most earnest business, to search the verity of these obscure and misty doubts; and by adventure lifted up a sea-tangle."

THE MATHEWSIAN LIBRARY AT CANBERRA.

By Tom Iredale.

In these "Proceedings" for the year 1939-40, p.31, I wrote a note about Gregory Mathews when he arrived in Australia to work with his Ornithological Library which he had presented to the Commonwealth of Australia and which was housed at Canberra. Its quality was there briefly mentioned, but it appears that its extent has not been at all understood. This is mainly due to the non-existence of a catalogue of the works contained therein and, while he was in Australia, Mathews, assisted by the Commonwealth Librarian and one of his assistants, Miss E. Hall, drew up an annotated account which the Government engaged to publish as soon as opportunity offered. It is hoped that this promise will soon take effect as, until publication, the wealth of books and information will not be available to the public of Australia. Moreover, the annotations deal with the books from every angle, giving a resume of the history of Ornithology in Australia and also relating to many other parts of the world. The library is so complete in relation to Australian Ornithology that every reference of value may be checked therein and thereby personal prejudices abolished. Whatever opinions may be held belong to the owner thereof, but published facts are of general value.

But the study of ornithological history also means the study of Australian history, as nearly every one of our early visitors, and later our inland explorers as well as the surveying vessels, carried someone interested in natural history, and the novel bird life continually claimed attention.

Great emphasis is always placed upon monetary value and, in that sordid sense, the library is very valuable, and to-day it would be very difficult, if possible, to duplicate it at any cost. But scientifically the library is possibly unique, as a complete library of the books relating to a continent. Nearly all the books are represented in the British Museum Library, but no other institution can be named in the same manner, and a very large number are not otherwise in Australian libraries.

Until a catalogue is issued its extent cannot be visualised, as the only key is a bibliography published by Mathews in his "Birds of Australia," and it is not realised that all the books therein mentioned are in this Library. It is estimated that there are some 5,000 works, including many scientific serials, some very rare, and most of the huge folio illustrated works such as Gould (whose complete works are included), Temminck and Laugier, the Planches Enluminees (very rare), and Sparrman's Museum Carlsonianum (exceedingly rare, two copies). In the completed catalogue the history of the authors (if of interest) is given so that the unlearned may learn who Sparrman was and why his work is included in this Library.

The President (Dr. Frank Marshall) and myself visited Canberra recently and examined the rarities in the Library, and were very surprised to find that even knowledgeable people in the Capitol were unaware that the Library was housed in the city. If the catalogue were published the people of Australia would be able to see the value of the Library, and the catalogue, with all the information recorded, would become a very valuable work of reference for librarians and universities throughout the world.

As an item of interest, the Library contains some books which are almost unique, and others such as Lewin's "Birds of New Holland," and Lewin's "Birds of New South Wales," and Boddaert's "Table des Planches Enluminees" are only known from less than half a dozen copies, all in National Libraries.

A STRANGE TORTOISE.

By E. Worrell.

During the course of a midnight crocodile hunt along the Katherine River, Northern Territory, in July, 1945, I succeeded in capturing a tortoise which, to date, has defied identification. At present the tortoise is alive and well, exhibited at Melbourne Ward's Gallery of Natural History and Aboriginal Art, Medlow Bath, New South Wales.

The remarkable anatomical characteristics of this tortoise to my mind make dissection and the subsequent cranial examination unnecessary if the species is already known, though the tortoise owes its life to sentiment.

The accompanying photographs render a detailed description superfluous—the outstanding peculiarity being the exceptionally large head with its powerfully muscled jaws. The head turns sideways (Pleurodira), and presses tightly against a fore leg, the exceptional size making withdrawal impossible. The eyes are large and snout somewhat pro-



"Boofhead," the remarkable Tortoise of the Katherine River

—Photograph by E. Worrell.

minent; no barbels are visible. Five claws are present on the fore-feet, four on the hind-feet. A narrow nuchal shield is present, but may prove to be absent in a series. The entoplastron is superimposed by the converging edges of the intergular, humeral and pectoral plates.

The carapace is dark olive brown; plastron pale greenish olive. A broad, pale pinkish bar passes from posterior of eye to tympanum.

Measurements are as follows: Head $2\frac{1}{2}$ ins. long by $1\frac{13}{16}$ ins. broad. Carapace $7\frac{3}{8}$ ins. long by $5\frac{1}{2}$ ins. broad. Plastron $5\frac{3}{8}$ ins. long.

The tortoise, unanimously christened "Boofhead," was duly placed in a tank occupied by several young *Crocodylus johnsoni*, *Emydura* and water-monitors. On the following day my attention was drawn to a quantity of crushed freshwater-mussel shell distributed over the bottom



of the tank. Several berries were floating and a number of water snail shells, partly crushed, were found. The possibility of the shell or berries being disgorged or excreted by the crocodiles, monitors or other tortoises was immediately discounted, leaving the new large-headed tortoise as the probable culprit. Closer examination of this tortoise's jaws revealed that the palate was entirely covered by a hard bony plate, unlike the modified plates of the *Emydura* and *Eelseya* which are widely divided posteriorly. A corresponding mandibular surface was also revealed, forming an excellent crushing apparatus. The obvious explanation was that mussels constituted a major item of this reptile's





Ventral view showing claws and parts of plastron worn on concrete tank.

