PROCEEDINGS

OF THE

Royal Zoological Society

OF

NEW SOUTH WALES

for the years 1965-66

Price: One Dollar

(*Free to all Members and Associates*)

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ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES
Established 1879

Registered under the Companies Act, 1899 (1917).

Patron:
His Excellency the Governor of New South Wales, Sir Arthur Roden Cutler, V.C., K.C.M.G., C.B.E., Kt.St.J.

Vice-Patron:
Sir Edward Hallstrom, K.B., F.R.Z.S.

COUNCIL, 1966-67

President:
Basil Joseph Marlow, B.Sc.

Vice-Presidents:
John Cameron Yaldwyn, M.Sc., Ph.D.
Ernest Jeffery Gadsden, F.R.Z.S.
Henry John de Suffren Disney, M.A.
Ronald Strahan, M.Sc.

Hon. Secretary: Mrs. Leone Harford

Hon. Editor: Gilbert Percy Whitley, F.R.Z.S., R.A.O.U.

Hon. Treasurer: John Miles Campbell, J.P.

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Gilbert Percy Whitley
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Chairman: Mr. F. McCamley
Hon. Secretary: Mrs. O. Wills

Junior Group:
Chairman: Mrs. L. Harford

Ornithological Section:
Chairman: Mr. L. C. Haines
Hon. Secretary: Mr. P. E. Roberts

EIGHTY-SIXTH ANNUAL MEETING OF THE ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES

The eighty-sixth annual meeting of the Society was held at Taronga Zoological Park, Mosman, on 24th September, 1966. The President (Dr. J. C. Yaldwyn) occupied the chair and welcomed guests, members and visitors. The President read the 86th Annual Report, which was adopted.

The Treasurer's Report was read by Mr. J. Campbell, and adopted.

Councillors retiring under the terms of Article 23 of the Society's Constitution were all re-elected.

Mr. G. P. Whitley introduced the guest speaker, Mr. Vincent Serventy, who addressed the meeting on "Nature Conservation in Australia — A Continent in Danger" (see page 7). A cordial vote of thanks to Mr. Serventy was moved by Dr. F. H. Talbot and carried by acclamation.

The President expressed thanks to the authorities and staff of Taronga Zoological Park for their contributions to the success of the afternoon's gathering, and to Mr. John Adkins for the use of his public address system and tape recorder.

86th ANNUAL REPORT (1965/66)

MEMBERSHIP

As at the 30th June, 1966, the total membership of the Society was 654 consisting of 1 Endowment Member, 3 Associate Benefactors, 10 Honorary Members, 59 Life Members, 497 Ordinary Members, 4 Honorary Associate Members, 18 Life Associate Members, 50 Associate Members and 12 Junior Members.

During the year 54 new members were admitted, 47 being Ordinary Members. The Society lost 13 members by resignation and 27 names were removed from the register under Article 9. A drop in the number of Associate Members during the year was made up with an increase in the number of Ordinary Members to give a net gain in membership of 1 over last year's figure.

DEATHS

I regret to report that during the year the following 9 members of the Society died:— C. Clayton, the Hon. D. Clyne, J. B. Dawson, Claude Hardy, H. R. Hendy of Swaziland, Capt. G. I. D. Hutcheson C.B.E., Mrs. E. P. McFarlane, R. Rattray and Mrs. D. L. Trenerry.

Since the end of the Society's year being reported on, Dr. C. W. George of Mosman has died, and his death has deprived the Society of another of its well-known senior members. (The death of Miss Joyce Allan, F.R.Z.S., in August 1966, was not recorded in this Report. Her obituary appears in these *Proceedings,* see p. 12).

PATRON

As indicated in our most recent publication, his Excellency the Governor of New South Wales, Sir Arthur Roden Cutler, V.C., K.C.M.G., C.B.E., Kt. St. J., has honoured the Royal Zoological Society of N.S.W. by becoming its Patron.

COUNCIL

Council held 11 meetings during the 1965-66 year, with an average attendance of 12½ councillors per meeting.

At the end of the financial year, Mr. J. L. Fry resigned from the Council. John Fry has been the Society's Honorary Treasurer during the last 3 years and we wish to record our sincere thanks for the detailed work he has put into our financial matters during this period. The balance sheet and revenue account for 1965-66 prepared from Mr. Fry's figures, will be presented at this meeting by our present Honorary Treasurer, Mr. J. M. Campbell. Mr. Ronald Strahan, a lecturer in

Zoology at the University of N.S.W., was elected to Council as a replacement under Article 27.

DELEGATES

Mr. H. J. de S. Disney was the Society's delegate to the National Trust Seminar on Bushfires, held at Leura, New South Wales in April and at the moment is still overseas after attending the XIV International Ornithological Congress at Oxford in July as a representative of this Society.

Mr. C. N. Smithers is the Society's representative on the Council of the recently formed Australian Entomological Society.

I have great pleasure in informing the Annual General Meeting that the Council was able to nominate Councillor R. Strahan to the Minister of Lands for a recent vacancy on the Taronga Park Trust. Mr. Strahan's appointment to the Trust was gazetted a few weeks ago and he now joins a line of Royal Zoological Society members who have served on this body since the Society transferred its animals to the Trust in 1916. Two Councillors of our Society are now Trustees of Taronga Park.

SECTION MEETINGS

The Council thanks the Chairmen and Secretaries of the Society's three active Sections for the work they have done on the Society's behalf during the year. Thirty-six lectures or other programmes were given, and the Junior Group, under Mrs. Harford, met 11 times. Two sections held field trips. Mr. M. Gregg has our special thanks for his organisation and production of the 1965-66 Syllabus and for the present second-half-of-1966 Syllabus. Members will note that syllabuses will now be issued every six months, as this allows the Section officers much greater freedom in their choice of subjects and speakers.

ACCOMMODATION

Little progress was made during the year on the general question of integrated accommodation for the Society, about which I spoke strongly in the Annual Report last year. However, it has been decided that all the Society's meetings, starting in January next year, will be held in the Hallstrom Theatre at the Australian Museum. This means the Society's association with Anzac House, dating back to 1958, will cease after the Section meetings this December.

As a further indication of the "winds of change", I can now inform you that Bull's Chambers, 28 Martin Place, will be demolished in 1968 and the Society has been notified of the termination of the lease on our office there at the end of 1967. This means that during the coming year the question of Society accommodation, integrated or not, will have to be faced by your Council. Our library room and publication store here at Taronga Park, now appear to be the only stable section of the Society's occupation of space.

LIBRARY

The future of the Society's valuable library has been considered in detail by a Council Library Committee planned during the year covered by this report and set up last month. Its report, which has just been accepted by Council, is on page 30 of these *Proceedings,* but I would like to outline to you here the changes agreed upon. Subject to a set of conditions which will be laid down in a legal agreement, the book and periodical holdings of this Society, euphemistically referred to as our "Library", will be placed on indefinite loan in the Biological and Medical Library of the University of N.S.W. There members will have access to them, as well as to the whole University Biomedical Library, from 9.00 a.m. to 7.00 p.m. on week days, and 9.00 a.m. to 5.00 p.m. on Saturdays. Popular magazines and all Australian periodicals received by the Society in exchange for our publications from now on will be retained for one year in our rooms before being passed to the University Library under the same agreement.

Following this change, the storage and handling of the Society's own publications will be completely reorganized in our rooms here at Taronga Park, and the back numbers of our numerous Handbooks, Reprints, *Zoologists* and *Proceedings* will at last be easily available for much wider distribution.

GRANTS

We wish to acknowledge with pleasure a further grant of $200 from the N.S.W. Department of Education to be used to help the Society's rising publication costs.

PUBLICATIONS

One issue of the *Australian Zoologist* (volume XIII, part 2) and the *Proceedings* for 1964-65 were published during the year under report. The *Zoologist* was covered in the last Annual Report, but the *Proceedings,* issued last December, should be especially mentioned here. This issue contains a reissue of our Memorandum of Association, our revised Constitution and our up-to-date Rules. Once again these are available to the membership at large and the Society can efficiently order its affairs by them. A special reprint of these three items was run off at the same time and will be issued to future new members.

Another *Australian Zoologist,* an 82-page, 8 plate issue—volume XIII, part 3—was published on the 6th July last, and our editor informs me that *two* further *Zoologists* are in press at the moment. It seems that the 1966-67 year will see 3 *Zoologists* and a *Proceedings* join our publication list—surely quite an achievement for such a Society as ours, even in its 86th year. Mr. Gilbert Whitley deserves our very sincere thanks for his long continued activity, so freely given on our behalf.

THANKS

Once again I would like to thank personally, and on behalf of the Council, all the Society office bearers, Section officers and members who have contributed to the work of the Society, throughout the year, so generously with their time and energy. As the membership must realize, if it was not for people like this our Society just would not exist, because, although each one of us can play a part, some have to do the actual day to day work of keeping the Royal Zoological Society going and producing its publications.

— J. C. YALDWYN, President.

OFFICE BEARERS FOR 1966-67

At the 86th Annual General Meeting held on 24th September, 1966, the following Office Bearers were elected for 1966-67:—

President: Mr. B. J. Marlow.

Vice-Presidents: Dr. J. C. Yaldwyn, Messrs. H. Disney, E. J. Gadsden and R. Strahan.

Hon. Secretary: Mrs. L. Harford.

Assistant Honorary Secretary: Mrs. O. Wills

Hon. Treasurer: Mr. J. Campbell, J.P.

Assistant Honorary Treasurer: (Vacant).

Hon. Editor: Mr. G. P. Whitley.

Hon. Solicitor: Dr. Aubrey Halloran.

Hon. Auditors: Messrs. Peat, Marwick, Mitchell & Co.

ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES

BALANCE SHEET AS AT 30th JUNE, 1966

1965			
	ACCUMULATED FUNDS:-		
6,152	Balance at 1st July, 1965	5,386	
50	*Less* transfer to Building Fund	—	
(716)	*Add* Surplus transferred from Revenue Account (Deficiency)	304	
5,386			5,690
1,500	PUBLICATION RESERVE	1,500	
	CURRENT LIABILITIES:-		
20	Ladies Auxiliary	20	
1,033	Subscriptions in Advance	506	
1,250	Provision for Printing Zoologist	—	
2,303			
	BUILDING FUND:-		
2,964	Balance at 1st July, 1965	3,265	
301	*Add* Income Received during year	180	
3,265			3,445
$12,454			$11,161

1965			
	FIXED ASSETS:-		
1,224	Furniture and Equipment—cost	1,224	
—	Additions during year	55	
		1,279	
824	*Less* Provision for Depreciation	957	
400			322
1,018	Library—cost		1,018
1,000	Paintings—cost		1,000
2,418			2,340
	INVESTMENTS:-		
	Australian Commonwealth Treasury Bonds—cost:-		
320	4¾% 1969 (Market Value $320)	320	
1,000	Special "D" Bonds	1,000	
	Australian Guarantee Corporation Limited—		
3,400	Short Term Notes—cost	2,800	
4,720			4,120
	BUILDING FUND INVESTMENTS:-		
	Australian Commonwealth Treasury Bonds—		
560	5% 1965—cost	—	
	Australian Guarantee Corporation Limited—		
1,400	7% Debentures 1967—cost (Market Value $1400)	1,400	
—	7% Debentures 1970—cost (Market Value $1,386)	1,400	
1,255	Commonwealth Savings Banks of Australia	595	
3,215			3,395
	CURRENT ASSETS:-		
400	Publications on Hand (at valuation)	400	
1,688	Commonwealth Savings Bank of Australia	381	
13	Cash in Hand	525	
2,101			1,306
$12,454			$11,161

ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES

PUBLICATION ACCOUNT FOR THE YEAR ENDED 30th JUNE, 1966

1965			1965		
1,250	Cost of printing "Zoologist"	—	156	Sales of Publications	225
139	Selling Costs	—	200	Government Grant	200
540	Proceedings	754	50	Donation	—
			1,523	Deficiency transferred to Revenue Account	329
$1,929		$754	$1,929		$754

BUILDING FUND INCOME ACCOUNT FOR THE YEAR ENDED 30th JUNE, 1966

301	Transfer to Building Fund	180	90	Donations		33
				Interest:-		
			126	Investments	122	
			35	Bank	25	147
			50	Transfer of Donation Received		—
$301		$180	$301			$180

REVENUE ACCOUNT FOR THE YEAR ENDED 30th JUNE, 1966

1,523	Publication Deficiency	329		Subscriptions Received:-		
—	Donations and Subscriptions	48	1,969	Full Members	2,053	
28	Electricity and Telephone	8	122	Associate and Junior Members	122	2,175
48	General Expenses	70	247	Interest		260
326	Printing, Stationery and Stamps	777	—	Surplus on Sale of Bonds		8
1,018	Rent Paid	790	2	Sundry Income		16
120	Provision for Depreciation	133		Excess Provision for Doubtful Debts		
(716)	Surplus transferred to Accumulated Funds	304	7	written back		—
(Deficiency)						
$2,347		$2,459	$2,347			$2,459

Declaration by the Secretary

I, Mrs. Leone Harford, being the Secretary of the Royal Zoological Society of New South Wales, do solemnly and sincerely declare that to the best of my knowledge and belief, the accompanying balance sheet and revenue account are correct, and I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the Oaths Act, 1900, as amended.

DECLARED at Sydney this)
sixteenth day of September, 1966)
before me: W. H. WISE,) L. HARFORD.
Justice of the Peace.

Statement by Directors

In the opinion of the Council of the Royal Zoological Society of New South Wales, the accompanying balance sheet is drawn up so as to exhibit a true and fair view of the state of affairs of the Society as at 30th June, 1966 and the accompanying revenue account is drawn up so as to give a true and fair view of the results of the business of the Society for the year then ended.

DATED at Sydney, this sixteenth day of September, 1966.

SIGNED ON BEHALF OF THE COUNCIL,
J. C. YALDWYN, President.
F. H. TALBOT, Vice President.

Auditors' Report to the Members

The accompanying balance sheet and revenue account of the Royal Zoological Society of New South Wales are, in our opinion, properly drawn up in accordance with the provisions of the Companies Act, 1961-1966 and so as to give a true and fair view of the state of the Society's affairs as at 30th June, 1966 and of its results for the year then ended.

The accounting and other records (including registers) of the company examined by us were, in our opinion, properly kept in accordance with the provisions of the said Act.

PEAT, MARWICK, MITCHELL & CO.,
Chartered Accountants.
Registered under the Public Accountants Registration Act, 1945, as amended.

82 Pitt Street,
Sydney.

NATURE CONSERVATION IN AUSTRALIA

By VINCENT SERVENTY

THE NEXT TEN YEARS

There is a tide in the affairs of nature conservation which taken at the flood leads on to success (with apologies to Shakespeare). I feel that by 1976 we will have passed the point of no return. By then we shall have saved a substantial proportion of Australian animals and plants, or many of them will have gone forever.

To use another famous quotation in a new sense: "No man is an island." He is part of a web of life. If he destroys that web wantonly or through greed, he loses part of himself. Admittedly the belief that the environment is part of ourselves, requires progressive and sophisticated thinking. The peasant's mentality is obsessed with the mere necessity of staying alive. He cannot lift his eyes away from the trough in case somebody else snatches away his food. However great societies have only risen through some men showing more sensitivity to the environment. Paradoxically nature rewards these societies by higher and higher standards of living, which are the end-product of higher standards of thinking.

Nature conservation flourishes in such countries with high standards of living. It is almost unknown in those with low standards. So our future outlook is hopeful. The more leisure we have, the more demand there will be for further opportunities to broaden and deepen our personalities. It is here that the study of nature comes into its own. In this climate of increasing interest what should organised naturalists be doing to transform this desire into fruitful work?

LEGAL FRAMEWORK

1. *Federal*

The Federal Government often passes demands for nature conservation back to the States. Yet it is too often forgotten that the Federal Government controls vast areas. The Northern Territory and New Guinea are two such areas. A National Park Service should be set up to serve these territories, and reserves set aside now. When New Guinea gains independence this will mean a framework of trained staff and reserves will be in working order. As with Africa, the new Government will realise that the national parks offer an assured source of tourist income. Similarly in the Northern Territory the Federal Government could before independence, excise the national parks and keep them permanently as Federal Territory. This could be the nucleus of a national parks system on the United States pattern. States could be encouraged to cede scenic areas for other Federal parks. Although this may not seem likely to be done, I think it is quite practicable. For example Kosciusko State Park under Federal control would be developed with Federal money. However, most of the financial benefits would go to the State of New South Wales with tourist money spent in towns like Cooma and the recreational benefits to State residents. The South-west area of Tasmania could become equally popular if Federal money was available for its development.

At first the Federal National Parks Service could call on the Wildlife Division of the C.S.I.R.O. for the research needed but gradually it would develop its own scientific personnel.

2. *States*

Every State should have its own National Park Service, not as a section of any other department but as an entity in its own right directly answerable to the Premier. Under the Director would be two Assistant Directors with advisory councils for each. Basically the national parks with mass usage would be one section. The other would be nature reserves with specialised usage. The first advisory council would be

biassed towards people with skill in public recreation, education and tourism. The second advisory council would be biassed towards those interested in scientific work and education.

Appointments would be made only among those skilled in this field. Owing to the lack of training in Australia, some overseas people would need to be recruited until we can train our own people. Also outsiders coming to the area lack local prejudices and can see more clearly what is needed. What is true of Australian education is equally true in this new field of national parks. How can this be brought about?

A National Parks blueprint

The biggest problem facing conservationists is to know what areas should be preserved. Should it be area A or area B? Are all the rain forest types of habitat preserved? What about areas west of the ranges? How long do certain leases have to run, etc? Some years ago the Academy of Science set up State Committees to solve this problem. As far as I know, only one State has really produced a worthwhile final result, but I may be wrong in this. However a report mouldering away in a pigeonhole is a practical failure.

In Western Australia the Royal Society took over the State report and with the assistance of various Government Departments, this was finally printed as an impressive volume. This printed report is a blueprint for conservation. Pressure is being brought on the Government to take action with excellent results. In Western Australia, naturalists know what needs to be done and Governments also know what needs to be done.

What should be done in New South Wales?

Much of the success of the Western Australian effort was due to the chairman Dr. D. Ride, Director of the Western Australian Museum. The Museum has staff and facilities to organise such surveys. It can call on various other experts. I suggest that the New South Wales Conservation Council might well approach the Director of the Australian Museum with a view to preparing and printing a similar report for this State. The Academy of Science report might well provide the backbone and the final draft be speedily produced. Money for printing should be sought from the Government and from other sources. Speed is the essential factor.

Smaller Sanctuaries

The big national parks will keep samples of major habitats intact. Smaller parks provide for everyday delight. We need honeyeaters in our gardens and around our streets, not only in parks perhaps a hundred miles away. Even one tree can make a difference between a pair of Frogmouths living in an area or dying out. This is where local societies can play a big part and already a great deal is being done. We must not forget river foreshores, lakes and marine parks too. That noisy monstrosity, the speedboat, must be curbed. Why should the peace and quiet of every lake be destroyed to cater for one minority group? Just as surfboard riders are being restricted, so should sections of rivers and certain lakes be put out of bounds to speedboats. Canberra has done this with Lake Burley Griffin, reserving this for rowboats, sailing craft, fishermen and naturalists. Wildlife can survive minor intrusions but not major ones.

Societies

A Conservation Council is an essential feature of any State system but New South Wales already has this. Perhaps there is need for regional councils, such as the Northern Rivers etc. The Adult Education Board could organise weekend schools to arouse local opinion and offer expert advice.

Education

No battle is ever entirely won. No battle is ever entirely lost. We must plan for the future.

A Nature League

A nature league for children is urgently needed. The framework is present in the Gould League of Birdlovers. The Conservation Council

might approach the Gould League of Birdlovers to see if they would be willing to broaden their aims, as has already been done in Western Australia and in the United States, with its Audubon League. If they prefer to continue as they are, then consideration should be given to setting up a Junor Nature League in the schools, since the study of birds is too limiting to provide the nature conservation attitudes we need.

Already the curriculum provides for nature conservation and is excellent in this regard. However teachers need help.

Nature Advisory Service

The Director General of Education should be approached to see if a service similar to that in Western Australia could be set up to help teachers with science education. This service also assists the Gould League and the Junior Tree Society and works with other naturalist organisations.

Nature Conservation Day

One day in spring should be set aside for the celebration of a Nature Conservation Day as is done with Arbor Day.

Wildlife Magazines

Many societies spend a considerable amount of money producing their own magazines. A far better effort could be achieved by supplying members with issues of *Wildlife in Australia*. Society printing efforts could be devoted to producing scientific papers on work being carried out by members. Given support by societies all over Australia, *Wildlife in Australia* could become one of the most powerful organs of conservation in the country.

Television and Radio

We should all by personal contact and by letter, ask that our radio and television stations give us natural history material. The A.B.C. should be encouraged to set up a Natural History Unit, as has been done in Great Britain.

Zoos

The day of the old time zoo with cramped cages is finished. The public will increasingly demand that zoos be pleasant places where the animals are in comfortable conditions. More and more they will want "walk-in" enclosures. For example at Regent's Park one walks into the humming bird cage. It is a delight to have these beautiful jewels flitting past one's face and landing in a branch a few feet away. There is urgent need for scientific direction. Basically a zoo is for public education and only secondarily for producing scientific data or for breeding animals. Hens lay quite well in battery cages but most of us are sickened by the sight of such a battery. A kangaroo may keep healthy on a concrete floor but most people dislike seeing them under such conditions. It is not only a matter of justice to the animals being done. It must also appear to the general public as having been done.

The Suburbs

It is surprising how on a quarter acre block, the keeping of most of the bushland can mean the keeping of a wide variety of animals and plants. Every school should have its own wildlife corner. In older schools these can be recreated by suitable planting. They provide natural laboratories for the children.

The Future

Can one be permitted a quick look at "Australopia": cities not allowed to grow to more than 500,000 people and linked by green belts of farms and national parks; treelined streets and dozens of small parks scattered through the suburbs; and, for the adventurous, wilderness areas where one can tramp for days out of sight and sound of other humans.

OBITUARY NOTICES

AUBREY HALLORAN

(Plate I)

One of the oldest members of the Royal Zoological Society of New South Wales, and the longest in office in the history of the Society, was Dr. Aubrey Halloran, O.B.E., B.A., LL.D., F.R.A.H.S., F.R.Z.S., F.T.P.A., who died in his 95th year on 5th October, 1966 at Sydney.

Born at Hargraves, near Mudgee, New South Wales, on 3rd December 1871, Aubrey Halloran decided to make Law his profession. He graduated from the University of Sydney as B.A. in 1892 and LL.B. in 1894 and was admitted as a Solicitor on 1st June 1895, later practising also as a Notary Public. In October 1961, Mr. Halloran was awarded an Honorary Doctorate of Laws at the University of Sydney, of which he was one of the oldest graduates: "There were only about twenty students to a class when I was at the University", he said.

He joined the Royal Zoological Society of New South Wales on 10th April 1907, was on the Council on 8th May 1907 and was our first Honorary Secretary (1908). By 1914, he was a Life Member and was our President in 1926. In 1929, he was elected to Taronga Park Trust to fill the vacancy caused by the death of the Hon. Frederick Flowers. Congratulations to Mr. Halloran on his election as Grand Master of the United Grand Lodge of Freemasons of New South Wales were extended to him in the *Australian Zoologist,* 6, 1930, p. 183. After he became an Officer of the Order of the British Empire in 1954, he was guest of honour at a dinner tendered him by the Royal Zoological Society and was elected a Vice Patron at about the same period. He was Honorary Solicitor to the Society for many years.

Aubrey Halloran was extremely active in many fields, especially in historical, legal, artistic, literary, philanthropic and musical circles. He held high office or was prominent in the affairs of the Royal Australian Historical Society, the Society of Notaries, International Society of Australia, New Settlers' League, the Good Neighbour Council, English Speaking Union, the Shakespeare Society, Dickens Fellowship, the Millions Club (now the Sydney Club), the Royal Overseas League, Royal Institute for Deaf and Blind Children, Town Planning Association, Royal Art Society, Rotary International and other organizations. He was a former Trustee, not only of Taronga Zoological Park and Ashton Park, but of Captain Cook's Landing-place at Kurnell and Sublime Point, Bulli, New South Wales. He often spoke on historical occasions and unveiled memorials to mark spots of special interest to Australians.

In his younger days, his recreations were yachting and motoring. He was one of the earliest motorists in Australia and he was a Life Member of the Royal Motor Yacht Club. During the second World War, he lectured to servicemen on the maintenance of motor engines and motor boats. He had a fund of good humour and liked to laugh and dance and even play the piano at parties. Although he was a forceful and stimulating speaker, Aubrey Halloran rarely wrote for the printer, so only his Presidential Address for 1925-26 appears in the *Australian Zoologist* (4, 1926, pp. 283-286), but he took great interest in our Society's publications, regarding them as a lasting record of work well done. Aubrey Halloran had earlier delivered his Presidential Address to the Royal Australian Historical Society, to whose *Journal* he also contributed some papers on some early legal celebrites[1].

[1] President's Address: *R.A.H.S.J.*, 10, 1924, pp. 57-63. Some early legal celebrities: *R.A.H.S.J.*, 10, 1924, pp. 169-198 & 301-347; *ibid.*, 12, 1926-27, pp. 41-72 & 317-352. He also wrote about explorers such as Hume and Hovell and the history of country towns in other publications.

Portraits[2] of Aubrey Halloran have been published in the *Cyclopedia of New South Wales,* 1907, p. 334, the *Sydney Morning Herald,* August 1, 1925, and in the *United Grand Lodge of N.S.W.—N.S.W. Masonic Hospital,* 1931, p. 2. The Royal Australian Historical Society has an oil painting of him in his University of Sydney robes, besides photographs. For the illustration reproduced here, I am grateful to Mr. Gordon Halloran.

Dr. Halloran is survived by a son (Mr. Gordon F. Halloran), three married daughters, grandchildren and great-grandchildren. A brother of his, Dr. Garnet Halloran, who predeceased Aubrey, was also very prominent in the affairs of the Royal Zoological Society of New South Wales.

— G. P. WHITLEY

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[2] I am grateful to the Mitchell Library, Sydney, for access to the books cited.

JOYCE ALLAN

(Plates II & III)

The death of Miss Joyce K. Allan, after a long illness, on August 31st, 1966, removed from our Society our first lady Fellow and a conchologist and artist of distinction. In private life she was Mrs. H. W. Kirkpatrick (*nee* Catherine Mabel Joyce Allan) but she signed her scientific articles and drawings Joyce K. Allan. She was the daughter of the late J. Stuart Allan of Wellington, New Zealand, a well known artist who illustrated horses and sporting subjects for some of the authoritative Lonsdale Library series, *Town & Country Journal,* and other publications. This love of drawing was inherent in Miss Allan, who was born in Sydney and educated at Fort Street Girls' High School. At that time, leading Australian artists and writers had established weekend camps in the "bush" then existing near Balmoral, Sydney, so perhaps it was thereabouts that the Australian Museum's conchologist, Charles Hedley, may have met her father; in any case, it was arranged that Miss Allan would assist Hedley as a cadet in the Museum, to sort the James C. Cox and other collections and to draw shells to illustrate Hedley's papers. She was thus the first woman member of the scientific staff, being a "temporary assistant" in 1917 and placed on the permanent staff in November 1920. Seated before a slate with a Union Jack-like design on it, she would put a spoonful of shell-sand on the centre and, using a camel hair brush, would flick in radial directions the various orders and families of mollusca. Rubbish would be discarded and the residue again sorted into genera and species, labelled, boxed and placed in cabinets. This long and laborious arrangement gave Joyce Allan an extensive knowledge of Australasian and Pacific shells. She illustrated some of the Victorian species of *Bullinus* for Hedley's paper on them in the *Records of the Australian Museum,* 1917, and in 1919, some of her drawings illustrated Hedley's *Wild Animals of the World,* a popular guide to the then infant Taronga Zoological Park. In subsequent years she was to draw probably more than 9,000 illustrations of mollusca for conchologists like Hedley, Gabriel, Hull and Iredale, to say nothing of her own writings. She not only figured many rare and minute shells for the first time but showed interesting phenomena such as fragmentation of limbs and girdles, eggs and other features of molluscan life. Miss Allan was equally facile in oils, water colour, or black and white drawing (either in line or wash, using lampblack). In addition to shells she illustrated mammals, fossils, spiders, insects, crustacea, sharks, elasmobranch eggs and fishes for her colleagues. Her drawings apeared in both editions of the *Australian Encyclopaedia* (1925-26 and 1958), the *Australian Junior Encyclopaedia,* the British Museum's *Report* on the 1928 Great Barrier Reef Expedition, the *Australian Museum Magazine, Australian Zoologist* and our *Proceedings, Victorian Naturalist, Journal of the Malacological Society,* her own books and elsewhere.