—Photograph by E. Worrell.

diet, so I gathered several mussels up to two inches in length and placed them in the tank.

The tortoise's attention was shortly directed to one of the mussels, whereupon it seized one and crushed it with a seemingly effortless bite. The tortoise then scratched the larger pieces of shell from its jaws, using the clawed fore-feet intermittently. Finer pieces of shell were swallowed, and disgorged at various intervals during the following two days. The remaining mussels were given similar treatment.

Within a few days the tortoise would accept from my hand water molluscs, grasshoppers, beetles, frogs, beef or mutton raw or cooked, raw crocodile and goanna flesh, occasional berries, leaves and pieces of wood. Its voracious appetitie seemed incapable of complete satisfaction. It had eventually to be separated from the crocodiles—when I discovered several of the latter with as much as three inches bitten from the ends of their tails.

On two other occasions only have I seen this species, both specimens eluding capture by a mere two feet or so. However, by the time these notes go to print, I hope to have returned to the Northern Territory to carry out a search for further specimens.

Note.—Since Mr. Worrell's article was written, "Boofhead" the tortoise has died, a victim of the cold weather of October, 1946. It is now preserved at the Australian Museum, where Mr. J. R. Kinghorn identifies it as *Emydura krefftii* Gray.

—Eds.

THE NORTHERN RIVER SNAKE.

By E. Worrell.

The northern islands, New Guinea and the fresh waters of Northern Australia form the range of the Northern River Snake (*Natrix mairii*), one of our lesser known Aglypha snakes. Below is a revised description and some notes on the habits.

The head is somewhat pointed—slightly distinct from the neck. The eyes are large—pupils round. The body is short, cylindrical to depressed. Tail fairly long—tapered.

Scalation.—Headshields: Rostral almost crescentic, broader than deep, occupies barely one-eighth distance from tip of snout to frontal when viewed from above; nasal divided; loreal present; internasals as deep as prefrontals; frontal twice as deep as broad, narrowing posteriorly, equally as long and one and a half to twice as broad as supraoculars; two preoculars, not touching frontal; three postoculars; one temporal touching postoculars, two following; eight upper labials, third to fifth usually entering eye; nine lower labials.

Scales: 15 to 17 laterally keeled rows.

Ventrals: About 150. Anal divided.

Subcaudals: Around 65 divided.

Colour.—Head: Lead-blue to olive; labials white to yellow; throat white.

Dorsal surface: Variable—may be yellowish, olive, brown, greenish and almost black. Black or brown specklings may be evident.

Ventral surface: Often white or yellow tinged with pink or black.

Attaining almost three feet, this harmless snake lies in the river-shallows during the hotter parts of the day with its snout above water, venturing into the heavy grass at evening. Its diet consists of frogs which are almost invariably swallowed hindquarters first. It is adept at tree-climbing, preferring low-hanging limbs over water. Specimens in captivity always spent the later night and early morning outstretched on branches provided.

Natrix mairii is particularly agile, and if captured by the tail will, with a few quick thrashes dismember at any part of the tail to within half an inch of the anus. This habit was previously thought to be confined to lizards, but I have also known young *Boiga* to snap an inch or so from the tip. *N. mairii* appears to dismember as easily as any skink, though naturally the missing part is not reproduced.

As a rule inoffensive, when excited the Northern River Snake will depress the entire body, particularly the neck. The minute teeth rarely draw blood.

Natrix mairii is usually encountered from December onwards when the rising rivers force it to higher ground, and from January (usually later) about five to twelve elongate eggs, barely one inch in length are produced. The youngsters, barely six inches long, emerge over two months later.

THE GIANT SKINK (*Egernia major*) IN THE VIVARIUM.

By G. Longley.

The first specimen of this skink to come into my possession was one which I purchased from Mr. W. Turner on December 24, 1936. This was a male measuring 23 inches, which had been received by him, along with several others from the Clarence River district of N.S.W.

The colour of this lizard is a deep chocolate brown, a number of very faint longitudinal stripes on the dorsal surface and flanks giving a rather shadowy effect. The limbs are powerful and well developed, the fourth digit, as is often the case with lizards, being the longest. The tail is long and powerful. The scales, which are without "keels" and have a very glossy appearance, lie very close together, and on account of their extreme smoothness make this reptile rather difficult to hold. In fact, it has a rather disconcerting habit of suddenly deflating its lungs and slipping backwards through one's fingers, and as it is capable of travelling over the ground at a high speed, it is not easy to recapture.

The deep lustrous eyes are protected by well-developed eye-lids with cream-coloured rims.



The Giant Skink or Land Mullet (*Egernia major*)

—Photograph by E. Worrell.