When Hedley left the Australian Museum in 1924, Miss Allan was in charge of the department of molluscs until Mr. Tom Iredale was appointed conchologist. Miss Allan was elected to membership of the Linnean Society of New South Wales in July 1929 and joined the Royal Zoological Society of New South Wales in 1931. She was the first woman to be elected a Fellow thereof and was made an Honorary Member of this Society in 1944. In April 1933, Miss Allan took exhibits to Melbourne for the Fisheries and Fauna Exhibition in aid of hospitals there. She also lectured, collected and studied specimens in and around Melbourne. Later in the same year she was organizing secretary of the first combined scientific societies' exhibition in Sydney. In June 1941, she visited the Clarence River, northern New South Wales, to collect and observe nudibranchs, in which she specialised.

During World War II, Miss Allan was seconded to the Department of National Emergency Services (1942-44) as assistant to the Superintendent of Air Raids Precautions. Her lecturing and organizing talents were put to use in A.R.P. training (largely by her screening of 16mm. films) and in services at Air Force House, Sydney.

Returning to the Australian Museum, Miss Allan rose to the position of Assistant Conchologist and was appointed Conchologist (a title later changed to Curator of Molluscs) when Mr. Tom Iredale retired in 1944. Her assistant from 1948 was Donald McMichael. It was then not obligatory for curators to have a university degree. Miss Allan, having matriculated, had intended to study medicine, but had given up that idea for her museum career. She thus did not embark on a university course, though she attended a special class in biology under Professor W. J. Dakin at the University of Sydney.

Miss Allan collected specimens in New South Wales, Victoria, Queensland, Lord Howe Island and New Zealand.

She rearranged the shell displays in the public gallery of the Australian Museum, wrote newspaper articles and delivered radio broadcasts and popular lectures, thereby laying the foundation for some of the popularity which shell-collecting enjoys nowadays. She was the first Patroness of the Malacological Club of Victoria (now the Malacological Society of Australia) and was an Honorary Zoologist (later Honorary Associate) of the Australian Museum. In 1949, she married Mr. H. W. Kirkpatrick. She attended A.N.Z.A.A.S. congresses in Australia and New Zealand. In 1953 she travelled to the International Congress of Zoologists in Copenhagen and was the only Australian on the International Colloquium on Zoological Nomenclature there, and she studied shells in the British Museum (Natural History) and continental museums.

Miss Allan was a keen golfer in the Manly Golf Club and belonged as well to the (now Royal) Overseas League, Women Writers' and the Royal Art Society of New South Wales. She sometimes exhibited paintings at the latter Society's showings.

Miss Allan retired from the Australian Museum in 1956 on medical advice but continued working on shells until prevented by ill health.

She is commemorated in the names of several shells (*Allanassa, Coralastele allanae, Rissoina allanae*), a fish (*Microcanthus joyceae*) and a hemipterous insect (*Scotinophara allanae*).

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I understand that the Malacological Society of Australia proposes to publish a bibliography of Miss Allan's writings, with an index to her new generic and specific names, so here it may suffice to record briefly the publications to which she contributed, either by herself or in joint authorships, over thirty years or so. Unless otherwise indicated, these were printed in Sydney, and the years are dates of publication.

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— G. P. Whitley.

MELBOURNE WARD

(Plates III - V)

Charles Melbourne Ward, F.Z.S., F.R.Z.S., was known to his great number of friends simply as "Mel" and all were very shocked by the news of his sudden death on his 63rd birthday, October 6th, 1966, at Medlow Bath, in the Blackheath region of the Blue Mountains of New South Wales. Some touching tributes to him appeared in Blue Mountains publications. His passing was almost unnoticed by the Sydney newspapers but a Blackheath schoolboy wrote to the editor of the *Sun* newspaper[1] this letter on a page torn from a school exercise book:—

Last Thursday, a great man died.
His name was Melbourne Ward, of Medlow Bath.
For many years, Mr. Ward ran a gallery at Medlow Bath and a museum at Katoomba.
He also found time for charity work, giving lectures and exhibitions.
For many years he devoted his life to the study of nature.
Throughout the war years he taught the troops in New Guinea (this should have been New South Wales—G.P.W.) to live off the land.
He was very well known for his study of crabs.
He also devoted much of his time to the Aborigines of Australia and the tribes of New Guinea.
He owned one of the best collections of relics of early Australia and a very large collection of native weapons and implements from every part of the world.
He will always be remembered by the pupils of Blackheath Public School for his generosity by visiting the school about every two months, giving talks on natives, birds, reptiles, showing films.
Every Christmas time the school holds a concert and the senior classes perform an operetta.
Mr. Ward was always there, giving his time all night, putting on make-up and lending stage props.
Would you please print something about Mr. Ward, who we believe was one of Australia's greatest men, and always will be.
Thank you very much.

This anonymous schoolboy's letter is as appropriate an epitaph as any. The *Sun* immediately complied with his request and, under the fitting title, "Saluting a natural gentleman", printed an account of Mel Ward, with a photograph, largely based on a fuller biography from *People* magazine of January 1951. From the zoologist's standpoint, a rather more detailed treatment is required, for probably in a century's time, people will still want to know something about Mel Ward. However, one is only too conscious of the imperfection of this notice, for it seems as if Mel had crowded half a dozen lives into his unique career and the task of covering all the facets of his varied nature (though attempted with the best of will and indeed affection) is difficult to the verge of impossibility.

Early years:

The younger son of Hugh J. Ward, the famous theatrical entrepreneur, and Grace Ward, an accomplished singer, Melbourne Ward was named after the capital city of Victoria where he was born on October 6th, 1903. He travelled extensively with his parents and one of the earliest photographs of Mel shows him as a little boy on Brighton beach, England—

[1] I am grateful to the Editor, Mr. B. J. Tier, for permission to reproduce this letter from the *Sun* (Sydney) of Wednesday, October 19th, 1966.

holding a crab. He went to school in Australia (particularly the Marist Brothers' College at Darlinghurst, Sydney) and in the United States (including a private school in New York). In 1917 he was fascinated by the displays in the American Museum of Natural History in New York—many years later he was himself to contribute specimens towards an exhibit therein. As a youth, Mel studied crabs by the seashore near his parents' homes in Sydney and Melbourne, watching their behaviour for hours and collecting specimens. He tried to puzzle out what they were from Professor W. A. Haswell's *Catalogue of the Australian stalk—and sessile-eyed crustacea,* published in 1882. Although many of the technical expressions in this dry monograph were explained in Haswell's Introduction, their meanings could not have been absorbed by an unassisted novice. So young Mel had to consult dictionaries and encyclopaedias for even such "easy" technical terms as dorsal, ventral, retractile, etc. All Haswell's *Catalogue* was morphologically descriptive: there was nothing in it to indicate that *Macrophthalmus* burrowed into mud, *Ocypoda* scuttled along beaches, *Ligia* ran over rocks, *Idotea* swam in rock-pools, or that *Ourozeuktes* burrowed into living fishes. Those were the sort of natural history aspects in which Mel was interested. As he expressed it, "I don't tell the crabs what they are; I let them tell me."

When in his teens, Mel visited the Gladstone area in Queensland and met a local "character", a man known simply as "Warrigal", who took him out fishing and from whom he learnt a good deal of natural history and angling lore. He corresponded with the Smithsonian Institution in Washington and sent crabs to Miss Mary Rathbun, his revered friend and colleague there. As one result, an Australian crab was found to be new to science and was named *Cleistostoma wardi* Rathbun in his honour.

Mel had left school at 16 to go on the stage for eight years. He made his début as a dancer with the popular comedian Gus Bluett in *The Bing Boys on Broadway* in 1919. Mel is still remembered by old theatre-goers for his acrobatic and eccentric dancing, in which he was a master, although he would have preferred to be a classical ballet dancer; he also shone in pantomime roles. As early as the 1920's he retired from active stage work and devoted his energies to his hobby, marine zoology, though he frequently appeared as an entertainer. Mel played many musical instruments, particularly saxophone and clarinet, but was also skilful with outlandish native drums and wind instruments. He loved not only the classical masters but modern dance and jazz music and was specially fond of singing American negro spirituals and folk-songs, often being accompanied by his wife, Halley, on the guitar. In cabaret or on the dance floor Mel was as much at home as at a private recital or rehearsal.

His travels and scientific activities:

Melbourne Ward's zeal as a marine collector meant that he was a regular and welcome visitor to the scientists at the Australian Museum, Sydney, and the Museum's *Magazine* in 1927 reported that he had just returned from several Pacific Islands, California, Mexico, Panama and Cuba, bringing with him an interesting collection of lizards, frogs and marine invertebrates. In January 1926, Mel had collected in Port Phillip, Victoria, and in September of the same year visited Heron Island, Queensland. In November 1927, he collected amongst the islets of the Bunker Group, Queensland; Hoskyn, Lady Musgrave and Fairfax Islands being visited. It may be useful to place on record here other dates and localities of Mel Ward's collections, though the list is probably not complete.

Mel had in his early years made large collections in Samoa, Fiji, Hawaii, California and Atlantic United States of America. In September 1928 he visited the Albany Passage, Queensland, including Thursday and Murray Islands in Torres Strait. There he joined the natives in their

songs and dances, learning their music and steps, and even being filmed taking part in their celebrations. He loved the aborigines and in later years had some staying at his home as guests. In 1928 too he collected at Hayman Island and dredged in the Whitsunday Passage, Queensland.

Mel joined the Royal Zoological Society of New South Wales in 1926, was made a Fellow a decade later and became a Life Member in 1947. He joined the Linnean Society of New South Wales in 1930 and was a member of the Anthropological Society of Australia, the Art Galleries and Museums Association, and other societies and organizations. He was also Honorary Collector for the Queensland Museum, Brisbane, and became a Life Member of the Royal Australian Historical Society. In July 1929 he was apointed an Honorary Zoologist of the Australian Museum, Sydney. He was away in the field at the time—characteristically, for he was an open air naturalist, and his university training consisted merely of a short, special course of biology under Professor W. J. Dakin. In 1929, Mel went to the Port Curtis district, Queensland, with William Boardman. In his adolescent days, this had been his haunt with "Warrigal" but now, a sophisticated scientist, Mel was familiar with Grant & McCulloch's work (*Proc. Linn. Soc. N.S.Wales*, 31, 1906, pp. 2-52) concerning the shore crabs of the Gladstone district and he contrasted, as they had been the first to do, the mud fauna of the mangroved coastline with the coral inhabitants of the Capricorn Group offshore. North-West Islet was then his headquarters, a spot he was to revisit with Hayter and Embury's parties in December 1929, in 1930 and 1931, in which year Tom Iredale and I accompanied him there as fellow lecturers and naturalists. In February 1930 Mel joined a collecting party (including J. Slevin from California and J. R. Kinghorn, Sydney) to go to the Jenolan Caves district in New South Wales.

In 1931 he travelled overseas. In Washington he worked with Dr. Mary Rathbun at the Smithsonian Institution and he was received by the President of the United States. In January he crossed to London to study the type-specimens of early collectors in Australia at the British Museum (Natural History) and he became a Fellow of the Zoological Society. He was received by His Holiness the Pope in Rome and studied in the great museums of Paris, Berlin and elsewhere, including the Musée Océanographique at Monaco and the Naples Aquarium. He also visited Egypt. Though not unusual nowadays for subsidised graduates travelling by air, such a Grand Tour in the 1930's, by ships and rail, was beyond the dreams of most zoologists, if only for financial reasons, but Mel made the best uses of his independent means and his time was his own, for he had no office or employer. In this memorable year of 1931, Mel married the young lady who was to be his ideal companion thereafter.

Two Americans, James Shackleford and George Dromgold, came to Australia and New Guinea to make movies about 1932 and 1933. They needed a naturalist so Mel joined them; he sometimes found himself acting as technician as well as naturalist. He became interested in the people of New Guinea, where the Papuan children named him Ouibada, meaning "long hair." Mel's habit of wearing his hair long began in the tropics to protect the back of his neck. He never wore a hat if he could avoid doing so and was not fond of sunbaking. While with the movie-makers, of course, Mel collected native relics and marine specimens.

In 1933, Mel was responsible for obtaining from Victoria specimens for the Australian Museum of the large spider crab, *Leptomithrax spinulosus* (now *L. gaimardii*) which was at that time in plague numbers.

Melbourne and Halley Ward in December 1933 established the museum and laboratory on Lindeman Island, Queensland, where they were to live in idyllic circumstances until September 1935. They combed

the reefs for specimens at every low tide, even if this involved getting up in the middle of the night and wading forth with hurricane lamps. In this way, Mel achieved a unique position as an ecologist, the papers and notes he wrote then being far in advance of their time. In those days, snorkels and flippers and face-masks (to say nothing of aqualungs) were still in the future. Mel wore a small pair of pearl-diver's goggles and held his breath under water while he levered coral or large rocks with a small crowbar or with his hands. Starfishes and corals were dried and tinted to their original life-colours by Halley, while Mel (in those days before colour-photography with electronic flash) painted a series of water-colours of living animals of cowry shells, many of which were reproduced in colour in the ninth volume of the *Australian Zoologist*. He and I dredged offshore, hand-hauling the catch, by day and night, and he arranged for me to secure a devil ray off Lindeman Island for dissection and description.

Mr. M. W. F. Tweedie of Singapore sent Mel a collection of crabs from Christmas Island in the Indian Ocean for study, his results being published by the Raffles Museum in 1934. From 1936 onwards, Mel received collections from the Mauritius Institute, the basis of the reports which were published at Port Louis in 1942.

Every now and then Mel would visit Sydney for the cooler climate and in 1936 he broadcast radio talks and came to live at Double Bay, a suburb of Sydney. His brother, Hugh Ward Junior[2] was master of a small trawler which yielded many fresh specimens for Mel's cabinets. Mel collected other material on car trips along the New South Wales coastline to southern Queensland and also purchased specimens from correspondents in all parts of Australia.

In 1938, Mel embarked upon H.M.A.S. "Moresby" as Naturalist, sailing from Sydney in May, and he landed at Bathurst Head, Queensland, and at Bremer Island and Boucaut Bay in the Northern Territory. Until July 1938 he collected at Darwin and its environs, including Melville Island. On this expedition he obtained unusual animals by dredging, also by trailing rope-tangles along the bottom, in this way securing a rare fish which was named after him, *Prionobutis* (*Themistocles*) *wardi*.

On April 17, 1939, a party of Americans came to Sydney to gather material for groups for the American Museum of Natural History, New York: Michael Lerner was their leader, W. K. Gregory, H. Raven and Miles Conrad were the zoologists. Mel accompanied them to the Great Barrier Reef. It gave him great pleasure to contribute towards a group-exhibit for the great American Museum of Natural History he had haunted when a boy.

Mel Ward's display of corals and other creatures from the Great Barrier Reef, from his private collection, was the central feature of the Royal Zoological Society of New South Wales's Australian Marine Life Exhibition which was visited by 7,000 persons at the Manly Art Gallery in 1939. By that year, he had completed his researches on the Brachyura of the second Templeton Crocker-American Museum Expedition to the Pacific Ocean for the *American Museum Novitates* and followed this with a report on Philippine Island crabs in 1941.

A biographical account of Mel Ward was given in Miss Jean Devanney's book, *Bird of Paradise* (1945), in which she mentioned that in the Cocos Islands in the South Seas Mel learned that the tropical land crab, though generally timid, will attack disabled man. I do not know if Mel was actually at the Cocos Islands. He is also said to have collected in South America, New Britain and India, but I am not sure if this was so; it is difficult to trace now the dates of his various travels.

[2] An account of the career of Hugh, Mel's brother, was published in *Fisheries Newsletter*, 14 (4), April 1955, p. 21.

Certainly he had been in many strange out-of-the-way places and must have had a number of adventures. One kind of crab that Mel collected in Cuba lived in quicksand and the only way he could secure it was to lie flat on the sand and grab for the little creature. He had to be very fast, but through his training for athletic dancing was doubtless able to make his body respond easily after he had worked out the movement he would take. It was a method perilous for him, but he was determined to have that specimen. In Panama Mel had studied crabs, termites, scorpions, frogs and other creatures and one night in a Central American jungle saw eerie long-haired corpses of men killed in a revolution being carried away. Although Mel and his brother had learnt and practised jiu-jitsu and Mel had been trained in sword and rapier fencing, he told me that he had felt very frightened on that occasion. Mel then collected on the coast of Central America and U.S.A. from Panama to San Francisco.

Wartime service:

When World War II broke out, Mel tried to enlist but was rejected on physical grounds, but he offered his services to the Australian Army Education Department as honorary entertainer and instructor to the camps. From his collection of lantern-slides, Mel selected those relevant to jungle survival, native foods and similar topics and he demonstrated his specimens of edible animals and plants to the troops at Lowanna training camp, in the Dorrigo rain-forest, New South Wales. He taught the men tropical hygiene, how to find food in the bush as the aborigines did, how to catch small game, to cook snakes, and what to avoid as poisonous or harmful. He collected and carefully labelled snakes, fishes and other animals for scientific purposes. This pioneering work of training soldiers to live off the land is described in Jean Devanney's book, *Bird of Paradise,* already mentioned, and was also referred to in the *Sydney Morning Herald,* November 16th, 1942.

The collections in the Blue Mountains:

His father had bequeathed to Mel a magnificent collection of old Japanese armour, weapons, and valuable relics from many foreign lands as well as souvenirs of stage productions which he had gathered during his travels as a theatrical producer, so Mel used these and his natural history collections as the nucleus for his Gallery of Natural History and Native Art, housed at the Hydro Majestic Hotel at Medlow Bath, in the Blue Mountains of New South Wales. During World War II Mel's ethnological collection was augmented by his acquiring the St. Joseph's College, the Sir James Burns and the Josephi collections. He spent a great deal of time reading, studying and arranging his collections in the Blue Mountains, seeming for a while to have become less interested in the taxonomy of crabs and marine life (not for him the quibbles of the systematists!) and more in the history and science of mankind, delving deeply into medieval and ancient history, witchcraft, religions, mythology and superstitions and their meanings. He stressed the positive side of man's achievements and deplored the destructive forces of some communities. Aboriginal habits and legends continued to enthral him: he had earlier contributed a brilliant series of articles on these to the monthly magazine, *Outdoors and Fishing.* He was also interested in the history of the Blue Mountains and was compiling some theatrical reminiscences.

Mel also accumulated a fine collection of Australiana: relics of convict days, books, historical documents pictures, models. His superb collection of anthropological material from Australia and the Pacific has already been mentioned, but this was linked to modern times by series of musical instruments and other objects illustrating the development and evolution of human ideas in various fields (particularly in music, painting, weapons and other artistic and technical achievements). These he demonstrated almost daily to the visiting public and overseas tourists.

His library is immense: Mel had every book he could obtain bearing upon the manifold subjects which engrossed him, ranging from old books of travel (now collectors' desiderata) to the most modern anthologies. Amongst his rare books are John White's own copy of his *Voyage to new South Wales* (first edition, 1790), Angas's *New Zealanders,* and many others.

He welcomed enquiries and loved to look out a pile of books on any question for any genuinely interested visitor. His enthusiasm and encouragement helped a number of young naturalists to make good use of their time. His books, photographs, drawings and specimens were meticulously listed, labelled or catalogued by him so that his whole collection at Medlow Bath and at its branch, the Pyala Museum at Echo Point, Katoomba, is unique and priceless. A coloured illustration of Mel Ward in his Medlow Bath Gallery appeared on the cover of the Sydney edition of the *Reader's Digest* for June, 1957.

Lectures:

Mel frequently addressed the Rotary Club in the Blue Mountains and regularly visited Blackheath Public School, lecturing, displaying exhibits and helping to produce its plays, as the schoolboy's letter so eloquently testified. He frequently lectured at the Australian Museum. His annual talk to the Royal Zoological Society of New South Wales was simply entitled "Something of interest" and we would not know the topic until he started speaking: it might be an account of the journey he and his wife took across America with a lively account of the Hopi Indians, or he would call to mind his field days on Long Reef, near Sydney, or in Queensland, or show series of his beloved crabs and shells. Whatever the topic, "Something of interest" was always something to remember. One always learnt something not known before.

Mel's series of radio talks of thirty years ago were revealing, but he was quick to seize upon the new medium of television for more talks and demonstrations. Notwithstanding his professional experience on the stage, he was amenable to advice on technique from much younger producers. His programmes were a delight: not only would costumes or specimens be brought forth to illustrate each feature but Mel might break into a song or dance or play an astonishing variety of exotic musical instruments. Or he might introduce some friend to share the limelight: there would be no stiff handshakes or formality, but the two would address one another by their nicknames and *ad lib* with an ease and humour still too rare on television. In the Blue Mountains particularly Mel was revered as an educator and one who did much to nourish culture in the region.

His early training as an eccentric dancer had given Mel a muscular, stocky frame; this was toped by a mass of curly dark hair which he later wore to shoulder length. With age, the snowy whiteness of his hair was matched by his beard. When we walked the streets of Sydney we would be amused to hear children whisper to their mothers, "there goes Father Christmas." And at the festive season, suitably attired, what a marvellous Santa Claus he was, with his great actor's voice muted for the occasion, and his blue eyes twinkling as he handed out presents to children, the picture of benevolence.

It may well be left to others to write about other aspects of this great but unassuming human being. He was the last to look for honours, decorations, awards (much as he deserved them) but several colleagues paid him the zoologist's compliment of naming newly discovered animals after him. I may mention the following, but there will doubtless be an increasing number of others: first the crab, *Cleistostoma wardi* Rathbun, 1926; then a suite of Iredale's mollusca, *Nivigena melwardi* (the beautiful white variety of a cowry), *Sepiella melwardi, Pharella wardi, Quaesithyria wardi,* and the name *wardiana* bestowed upon five species or subspecies of

other mollusca. Joyce Allan named a nudibranch *Asteronotus wardianus,* Professor T. T. Flynn a pycnogonid *Ascorhynchus melwardi,* and Livingstone a starfish *Pseudogoniodiscaster wardi.* My tribute has been proffered in several names of fishes: *Parasyngnathus wardi,* a pipefish, *Austrolethops wardi,* a blind goby, and small reef fishes in the genera *Pomacentrus* and *Themistocles.* A genus of snakes was named *Melwardia* by Eric Worrell in 1960.

Acknowledgments:

For help in the preparation of this memorial notice, I have to thank Mrs. Halley Ward, Dr. J. C. Yaldwyn (Australian Museum), Dr. C. Michel (Acting Director of the Mauritius Institute) and Mr. B. J. Tier (Editor of the *Sun,* Sydney). Grateful acknowledgments are also made to the library staffs of the Australian Museum and the Mitchell Library, Sydney, for their resources and assistance.

The photograph of Mel on plate V is by Mr. E. Baker; on plate IV by the late Professor W. J. Dakin, and a snapshot of mine is on plate III.

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16. A new genus and eight new species of Brachyura from Mauritius and the Chagos Archipelago.
    Mauritius Inst. Bull. (Port Louis), 2 (2), August 15, 1942, pp. 39-48, pls. 2-4.
17. Notes on the crustacea of the Desjardins Museum, Mauritius Institute with descriptions of new genera and species.
    Mauritius Inst. Bull. (Port Louis), 2 (2), August 15, 1942, pp. 49-113, pls. 5-6.

18. Primitive man and his larder.
Austr. Mus. Mag., 8 (2), Nov. 20, 1942, pp. 52-56, 5 figs.
19. (Book review): "Mostly Australian", by Charles Fenner.
Austr. Mus. Mag., 8 (8), June-Aug. 1944, p. 266.
20. A new crustacean.
Mem. Qld. Mus. (Brisbane), 12 (3), Aug. 6, 1945, pp. 134-135, pl. 13. (*Ctenocheles collini,* sp. nov.)
21. Primitive fishing.
Outdoors & Fishing, 1 (1), March 1948, pp. 36-37 & 59, 3 figs.
22. Tree water.
Outdoors & Fishing, 1 (2), April 1948, p. 125, fig.
23. Star gazing.
Outdoors & Fishing, 1 (3), May 1948, pp. 218-219, fig.
24. Moon magic.
Outdoors & Fishing, 1 (5), July 1948, pp. 364-365, fig.
25. Fabulous monsters of the bush.
Outdoors & Fishing, 2 (1), Sept. 1948, pp. 30-31, 4 figs.
26. Legends of the Mountains.
(A booklet of aboriginal legends published in the Blue Mountains between 1948 and 1955 and sold mostly at the Gallery at Medlow Bath).
27. Waratah legends.
(A booklet published in the Blue Mountains between 1948 and 1955 and sold mostly at the Gallery at Medlow Bath).

I have not been able to find copies of nos. 26 & 27 which were "pocket-sized" booklets, not illustrated, printed by J. Bennett & Sons, Katoomba.

28. Trees have many souls.
Outdoors & Fishing, 2 (3), Nov. 1948, pp. 177-178, fig.
29. Myth creations of the Australian aboriginals.
Outdoors & Fishing, 2 (5), Jan. 1949, pp. 311-312, fig.
30. Turtles in fact and fiction.
Outdoors & Fishing, 3 (2), April 1949, pp. 102-103, 6 figs.
31. Dugong, the hardy mariners of yore.
Outdoors & Fishing, 3 (4), June 1949, pp. 250-251, 2 figs.
32. Legends of the mountains.
Outdoors & Fishing, 4 (2), Oct. 1949, pp. 114-115 & 123, 5 figs.
33. Boolmotha — legends of death.
Outdoors & Fishing, 5 (2), April 1950, pp. 105-106, 2 figs.
34. The spirits of flame.
Outdoors & Fishing, 6 (6), April 1951, pp. 470-471, 2 figs. (Aboriginal fire legends).
35. Folklore of the coconut.
Austr. Mus. Mag., 10 (10), June 1952, pp. 319-321.
36. Cats.
Festschrift 75. Geburtstage Tom Iredale (Sydney: roneo'd for private publication), 1955, pp. 1-6.
37. Legends of the sun.
Australian Outdoors (formerly *Outdoors & Fishing*), 13 (9), July 1955, pp. 34-35, 69 & 81, fig.
38. Notes on marine ecology of Lindeman Island, Queensland, with special reference to the Brachyuran crabs.
Austr. Zool., 13 (2), August 10, 1965, pp. 127-134.
39. Life on a sand flat.
Proc. Roy. Zool. Soc. N.S.Wales, 1965-66 (1967), pp. 59-65.

NAMES PROPOSED BY MELBOURNE WARD FOR NEW GENERA, SPECIES AND SUBSPECIES OF *CRUSTACEA*

The first number after each name refers to a paper in the above bibliography; the second number (after the colon) to the page on which the new name first appeared.

118 new names in all.

G. P. WHITLEY.

REPORTS OF SECTIONS AND COMMITTEES

Ornithological Section Annual Report, 1965-66

Monthly meetings were maintained in conjunction with the N.S.W. Branch of the Royal Australasian Ornithologists' Union. The average monthly attendance was 60. At the respective monthly meetings, members were entertained as follows:

July, 1965—*Birds of Narran Lake*—an outline of a trip to the area by Mr. H. Battam.