When disturbed this skink hisses loudly, but seems reluctant to bite. In fact, after handling a number of specimens I have received very few bites, the bite, of course, being of no consequence. The food of these skinks is the same as that of the Blue-tongue Lizard, such as snails, slugs, beetles, and their larvae, raw, or cooked meat, young mice, and a little fruit, such as chopped bananas, pears, apricots, etc. They will also drink fresh milk as well as water, the liquid being lapped rather slowly. They are particularly partial to large slugs which they shake violently before swallowing. Not having as large or powerful jaws as the Blue-tongue Lizard, these skinks display a resourceful method of obtaining their food. I have often watched incidents such as the following in the vivarium:—

A large Blue-tongue Lizard will be busy cracking the shell of a snail when *Egernia major* ranges up alongside him, an interested

spectator. When the shell has been removed by the Blue-tongue, *Egernia major* quietly picks up the mollusc and swallows it. The Blue-tongue looks up somewhat surprised but attacks another snail, when the same thing happens. After this has been repeated three or four times, the Blue-tongue begins to lose patience, and retires with a large snail to where he can crack the shell in peace, leaving *Egernia major* to crack his own snail shells.

On February 3, 1938, I purchased a female which was slightly smaller than the male. Another striking feature about these skinks is the development of the "dewlap" or swelling on the throat which is common to adults of both sexes.

February 10, 1939.—A brood of nine young *Egernia major* was born as their mother was on her way to Sydney from northern N.S.W. Two of these young I purchased on the above date. They were then a few days old, and about 6 inches in length. The colour and general appearance were similar to the adults, except that they were slightly paler on the flanks, which were very prettily patterned with pale blue spots. They thrive well on earthworms, isopods, raw meat, milk, and also cake crumbs, but unfortunately one died on September 9, 1939, a victim to some of the low temperatures experienced at that time of the year.

The other young skink grew considerably, and by the end of March, 1941, most of the blue spots upon the flanks had disappeared, but this one also became a victim to the cold, as on July 12, 1941, with an early morning ground temperature of 43 deg. Fahr., I found it dead in the darkened portion of the vivarium, and later took it to the Australian Museum. The adult male died from some unknown cause, and was also taken to the Museum, 10/9/41.

On the morning of October 11, 1941, I noticed the large female was having some difficulty in sloughing, so I took a basin of warm water, and placing her in it, commenced work on the slough by the aid of a pair of forceps and my fingers. After the lapse of 1½ hours, I had freed her of the slough, and she seemed more contented. On a subsequent occasion I worked for double the above length of time in order to free her of the slough. She was gently handled and never seemed to resent the operation, as she made no attempt to bite. She is now in perfect health and at the time of writing (June 15, 1946) is hibernating until the return of warmer weather.

**OBSERVATIONS ON A YOUNG FRILLED LIZARD,
Chlamydosaurus kingii.**

By G. Longley.

A young female lizard of this species, 19 inches in length, arrived from the Northern Territory on June 22, 1945, whence it had been despatched for me by Mr. E. Worrell. Mr. G. Cann, of Taronga Park, very kindly took care of it for me until I was able to prepare a suitable vivarium for it, and also to give it an opportunity to recover from its long journey. On May 31, 1945, I brought *Chlamydosaurus kingii* home, and placed it in the vivarium prepared for it, along with a small Gould's monitor, a *Varanus punctatus*, and another allied species. This vivarium was heated by means of a small kerosene lamp.

At first the frilled lizard was inclined to be very aggressive, spreading her frill, and rushing at me with wide open mouth. I usually countered this rush with the open palm of my left hand, and took hold of her gently by the shoulders with my right. After a while, she became quiet, and I could handle her quite easily.

The next difficulty was food, as grasshoppers, crickets, cockroaches, caterpillars, beetles, etc., are not plentiful at this season of the year. So I decided to try cooked meat. A small quantity of cooked lamb was cut up into suitably sized pieces, and holding the lizard with my left hand, I gently pressed a piece of meat against the front of her jaws with the thumb and first finger of my right hand. The result was startling, as she opened her mouth suddenly, seized the meat, and my finger at the same time, and for a while was reluctant to let go her hold. At last she decided that the meat tasted better so released her hold on my finger while she continued to chew the meat, as she was busy chewing I took the opportunity to place another piece of meat in her jaws, and continued to do so until all the meat was finished. I have fed her at weekly intervals in this manner for the



Frilled Lizard (*Chlamydosaurus kingii*)

—Photograph by E. Worrell.

past twelve months, varying the diet at times by mixing a little raw egg with the meat, and also giving a few live insects when obtainable.

About three weeks ago she seemed rather sick, partly due to the cold change in the weather, so I gave her about three teaspoonsful of warm water, later followed by a little raw egg given by means of a spoon. She was kept warm and is now completely recovered. This lizard, like a number of the agamidae, is subject to colour change, the dorsal surface often being a dull brown, which frequently changes to a reddish cast with a wide overcheck pattern of black with thinnish lines which give a rather pleasing effect. There is usually a white patch on either side at the angle of the jaw. The scales which are juxtaposed, are deeply "keeled."

One thing is very noticeable: the interior of the mouth is a creamy white, excepting the tongue, which is pink or red. Coloured illustrations in books often show the interior of the mouth of this reptile to be red, which is incorrect.

LIST OF MEMBERS.

As at July 20, 1946.

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.

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