August, 1965—*Man's Place in Wildlife Conservation*—a paper presented by Mr. Allan Fox, Education Officer, Fauna Protection Panel.

September, 1965—Films from N.S.W. Film Council *Bird Sanctuary* and *Penguins of Macquarie Island.*

October, 1965—*New Zealand Birds*—Dr. J. C. Yaldwyn, Australian Museum.

November, 1965—Members' Night.

December, 1965—Members' Night.

January, 1966—*Birds in Colour*—Colour Slides—Mr. Ellis McNamara.

February, 1966—Films from N.S.W. Film Council—*Bird Migration, The Living Bird, The Vanishing Prairie.*

March, 1966—Film of Trip to United States and U.S. Birds—Mr. N. Chaffer.

April, 1966—Members' Night.

May, 1966—*Effect of Seven Inches of Rain on Tanami Desert*—Mr. H. J. de S. Disney.

June, 1966—*Birds of Wolli Creek*—Mr. L. C. Haines.

The following Field Outings were held:

A Visit to the Upper Hawkesbury Lagoons—A Lotus bird and 2 little Bitterns were observed at Long Neck, and 5 Glossy Ibis at Pitt Town.

A Visit to Long Reef and Dee Why area—Sooty Oyster catchers and Tawny Grassbirds were observed.

Field Outing to Homebush Bay—Observations included Wood Sandpiper, Marsh Sandpiper, Chestnut Teal, Musk Duck, Pink-eared Duck, Maned Goose and Nankeen Night Heron.

Observations made by members during the past 12 months included the following:

Three Gull-billed Terns at Wilberforce in October, 1965; Ground Parrot, Glossy Black Cockatoo, Blue Winged Shoveller at Nadgee Faunal Reserve in September, 1965; Several Fairy Terns at Boat Harbour on 8/8/65; Terek Sandpiper, 5 Avocets, 4 Red Kneed Dotterels on Ash Island, near Newcastle in July, 1965; 6 Red Kneed Dotterels and 4 Pink-eared Ducks at Bushell's Lagoon in July, 1965; Several Regent Honeyeaters at St. Ives from April to June, 1966.

— H. BATTAM, Hon. Secretary.

Ornithological Section Field Days

By L. COURTNEY-HAINES

(Plate VI)

At the 1965 September meeting of the Ornithological Section, I put forward the suggestion that bird-watching field-days to places of ornithological interest be held. The suggestion was received with wild enthusiasm, and four field-days were immediately planned.

The first was held on October 10th, 1965, and the areas visited were the Richmond and Windsor lagoons. Twenty-six members attended and a total of 79 species of birds were recorded.

Those regarded as the best for the day, were—Snake-necked Darter; Marsh Tern; Lotus Bird; Sharp-tailed Sandpiper; White-headed Stilt, nest containing 4 fresh eggs; Glossy Ibis; Plumed Egret; Little Bittern; Swamp Harrier; Little Falcon; Red-backed Parrot; White-browed Wood-Swallow and Dusky Wood-Swallow.

Our second field-day to Dee Why Lagoon and Long Reef was on November 7th, 1965. There were 32 observers present, including Mr. and Mrs. H. B. Menzer of Corpus Christi, Texas, U.S.A. The morning was spent at the lagoon where a nest of the Golden-headed Fantail Warbler containing a clutch of 4 fresh eggs was examined and photographed.

Because of a brisk breeze blowing in from the sea, birds kept well under cover, nevertheless we were able to show our American friends a number of interesting species. These included White-browed Scrub-Wren; Little Grassbird; Blue Wren; Grey-backed Silver-eye and White-cheeked Honeyeater. There was however, no sign of the Tawny Grassbird, a very rare species for Sydney, which had been reported to have been observed in the Dee Why Lagoon area. (The following weekend 13th November, I again visited the lagoon in the hope of putting up a Tawny Grassbird, but instead recorded for the first time for Dee Why Lagoon, a family troup of Variegated Wrens).

After lunch the party of observers moved north to Long Reef, where excellent views were obtained of White-fronted Tern; Crested Tern; Sooty Oystercatcher; Golden Plover; Turnstone; Grey-tailed Tattler and the curious Reef Heron.

The next field-day was to Homebush Bay on March 12th, 1966. Again there was an enthusiastic gathering of bird-watchers and a really first-class day was enjoyed by all. A total of 46 species was recorded, the best of these being Double-banded Dotterel; Wood Sandpiper; Marsh Sandpiper; Japanese Snipe; White-headed Stilt; Wood Duck; Chestnut Teal; Pink-eared Duck; Musk Duck; White-fronted Chat; Little Thornbill; Little Grassbird; Golden-headed Fantail Warbler; Mistletoe bird; Eastern Spinebill; Pipit, and Chestnut-breasted Finch.

The fourth and final field-day for the Society's year, was held on March 26th, 1966, and the locality chosen, the mud-flats of the old estuary of Cook's River, Botany Bay. Gale force winds and driving rain somewhat hampered the activities of the 30 or so bird-watchers who made an appearance, and only 16 species of birds were logged. These included Golden Plover; Double-banded Dotterel; Red-capped Dotterel; Black-tailed Godwit; Bar-tailed Godwit; Knot; Curlew Sandpiper and Red-necked Stint.

The above brief report shows that field-days are very popular with bird-section members and there is little doubt that they will once again become a regular part of the Ornithological Section's programme.

I should like to thank all those who assisted or participated in any way.

Conchological Section Annual Report, 1965-66

Another successful year has ended for the Conchology Section. We have lost some of our older members, but have gained a number of new members, who are very interested and anxious to build up their collections of shells.

To start the year, Mel Ward gave one of his interesting talks. He told of collecting at Long Reef during the years from 1925 to 1937.

Dr. F. H. Talbot's talk "Noises of the Deep" was most unusual. He had sound recordings taken of deep sea fishes off the East Coast of Africa.

The Kodachromes and talk by Dr. D. McMichael made us all envious. We all would have liked to have been with him on that expedition to the Barrier Reef.

We have all learnt a lot from the talk by Mr. Gommersall on "Classification of Shells."

Dr. J. C. Yaldwyn gave a "Talk on Corals." He also had Kodachromes of live corals. It was most educational and interesting, especially to those of us who have seen live corals.

Our Display Night was much appreciated. There were many beautiful shells displayed by the members. Mr. Moore displayed a number of rare Volutes. It is nice to see these rare shells even if we cannot own them.

As usual our Christmas Party was a great success. It was nice to see old members, juniors and members of Council attending. Kodachromes were shown after supper and everyone had an enjoyable evening. Many thanks to the ladies responsible for the nice supper.

The Study Nights were taken up with Mitras from Fiji by Mr. Laseron, and Australian cones by Miss Thornley. Many Kodachromes of shells and collecting spots have been shown by members.

Four members spent two days at Taronga Park Aquarium cleaning and rearranging the shells that are on display there. We are pleased to say that the Section's shells and cabinets are now out of storage. They are in the office at Bull's Chambers, where we hope to work on them in the near future.

Field Days were well attended. Not much was collected by old members as they already have most of the local specimens. However the new members benefited. Places visited were Shellharbour, Gibbon, Sandown Point, Shark Island, Long Reef and Reef Beach. The Annual Field Day to Shark Island was held in February this year. A most enjoyable day was had by all.

The attendance at the meetings has been good. There has been an average of 27 persons at each meeting. We hope this number will increase in the coming year.

Many thanks go to the ladies who prepare the suppers. That "cuppa" is very welcome after the meeting.

In conclusion I would like to thank the chairman and all members for their patience and co-operation during the past year. They have all helped to make my duties as Secretary a pleasant one. May the Section have every success in the coming years.

(Mrs.) O. WILLS, Hon. Secretary.

Entomological Section Annual Report, 1965-66

An encouraging year on the whole, with keen interest shown and an average monthly attendance of twenty (20) members and visitors.

Our lecturers have been most informative and interesting, senior members too, gave us the benefit of their knowledge. Mr. E. O. Edwards spoke on the "Methods of Eating of Various Larvae", Mr. L. C. Haines on "Entomology Past and Present" and "Entomology of Wolli Creek". Mr. R. Gilroy talked about "The Painted Lady" (*Vanessa cardui*) butterflies having white spots. We also had two interesting and popular lectures on "Spiders". One by Mr. G. Holloway and the other by Mrs. V. Gregg, who

also showed us slides of the Funnel Web Spiders. A "Kodachrome Night" was thoroughly enjoyed, also Mr. R. Broughtwood's lecture on "Entomology & Photography." To all who helped make the meetings a success, we offer our sincere thanks and appreciation.

One "Field Day" was held, poorly attended, but greatly enjoyed, and rewarded by a good variety of captures. More such excursions will be arranged for 1967.

Officers elected for 1966-1967 were—Chairman, Mr. R. Gilroy; Vice Chairman, Mr. C. Goodrick, who has since resigned and Miss M. Lang elected; Secretary, Mrs. O. Thacker; Assistant Secretary, Mr. E. O. Edwards; Curator of Insect Collection, Mr. R. Gilroy; Greeter, Mr. S. Kerr.

— (Mrs.) O. THACKER, Hon. Secretary.

Junior Group Annual Report, 1965-66

A new Section, known as the Junior Group was started in July 1965. At the Inaugural Meeting, 14 juniors and beginners attended. Since that date 8 meetings have been held with an average attendance of 12.

Some of the subjects were "Bird Identification"—P. E. Roberts; "Marine Collecting"—Dr. J. C. Yaldwyn; "Beetles"—B. W. Salkilld; "National Parks and Conservation"—L. Willan; "Funnel-web and Other Spiders"—Mrs. V. Gregg. Would the lecturers and helpers please accept our thanks.

Although most of the meetings were quite well attended, I feel that night meetings do not fully cover all the needs of a group of this nature. Too many members live long distances from the city, making an added worry for parents when combined with the uncertainty of public transport timetables and unsavoury travelling conditions.

It will be for the Group itself to decide the time and format most convenient for them in the future.

We hope that in 1967, more suitable arrangements can be made so that meetings do not interfere too much with other studies.

The Conchological Section kindly extended an invitation for the Group to attend their social evening in December.

— L. HARFORD, Chairman.

First Report of Library Committee

(Received by Council and recommendations accepted, 13th September, 1966)

1. *Establishment and Terms of Reference*

The Council of the Society at its meeting of 9th August, 1966 resolved as follows:—

> "That a Library Committee shall be set up to examine the present state of the Society's library and to recommend to the Council what the future of the library should be. The Committee shall concern itself with all aspects of the library that it thinks fit, including whether or not the Society should continue to maintain a library. The Committee shall have power to co-opt additional members."

Members elected to the Committee were Mrs. B. Purse, Mrs. O. Wills, Mrs. L. Harford (convenor), Mr. C. Smithers, Mr. R. Strahan.

The Committee met at the Australian Museum at 5.30 p.m. on 24th August, 1966, members present being Mrs. Harford, Mrs. Purse, Mr. Smithers, and Mr. Strahan. An apology for inability to attend was received from Mrs. Wills. Mr. Strahan was elected chairman of the Committee.

The substance of the Committee's finding and its unanimous recommendations are set out below.

2. *Brief History of the Library*

In the absence of a catalogue or other readily available records, it is difficult to give a definitive history but it appears that at its inception the Society took over the nucleus of a library from the N.S.W. Acclimatisation Society. This appears to have grown by purchases and donations and, from 1916 to 1942, the Society's library was housed in a pleasant room in the entrance building of Taronga Park. In 1942 the library was transferred to the Society's premises in Martin Place but when this accommodation became reduced in 1958 the books and journals were moved back to Taronga Park where they are now housed partly in a "library" room in the administrative block and partly in a storeroom in the entrance block.

3. *Present State of the Library*

Books are housed in three glass-fronted cases in the "library" room. A cursory examination gives the impression that, apart from some works on birds, notably 13 volumes of Mathews' "Birds of Australia", most of the books are too old to serve as reliable references but not yet old enough to be of antiquarian value.

It is difficult to estimate the extent of the periodicals collection. A few runs of journals are arranged in sequence in cases in the "library" room but most are stacked in bundles on the floor, each bundle consisting of periodicals received in the same year. Periodicals in the storeroom are in a disordered pile of bundles and cartons, mixed with bundles of the Society's publications.

The Society has no list of publications regularly received in exchange for the approximately 180 copies of its publications distributed to Australian and overseas societies and institutions. Exchange presumably began in 1914 and was interrupted during the First World War for there appear to be no runs extending earlier than 1919. It may be assumed that the accessions for 1965 (which have not yet been deposited at Taronga Park) will provide a guide to past accessions and the Committee has requested the Secretary to compile a list of these. [It was later confirmed by the Secretary that 158 different titles were received during 1965].

However, it cannot be assumed that all journals received in 1965 will be represented by runs extending back to 1919 for it is with deep regret, even shame, that the Committee draws the attention of the Council to the destruction of many runs of "foreign language" journals, donated to the nation for pulping in a fantastically misguided gesture of patriotism during the Second World War. The extent of the losses occasioned by this irresponsible act will not be known until our present holdings are catalogued.

The present chaotic state of the periodicals (referred to by one senior member of the Taronga Park staff as "a pile of old magazines") leads to the fear that some may well have been destroyed from time to time in sheer ignorance of their value. Certainly some back issues of the Society's publications (stored together with the periodicals) are known to have been used for kindling a furnace at Taronga Park.

Finally it must be mentioned that there exists no safeguard beyond personal trust to restrain members having access to the collections from removing books or journals from the "library" room. Sad experience of librarians and curators in musems and other learned institutions demonstrates that such trust is often misplaced.

4. *Use of the Library*

Periodicals received by the Society are held for a year in the Society's room in Martin Place before being bundled and deposited at Taronga Park. During this period they are available for members to read or to borrow for periods of up to three months.

Members may obtain access to books by prior arrangement with the Secretary of the Society who notifies the Secretary of Taronga Park, who then opens the "library" room to the reader on the nominated occasion.

Access to back numbers of periodicals, except for some bound volumes of "Emu" and the few runs of other journals that are in sequence on shelves, is clearly impracticable.

Apart from one popular magazine and several semi-popular Australian journals, little interest has been shown in current periodicals and only a few members have sought access to the books. The "library" room is opened on only a few occasions each year.

In the view of the Committee, the very small use of our holdings is partly due to their inconvenient location but perhaps more to the fact that there is little of interest to the non-professional zoologists who comprise the great majority of the Society's membership.

5. *Considerations and Recommendations*

The Committee regards the following propositions as generally accepted:

(a) That although little use may be made of the Society's books and periodicals at present, the Society has a responsibility to maintain its holdings in the best possible condition, looking towards a future when these can be properly housed and curated and more extensively consulted.

(b) That although the library exists primarily for the benefit of members of the Society, it should be accessible to all bona-fide investigators (as is the case with libraries of other learned societies and scientific institutions in Australia).

(c) That, under existing circumstances, the Society is unable satisfactorily to house, administer, or use its library.

Accepting these propositions, the Committee is of the opinion that, until circumstances improve markedly, the bulk of our books and periodicals should be put in the care of an established library of a broad zoological nature.

Discussions between the chairman of the Committee and the Librarian of the Biological and Medical Library of the University of New South Wales, Kensington, have led to an informal understanding that the University would accept our holdings on indefinite loan upon the following conditions:

(i) The Society's books would be marked as the Society's property and shelved together with the University's holdings, according to subject.

(ii) The Society's periodicals would be bound and marked as the Society's property and shelved with the University's holding, according to subject.

(iii) Books and periodicals, as accessed, would be catalogued under title and subject in the University's card catalogue and a duplicate

catalogue of the Society's possessions would be prepared for the Society.

(iv) Members of the Society would have access to the library during its normal hours of operation—9 a.m. to 7 p.m. on weekdays; 9 a.m. to 5 p.m. on Saturdays.

(v) Members would be able to borrow books from the Society's holdings and, if engaged in study or research, from the University's holdings.

(vi) Books of considerable value (e.g. Mathews' "Birds") would be shelved separately with the University's rare books and put under such restrictions as required by the Society.

(vii) Periodicals would be available for use in the library but would not be lent. However, photocopies of journal material could be obtained through the library's copying service.

The Committee believes that such an arrangement would be advantageous to the Society and to the University. The Society would benefit by having its collections safely and properly housed, catalogued, and administered by trained librarians at no cost. Members would have ready access to the library, day and evening, week and weekend, and would be able to take advantage of an up-to-date collection of zoological books and periodicals many hundreds of times greater than the Society's present holdings.

The University would benefit by obtaining access to a number of older books and periodicals which are at present absent from its collections.

Notwithstanding these advantages, the Committee believes that current popular and semi-popular periodicals (particularly of Australian origin) should be kept close to the meeting room.

The Committee therefore recommends to Council:

1. *THAT, subject to agreement on the conditions broadly outlined in this Report, the book and periodical holdings of the Society be offered on indefinite loan to the Biological and Medical Library of the University of New South Wales.*

2. *THAT popular magazines and all Australian periodicals be retained for one year after receipt in the Society's rooms before being passed to the University library.*

On behalf of the Library Committee,
Ronald Strahan, Chairman.

25th August, 1966.

REPORT ON NATIONAL TRUST BUSH FIRE SEMINAR AT LEURA, NEW SOUTH WALES

April 16-17th, 1966

This was a very valuable and interesting and well organised seminar. I feel we should all be grateful to the National Trust for holding it and in such pleasant surroundings.

SATURDAY

Morning—The Minister of Lands spoke of how the loss to the bush in Australia was far greater than similar areas in America.

Fire fighting had greatly improved in N.S.W. and fires were now contained by men and one did not have to rely on them finishing in the sea.

The National State Parks Act will have fire fighting programmes. Guiding Principles being formed, such as Equipment, Access Roads, Water.

Afternoon: Field trip to see difficulties and effect of fire in Grose Valley.

Evening: Mr. Luke, Deputy Chief, Division of Forest Management, Forestry Commission, spoke on responsibility and that it must be a co-operative effort. There is also the moral obligation to prevent fires as well as the legal. The Authorities could not carry out their work effectively without access roads, also the importance of controlled burning to keep down the fuel build-up was stressed.

Brigadier Eason, Chairman, County Fire Authority, Victoria, led the discussion and told how they did it in Victoria. How they could call on the Army in real emergencies, and detachments of units would come from all over the State to help in an emergency, like the Gippsland fires. Thus still leaving some equipment available at each unit. The scheme was backed by the Premier, and Police, and P.M.G. were lined up to give immediate help by providing direct telephone links, controlling onlookers, etc.

SUNDAY

Morning: Mr. Strom gave a very stimulating paper on Environmental Conservation and Bush Fires, and while not denying there might be a need in management for controlled fires, pointed out our complete lack of knowledge on the effect of the environment and animals as a whole.

Dr. F. H. Talbot led the discussion and felt that the scientists were somewhat at fault in not having done something to produce this information and perhaps if funds could be raised this should be done.

Mr. A. C. McArthur, Officer-in-Charge, Protection Research, Forest Research Institute, Canberra, spoke on "Prescribed burning and Resources Management are compatible." The very fine research of Mr. McArthur and his staff have produced a table now acknowledged and used by everybody for working out conditions suitable for a prescribed burning.* If only 2-5 tons fuel per acre you can get a cool burn, which will not damage trees, but 10-15 or more will give you a fierce hot fire killing the tops of many trees. He considered yearly cool burns did not

* Details can be found in McARTHUR, A. G., 1962. Control Burning in Eucalypt Forests. *Commonwealth of Australia Forst. Timber Bureau Leaflet* 80, 31 pp., 11 figs. and 1965. The Place of Prescribed Burning in Australian Fire Control. *4th Conference Inst. Foresters Aust., Hobart, 1965*, 11 pp.

harm the environment (but in slides he showed tall rank grasses etcetera were replaced by bracken).

He believed that burning once every 5 years as happened before white man came was not harmful to the environment or the humus.

Dr. Joyce Vickery, National Herbarium of New South Wales, led the discussion and could not accept that annual controlled burning did not affect the all important humus and that what the forester called fuel was the plants they wanted to save.

Mr. Bruckhauser said no mention had been made of education and he felt this should be done from bottom up, i.e. teach all children the importance of fire danger. (I sugggest, "Have you Broken your Match", "Forest Fires finish Fishing", "Blazing Bushes Banish Birds").

Afternoon: Mr. G. P. Gabel, Parks Service Bureau, Department of Lands gave us the principles they intended to apply on fire control in National Parks and need for controlled burning.

If a large untouched wilderness area is wanted one must accept that about every 15-20 years it will be completely burnt out by wild fires and if it is necessary to put out these fires one must accept the responsibility of perhaps causing death to the men who go in to put them out, under the very dangerous conditions then prevailing.

Other methods of controlling fire or to reduce fuel were mowing, grazing, etc.

Dr. Webb, Ecology Section, Division Plant Industry, C.S.I.R.O., Brisbane, summed up the papers.

SUMMARY OF SEMINAR

Efficiency of controlled burning and fire trails were proved methods in controlling fires, but there was complete lack of information of effect of wild fires or controlled fires on fauna and only limited information on vegetation and soil structure. Thus research is urgently needed on these problems to show what conditions are needed to retain fauna and flora in particular areas. Fire may be necessary periodically for the survival of some species.

May 17th, 1966 H. J. de S. Disney.

ASHTON PARK DEVELOPMENT

(Figure 1).

The following letter was sent by the President of the Royal Zoological Society of New South Wales to the Hon., the Minister of Lands, Sydney:

The Minister of Lands,
Sydney,
N.S.W. 23rd September, 1966

Dear Sir,

Ashton Park Master Plan

The Council of the Royal Zoological Society of N.S.W. wish to take this opportunity to make a series of comments on the master plan for the development of Ashton Park, Mosman, made available by your Department in July, 1966. Several aspects of the master plan have our full commendation, but other aspects are, we feel, unsuitable in this rather specialized natural bushland park. We wish to thank the officers of the Lands Department, through you, for allowing us to examine in detail the actual diagram and associated text which together make up this master plan. Representatives of the Council have made a careful examination of this important harbour-side Park in the light of your Department's plan and have attempted to evaluate it from the biological as well as conservational point of view.

The following ten comments are presented for your information:

1. *Proposed New Parking Area* alongside Bradley's Head Road at the top of Ashton Park opposite Taronga Zoological Park's own parking area.

This large proposed parking area appears completely unnecessary for users of Ashton Park itself, though it may well be intended for overflow on busy days from the extensive Taronga Park parking area. Ashton Park's own parking area just inside the Park gates on both sides of the ridge road out to Bradley's Head appears quite adequate (with a little development as indicated on the plan) for the *normal* needs of this Park, though 2 or 3 days each year it is admitted that it might not be able to handle the extensive crowds which apparently gather to watch yacht races from the end of the point itself. If it is intended for extra parking for Taronga Park it appears to us that the present Taronga parking area could well be more extensively developed as an alternative.

This proposed new parking area is at present partly an open, grassed, slightly marshy area, bounded on its downhill, eastern side by a low sandstone ledge. This extensive triangular area is a vital part of the catchment for the small creeks that flow down the steep, bushed gully at the head of Taylor's Bay. A small patch of near rain-forest, unique within Ashton Park, has developed in this gully and it is the Council's belief that the development of the parking area above (especially if it was paved) would behead the creeks and so alter the continuous seepage down this moss-lined and fern-draped gully. Any alteration of this steady seepage could, we hold, greatly alter, if not permanently destroy, this "rain-forest" patch. The eastern contour track of Ashton Park (see comment 6 below) passes through this gully and "rain-forest" patch on its way around the head of Taylor's Bay to the Burrawong Avenue entrance to the Park. The track in no way disturbs the seepage (it has been channelled under the track in several places) and the contrast of the dripping banks and "rain-forest" to the dry sandstone forest of the remainder of Bradley's Head is a delight to the walker and user of this facility of Ashton Park.

The proposed new "parking area" could instead be extensively planted with native trees and shrubs (as proposed in the master plan for other areas along the eastern and western contour tracks) by, or under the supervision of, the N.S.W. Forestry Commission or some other body such as the Society for Growing Australian Plants. This could be done in such a way as to improve greatly the appearance of the open top end of Ashton Park along the Bradley's Head Road frontage.

2. *Picnic and "Passive Recreation" Area on the Athol Bay* or western side of Ashton Park gates.

This Council approves of, and commends your Department on, the proposed development of this area (work has indeed started on this aspect of the master plan). Such facilities, if provided as indicated in the

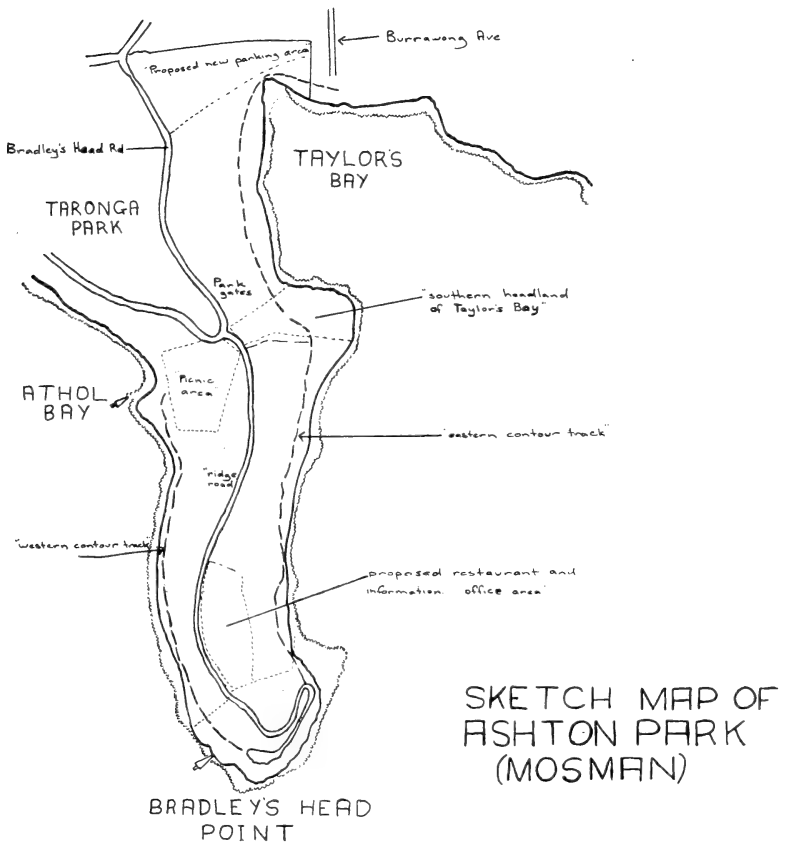

Figure 1.—Ashton Park, Mosman, Sydney.

plan, will go a long way to relieve the remainder of the natural area of the Park from public disturbance as distinct from intelligent public use (i.e. walking on tracks, admiring the views, trees, flowering plants, animals, etc.).

3. *Proposed Parking Bays alongside the ridge road* within Ashton Park and the proposed link road across the eastern bushland slope of the Park to the Bradley's Head turn-around area.

The master plan appears to indicate that a series of parking bays (termed "wayside rests" on the plan) are to be developed along both sides of the ridge road of Ashton Park. This appears undesirable to us as several unsealed roadside areas are at present available there for extra parking and any further opening up of the natural vegetation along the ridge will lead to deterioration of the bushland on both sides of the ridge. Sealing of such extra parking bays (if intended) would increase the run off of water from the ridge after rain and would bring about additional erosion on both eastern and western slopes.

The plan shows a proposed link road across the eastern bushland slope from the ridge road to the turn-around area at Bradley's Point. It is understood that the construction of such a road is no longer part of the master plan. This Council is very pleased to hear of this change as a road as originally indicated would have cut right through the natural vegetation of this slope and would have greatly disturbed the ecology and balance of the whole area of bushland involved.

It might well be pointed out here that the rather unsightly cottage on the eastern side of the ridge road at approximately the position of the start of the proposed link road on the plan could well be completely removed from the Park or at the very least screened from view. Its position isolated in the middle of relatively undisturbed bush appears unnecessary and incongruous. Could not buildings of any sort be kept to a minimum within Ashton Park and those necessary concentrated in the two areas already developed, i.e. just inside the Park gates on the western side, and near the end of the point in the vicinity of the gun emplacements and superintendent's cottage?

4. *Development and Terracing of the Bradley's Head Point area.*

The complete headland area at the southern tip of the point is lost to the natural ecology of the Park and should be developed as indicated in the master plan. The concept of terraces and open seating appears ideal to us and could do nothing but improve this section of the Park. This is where the main public pressure is brought to bear on the Park and where the crowds mainly gather for the few yacht race days and other days during the year when unusual activities can be viewed on the harbour. The provision of full picnic and "passive recreation" (descriptive term used on plan) facilities in this area appears to be fully justified. Development of this public recreational and historical area should include improved access to the beach in several places and the clearing of lantana and other exotics from the low foreshore cliffs. The large public toilets in the area need certain repairs to the fabric of the building but are otherwise in good condition. The gun emplacements and associated military works are in very good condition and obviously of great interest to visitors. As the Park staff clearly appreciate, the view of the harbour from the level of the guns must be kept unobstructed l y man-made objects. We especially commend the specially designed, vandal-proof wooden rubbish bins which are a feature of the Park.

5. *Development and Terracing of the Southern, or Park, Headland of Taylor's Bay* (the wedge-shaped area on the plan to the east of the Park gates extending from the road to the foreshore)

It appears from the plan that it is intended to clear this area of natural bush and provide terraces and open seating for public recreation,

then presumably to plant two areas of "native flowering shrubs, plants and trees" among the natural sandstone platforms thus exposed. This Council agrees that this is an attractive area with its natural stone and fairly open bushland containing many tall trees, and considers that the views of bush and harbour from the several wooden benches tastefully provided is delightful. However, we do not understand why this area should be cleared and terraced for increased public recreation when the developed picnic area to the western side of the Park gates is so near and extends right to the Athol Bay foreshore. The view from this Headland is mainly across Taylor's Bay to the Chowder Head reserve and down the harbour towards South Head so it would not serve well for yacht race viewing in addition to the developed area on the southern point of the Park. The eastern contour track goes right through the area to meet the short track down from the road inside the Park gates and there is plenty of space already for scattered and secluded picnicking. Better access to the beach could well be provided in the area by several short tracks down the low cliffs, but this Council recommends that no additional major clearing be carried out on this bushland slope and headland. Certain extra picnic facilities and seating could be added to the area without disturbing its natural appearance. It should be pointed out that if this area was cleared and terraced as planned this would completely cut the bushland of the Park into two separate areas from the biological point of view and thus disturb the ecology and free movement of many of the native animals living in the Park. Each separate area of bushland would then be increasingly subjected to human pressures on such things as plant growth and regeneration.

6. *Eastern Contour Track* from the southern tip of Bradley's Head to Taylor's Bay.

This is a fine and well-formed walking track obviously kept in very good condition by the Park staff. It is probably the most attractive item of the Park to bush walkers and biologists, amateur and professional alike. It does not obviously disturb the natural bushland through which it passes as it makes its way from the open area of Bradley's Head right along the eastern slope of the Park, around the southern headland of Taylor's Bay (discussed in comment 5 above), through Taylor's Bay itself and the "rain-forest" patch (discussed in comment 1 above) to reach the Burrawong Avenue entrance to the Park. This Council commends the appearance and form of the track, notes especially the neat, unobstrusive, white wooden safety fence where needed (the construction is simple, very strong and not too high), and hopes that the indication on the plan of "mass native flowering shrubs" etc. along both sides does not imply deliberate planting of large numbers of possibly unsuitable species. Some scattered planting of species natural to the Park here and there along the track might be justified, but a deliberate massing of flowering natives all along the track would give an effect more like an artificial garden than a bushland reserve. The addition of several short access tracks directly down to the beach from this contour track would be quite justified and would provide the public with extra open picnic areas and thus relieve the bushland from some human disturbance in busy periods.

7. *Western Contour Track* from the southern tip of Bradley's Head to the Athol Bay picnic and recreation area.

This is an interesting and well-used track along a much steeper slope than that traversed by the eastern contour track. As implied by the special comments on the plan it is intended that the stonework of this track is to be repaired, a safety fence is to be provided where necessary and the track drainage is to be restored. Basically this track is well-formed and its stonework will last for a very long time, but repairs are necessary (though the same stonework should be reused), some safety fencing is necessary (the same low, simple, wooden fencing as described

in comment 6 above would be ideal) and track drainage should be unobtrusively restored (stone guttering for example rather than half concealed piping). Attention should be given to the problem of possible erosion on the steep slope below the track as and when drainage is restored. The plan indicates that massed native flowering shrubs should be planted along both sides of the track, but as explained in comment 6 above this could well be unsuitable if done in an extensive and obvious manner. Certainly the heavy growth of badly scale-attacked, native *Pittosporum* along this track could be greatly reduced and other shrubs natural to the Park replanted in their place. (Note: this coastal *Pittosporum* is quite natural in Ashton Park, but tends to grow unnnaturally dense and straggly when this type of bushland is partly opened up and the undergrowth is exposed to more light than usual, as for example along this western contour track).

8. *Proposed Restaurant and Information Office* etc. on high point of ridge above Bradley's Head gun emplacements.

The Council of this Society advise very strongly against this proposed development. As it is, a road runs along the ridge of Ashton Park and the whole southern end of Bradley's Head is taken up with recreational and historical facilities. To take another big area from the remaining natural bushland of the Park, and the highest point of the ridge spur out into the harbour at that (that part of Ashton Park proposed for parking, see comment 1, is higher above sea level, but is not on the harbour spur), appears to us to be extremely unwise from the point of view of the whole general ecology and well-being of the Park's vegetation. Apart from further fragmenting the bushland area, such development would open up the whole of the higher ridge slopes of the southern portion of the Park to wind damage and soil erosion. Once the canopy of the bush is as extensively opened as would be necessary for this development, the whole of the southern portion of the Park would cease to be a functional flora and fauna reserve, leaving only the eastern slope of the Park north from the main gates to the head of Taylor's Bay undisturbed.

This Council, while fully understanding the general desire for a Park Information Office ("natural and historical", as described on the plan), wonder if there is enough public demand to justify a restaurant on the site under discussion. Certainly on a few special days during the year such a demand would exist, but would this demand be big enough to allow the proposed restaurant to be self-supporting? Most visitors on normal weekdays and holidays (as distinct from yacht race days etc.) would bring the maior part of their own food, and the Taronga Park refreshment rooms are only a few hundred yards up the hill. Meals at night are presumably not intended. Possibly a small refreshment counter might be justified, but could not such a counter, and the proposed Information Office, be sited either at the main gates to the Park or on the already cleared and partly developed southern end of Bradley's Head? Possibly the existing Taronga Park refreshment rooms could be expanded to include a restaurant which could be entered by the public directly from outside without necessarily having to pay at the Taronga Zoo gate.

9. *Vegetation of Ashton Park*

As a Zoological Society we do not intend to comment in detail on the vegetation of Ashton Park, but this Council would like to point out that this is the only sizable area of relatively undisturbed natural bushland along the shores of the southern portion of Sydney Harbour (i.e. Port Jackson proper, excluding North and Middle Harbours). This Park, as well as being dedicated for public recreation, is a *de facto* native flora and fauna reserve, and as such is of great interest to our Society as a conservation area for the mammals, birds, reptiles, insects and other animals typical of the different types of vegetation represented within its boundaries.

As well as containing an extensive area of the dry sclerophyll forest characteristic of the Sydney coastal sandstone areas, the Park has an interesting patch of near rain-forest (as discussed in comment 1) and it is this combination of types, and in this situation, which gives the Park such a distinct biological and ecological importance. Although there is some lantana and other exotics along the beach-front cliffs and across the head of Taylor's Bay gully below the suggested parking area, on the whole the park is relatively free of extensive areas of introduced plants. The living bush in general, appears to be in good condition, though in early August many dead trees and dead branches on live trees could be seen. Probably this is mainly due to the very dry conditions during the last year or so. There was, however, no obvious evidence of a general dying back of either of the forest types.

10. *Animals of Ashton Park*

There is no doubt that the Park is acting as a valuable refuge for many native animals right in the heart of the Sydney area. While there are no special animals that we are aware of, which are restricted, or almost restricted, to Ashton Park, several native animals are common in the Park but not at all common elsewhere in the City of Sydney and its suburbs. All the native bushland animals would be affected and their numbers reduced by further clearing and opening up of the Park and the one introduced mammal, which is quite common in the open areas of the Park, the rabbit, would increase in numbers and distribution. At the moment it is restricted mainly to the grassed areas and does not penetrate to any extent into the native bushland.

As far as native mammals in the Park are concerned the Ring-tailed Possum and the Brush-tailed Possum are common, the Long-nosed Bandicoot occurs (though its numbers have decreased during the last two years or so, presumably due to the unusual dry conditions) and the Marsupial Mouse is known to be present. The Ring-tailed Possum population of the Park has in fact been under detailed study by a Sydney University zoologist for a number of years and a picture of the fluctuation of their numbers and their movements within the area is beginning to be established.

At least 60 species of native birds have been recorded from the Park, and 5 introduced species are known there. Though many of the native species are only occasional visitors the Park acts as a bush refuge for birds within the City area and the breeding status of the birds listed in our records is under continual investigation by several of our members.

Among the reptiles, the Golden-crowned Snake (venomous, but small and not dangerous to man) occurs within the Park, and this is the only area, in this part of its range within Australia, where this interesting native snake can be seen reasonably easily by zoologists.

The insects and other animal groups found within the Park have not yet been studied in any detail, but the Park will contain the great majority of the native forms that might be expected from bushland of this type in the central N.S.W. coastal area. Because of its situation within the City this Park is especially suitable for their study and investigation.

We hope, Sir, that the above comments may be of use to you and your Departmental staff when you come to consider the final form of the proposed master plan for Ashton Park. If at any time this Society can provide further help with plans for the future of this vital reserve our facilities and specialized knowledge are at your disposal.

Yours faithfully,

J. C. YALDWYN,
President, Royal Zoological Society of N.S.W.

WILLIAM SHERIDAN WALL AND THE AUSTRALIAN MUSEUM

By G. P. WHITLEY

(Plate VII)

An early curator of the Australian Museum, Sydney, well over a century ago, was William Sheridan Wall, a descendant of Dr. John Wall of Worcester porcelain fame. He was born on 22nd October, 1815, at Dublin, Ireland, where he became a bird-preserver and he studied anatomy at Trinity College under Professor Robert Harrison. He arrived in Sydney in 1840 under Government engagement as a naturalist, being appointed to the Australian Museum as "Collector and Preserver of Specimens" on 1st August 1840, succeeding John Roach at a salary of £100 per annum.[1] His brother, Thomas Wall, arrived with him but was to perish eight years later on the ill-fated Kennedy expedition to Cape York.

In 1842, W. S. Wall supervised the removal of the Australian Museum's collections to the New Court House, Darlinghurst, Sydney, and in 1845 or earlier was styled "Curator." The late W.A. Rainbow, in his manuscript notes towards a History of the Australian Museum (of which he had been Librarian), wrote:

"Just when Wall actually became Curator I have, as yet, been unable to ascertain. Etheridge in the *Records of the Australian Museum*, vol. xi, 1916, p. 78, wrote, 'It seems probable that the Curatorships of (Rev. W. B.) Clarke and Wall overlapped one another, for on 18th Nov., 1845, the attention of the Meeting was called to the circumstance of a balance amounting to the sum of £32/3/4 still remaining due to the Curator in Liquidation of the full amount of his salary for the year 1842'.

"In the *Sydney Morning Herald* 29th December 1843, it is recorded that the Legislative Council had decided to abolish the office of Secretary and Curator, the position occupied by the Rev. W. B. Clarke. This step was taken owing to the financial depression then facing the colony, but it was taken without reference to the institution or Clarke. A petition of protest, drawn up by Clarke, was presented to the Council by Dr. Chas. Nicholson, a member of the Museum Commitee, but without avail.

"From 1st November 1843, there are virtually no minutes of the Museum Committee till 12th September 1845, when regular meetings were resumed. In the minutes of this meeting we read 'The Curator laid before the meeting a large collection of prepared specimens recently made by his brother, Mr. T. Wall, in the interior of the Colony'.

"In the minutes of 8th June 1842 appears the record 'Mr. Wall the Preserver.'

"I hope to pick up the date of Wall's appointment as Curator later, so far however it seems elusive."[2]

Through the courtesy of Mr. Malcolm J. Billings, a descendant of W. S. Wall, I have been privileged to read a diary of Wall's for the years 1845, 1846 and 1847 which is the possession of the Billings family in Melbourne. In this old exercise book is a copy of a letter from Wall, dated 5th September 1846, evidently to his employers, the Committeemen who then administered the Australian Museum. It reads as follows:

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[1] Colonial Secretary's *Return of the Colony of New South Wales* (State Archives MS. 4/272 in the Mitchell Library, Sydney), 1840, pp. 118 & 188; 1841, p. 180.

[2] References bearing on Wall's career are: George Bennett, Austr. Mus. Letter-book (MS., vol. i, Aug. 31, 1840, p. 31); Austr. Mus. document A.10.59G.; Brabazon's N.S.Wales Directory, 1843; the N.S.Wales Magazine, May 1843, p. 237; Low's Sydney Directory for 1844 and 1847; and W. A. Colman's N.S.Wales Almanac and Remembrancer for 1848. Wall's 29th birthday is noted in his 1844 Journal.—G.P.W.

Australian Museum,
5th Septr. 1846.

Gentlemen

I very humbly beg your obliging *consideration to my situation as Curator to the Museum.* Sinse my appointment in 1840 I have been in the receipt of a Salary of £100 per Anum, which without perquissites of any kind has been all my income; and which I have found, with all the economy I could exercise, very inadequate to the respectable maintainance of my family. I have hitherto refrained from making any application for an increase of salary; but in the hope that you are satisfied with my attention to the interests of the Institution and of my capabilities for filling the office, I would now very humbly request you would interest yourselves so far in my behalf as to obtain for me a remuneration more adequate to the wants of my family and the respectability of my situation.

In preferring this request I would only further trespass on your time to observe that under the present prospects of the Institution . . . (paper torn here) . . . responsibilities of my situation must (be) greatly increased then I beg assure you shall ever be met by me — by a faithful and zealous discharge of duty, and with a grateful recollection of any addition to my comforts your recommendation may procure me.

I have the honour to remain,
Gentlemen your very obediant servant.
(Signed) Wm. Sheridan Wall.

W. S. Wall's diary also contains miscellaneous notes on insects, birds' nests, an incomplete classification of mammals and birds, accounts and expenses incurred for the Australian Museum, and jottings of prices of groceries and clothing. The important part and the bulk of it however is devoted to Wall's "Notes of a Journey from Sydney to the Murrimbigi River in pursuite of Specimens of Natural History." A trip to the Murrumbidgee River was not to be undertaken lightly in the 1840's and this journey seems to have been overlooked by historians, though it deserves to be recognised.

Wall left Sydney 12th September 1844 by coach, then joined bullock teamsters and was subject to frustrating delays and loss of bullocks, but later made better progress on horseback or even by walking great distances in almost worn out boots. His hardships included acute shortage of money so that he was reduced to begging at times and he had nothing to give when he was bailed up by a bushranger. He often complained that he was getting few or no specimens, whilst the weather was abominable, yet at the end of his trip he listed 16 "Animals" (i.e. mammals), 4 Reptiles, 4 or more Fishes, 138 Birds, 28 specimens of Minerals, and 1 Jar of Insects as having been collected. His route lay from Sydney to Camden, Goulburn and Yass down to the Murrumbidgee in the vicinity of Gundagai and afterwards back by much the same route. It is very doubtful if any of his specimens are still extant. According to this Journal, written in 1844, W. S. Wall collected a bird he listed as "No. 30 Bugernigang Parrot" (the writing is not clear; it could be Bugerrigang). This entry is of interest as it is the first known use in any English writings of the name of the bird now universally known as the Budgerigar, and is three years earlier than Leichhardt's 1847 usage, the oldest hitherto known.[3]

After his brother's death, W. S. Wall was to have been sent to Cape York, possibly to seek his remains, but he was excused for health reasons from this agonizing assignment.

[3] Iredale & Whitley, *Austr. Nat. Hist.*, 14, 1962, p. 102.

One would give much for a photograph of a group of scientists patiently reconstructing, from some newly discovered bones, the probable appearance of a giant extinct animal, *Diprotodon,* in 1847. There, in the Australian Museum (then probably in the Darlinghurst gaol's) grounds, were W. S. Wall, Ludwig Leichhardt the famous explorer, and the eminent surgeon and zoologist, George Bennett, truly a worthy and dedicated triumvirate.

In September 1848, Wall was authorised to purchase a "dredging machine" for the use of the museum, the expense not to exceed £2.

At the end of 1849 a large whale was obtained and Wall wrote a very thorough account of it in the first *Memoir* of the Australian Museum, printed in 1851, by which time the present building at the corner of College and William Streets, Sydney, was in occupation, largely due to the efforts of Wall, whose whale skeleton, 33½ feet long, was then displayed in the grounds outside. In the 1850's W. S. Wall wrote a number of natural history articles for the *Illustrated Sydney News,* sometimes illustrated with excellent wood-cuts. Wall is probably shown, though not identified, in the engravings in the *Illustrated Sydney News* of November and December, 1854, showing the opening of the exhibition at the Australian Museum of objects to be sent to the Paris Exposition, when the Governor, escorted by troops, is depicted as being welcomed by the dignitaries of the time.

By 1858 Wall and George French Angas, the Museum's Secretary, were not on good terms and in January 1859 Wall retired on a pension. For a year or so he collected insects at Rockhampton, Queensland, for Sir William Macleay and for the Australian Museum, and he then settled down in the Randwick-Coogee area near Sydney where his family became prominent in Randwick affairs.[4]

William Sheridan Wall died in Sydney on 5th October, 1876. His influence on the Australian Museum was to be felt long afterwards. Two sons, George (later a mayor of Randwick) and William, had lived on the Museum premises and helped him with collecting, preserving and cataloguing specimens, and, much later, a grandson, Dr. F. E. Wall, M.L.C., was a trustee of the Australian Museum from 1926 until his death in 1941. To this day some of William Sheridan Wall's descendants visit the institution for which their forbear laboured so conscientiously.

My thanks are gratefully tendered to Mr. E. J. Billings of Toorak, Victoria, for the loan of Wall's diary, and to Mr. Edgar Beale of Wollongong, N.S.W. for information on Thomas Wall's activities with E. B. Kennedy's expeditions of 1847 and 1848 and the memorials erected to him in Queensland. Thankful acknowledgements are also made to the Mitchell Library, Sydney, for access to State Archives, old newspapers and books and to the Australian Museum for similar facilities.

EXPLANATION OF PLATE VII

Figure 1.—William Sheridan Wall from an old photograph in the Australian Museum.

Figure 2.—Memorial to Thomas Wall, brother of W. S. Wall, who perished on Kennedy's expedition to Cape York in 1848 when collecting for the Australian Museum. The tombstone commemorates T. Wall and a companion, Niblett, and was erected by Captain Owen Stanley on Albany Island, Cape York, but was replaced by others over the years. This wood-cut is from the *Illustrated Sydney News,* 24 June 1854, p. 124, from the original in the Public Library of New South Wales, Sydney.

[4] Lynch & Larcombe, 1959, *Randwick 1859-1959,* pp. 75, 106 & 108.

CHAETODON APHRODITE, THE JUVENILE OF **CHAETODON FLAVIROSTRIS** (TELEOSTEI, CHAETODONTIDAE)

By Barry Goldman

(Australian Museum, Sydney).

(Plates VIII-IX)

There is a marked difference in the colour patterns of *Chaetodon aphrodite* Ogilby and *Chaetodon flavirostris* Günther as can be seen by a comparison of the original descriptions. Yet two points suggested to me that these were colour phases of the same species. Firstly, I have recently observed apparently intermediate forms both on the Great Barrier Reef and in private aquaria in Sydney. Secondly, *Chaetodon flavirostris* is not known smaller than 50 mm. in length while there are no specimens of *Chaetodon aphrodite* larger than this.

Subsequent study of material in the Australian Museum has shown a complete gradation in body form and colour pattern between *Chaetodon aphrodite* and *Chaetodon flavirostris*. As Günther's name has priority, *Chaetodon aphrodite* becomes a synonym.

Chaetodon flavirostris Günther 1874.

(Plates VIII-IX)

Chaetodon flavirostris Günther 1874:41, pl. 32, fig. a (Vavau, Tonga).
Chaetodon aphrodite Ogilby 1889: 55, pl. 3, fig. 2 (Lord Howe Island, Tasman Sea).
Chaetodon flavirostris Seale 1906: 64 (Faté, New Hebrides).
Chaetodon flavirostris Jordan & Seale 1906: 341 (Vavau; Faté).
Chaetodon flavirostris Cockerell 1915: 44 (scales).
Chaetodon flavirostris McCulloch 1923: 2 (Australia; Lord Howe Island).
Chaetodon flavirostris Ahl 1923: 86 (Vavau).
Chaetodon aphrodite Ahl 1923: 181.
Chaetodon flavirostris McCulloch 1927: 64 (New South Wales).
Chaetodon flavirostris Whitley 1927: 8 (Lord Howe Island).
Chaetodon aphrodite Fowler & Bean 1929: 54 (Philippine Islands).
Chaetodon flavirostris Fowler and Bean 1929: 83 (Philippine Islands).
Chaetodon flavirostris McCulloch 1929: 246 (New South Wales; Queensland; Western Pacific).
Chaetodon flavirostris Haysom 1957: 2 (Heron Id., Queensland).
Chaetodon flavirostis Woodland & Slack-Smith 1963: 39 (Heron Island, Great Barrier Reef).
Chaetodon aphrodite Whitley 1962: 2.
Chaetodon flavirostris Whitley 1964a: 152 (Frederick Reef, Coral Sea).
Chaetodon aphrodite Whitley 1964b: 47.
Chaetodon flavirostris Whitley 1964: 47.
Chaetodon flavirostris Marshall 1964: 257 (Queensland; North Coast of New South Wales).

MATERIAL EXAMINED

Twenty specimens from the Australian Museum collection were examined. These are listed in table 1 with their standard length, registration number and locality of capture. Due to the limited number of specimens, no attempt was made to examine internal organs.

Standard Length mm.	Australian Museum Registration No.	Locality
26.2	IB 5697	Lord Howe Island, Tasman Sea.
26.8	IB 6464	Manly, New South Wales.
27.3	IB 5519	Lord Howe Island.
27.5	IB 7575	Port Hacking, New South Wales.
29.5	IB 7574	Port Hacking, New South Wales.
33.0	IB 5717	Manly, New South Wales.
33.4	IB 5718	Manly, New South Wales.
39.5	IB 5720	Lord Howe Island, Tasman Sea.
40.1	IB 5738	Manly, New South Wales.
49.6	IB 5831	Lord Howe Island, Tasman Sea.
66.0	IB 2370	New Caledonia.
72.5	IB 6435	Lord Howe Island, Tasman Sea.
112.4	I 7056	Lord Howe Island, Tasman Sea.
121.4	IB 7573	Heron Island, Great Barrier Reef, Qld.
124.8	IA 399	Clarence River, New South Wales.
125.0	IA 5244	Rarotonga, Cook Islands.
138.8	IB 7572	Coral Sea.
139.3	IB 4808	Coral Sea.
140.5	IB 6405	Norfolk Island, Tasman Sea.
150.0	IB 4816	Coral Sea.

Table 1.

DIAGNOSIS

Dorsal fin XII, 25-27; anal fin III, 19-21; pectoral fin I, i, 15. Oval, vertically compressed fish covered with small to moderate, round, ciliated scales in 31-34 rows from the upper edge of the operculum to the base of the caudal fin. Snout short and blunt, subequal to eye. Gape horizontal, jaws with brush-like bands of setiform teeth. Lateral line arched, terminating before soft dorsal and with 34-36 pored scales.

Ground colour in alcohol blackish brown. Ocular band in the adults restricted to the subocular region and to the osseous protuberance which develops on the frontal region. (This osseous protuberance is atypical of *Chaetodon,* but resembles that of *Heniochus varius* Cuvier.) The snout and frontal regions are yellowish-brown, as is the broad band along the bases of the dorsal, caudal and anal fins. Both the dorsal and anal fins have a marginal black band while on the caudal fin this black band is separated from the fin margin by a clear area of approximately the same width. Anterior to the caudal peduncle there is a verticle, crescent-shaped, blackish-brown band that is segregated from the trunk proper by a thin golden band which becomes constricted ventrally and merges dorsally into the darker body colour of the trunk.

COUNTS AND BODY PROPORTIONS

	Dorsal Spines	Dorsal Rays	Anal Rays	Pectoral Rays	Caudal Rays	Scales in Body Series	Pored Scales in Lateral Line	Scales above Lateral Line	Scales below Lateral Line
N	20	20	20	20	20	18	19	19	19
Mean	12	26.05	20.20	16.90	17	32.11	34.94	9.05	19.53
Standard Error	0	0.088	0.143	0.068	0	0.227	0.179	0.093	0.193

Table 2. Fin and scale counts in *Chaetodon flavirostris*.

Spinous Dorsal Fin: All specimens examined had twelve dorsal spines. These increase rapidly in length from the first to the fourth, which is the longest, being about twice the length of the first; they then decrease gradually to the last which is about one and a half times the length of the first spine. The first dorsal spine only was measured as the fin is covered basally by a scaly sheath which severely limited accuracy in measuring the other spines without damaging the specimens. Together with some of the other body characters, the dorsal spines have a negative allometric growth pattern, ranging in proportion of the standard length from 15% in the smallest individuals to 9% in the largest.

Soft Dorsal Fin: The number of dorsal rays centred about 26 (17 specimens), with two specimens having 27 rays and one having 25.

Anal Fin: All individuals had three anal spines and nineteen (1)*, twenty (14) or twenty-one (5) rays. Both the soft dorsal and anal fins, as can be seen from the plates, are rounded in the young and become rather pointed with age.

Caudal Fin: This is quite rounded in the young stages becoming almost lunate in the adult. It always consists of seventeen primary rays—a single ray on the upper and lower leading edges; and fifteen branched rays, eight above and seven below.

Pectoral Fin: Normally the pectoral fin consists of seventeen rays, the first two upper ones being simple, the other fifteen branched. There was one specimen with only fourteen branched rays on the right side (Aust. Mus. Reg'd. No. IB. 5717) and another (IB.6464) which had only sixteen primary rays in each pectoral fin—two single and fourteen branched rays on the right side, three single and thirteen branched rays on the left.

Scale Counts: Scales in the body series were taken as the number of scale rows between the upper edge of the operculum and the base of the caudal fin. The counts were thirty (1), thirty-one (3), thirty-two (8), thirty-three (5) and thirty-four (1). Two specimens, IA. 5244 and IB.5738 were too damaged to show body scale counts.

There were thirty-four (6), thirty-five (8) and thirty-six (5) pored scales in the lateral line. These were counted from the upper edge of the operculum to the termination of the lateral line in front of the twenty-third or twenty-fourth dorsal ray. No counts were made of the pored scales on the temporal region.

Horizontal scale rows were taken from the first dorsal spine, down posteriorly to the lateral line and up anteriorly to the lateral line from the

* The number in parentheses indicates the number of individuals sharing that particular character.

Standard Length in mm.	Post orbital	Sub orbital	Inter orbital	Diameter of Eye	Premaxilla	Snout	Head	Depth of Body	Body Length	Anal Fin Base	Dorsal Fin Base	Pectoral Fin	Ventral Spine	First Dorsal Spine	First Anal Spine	Caudal Peduncle
26.2	15.2	10.3	14.9	16.8	6.5	12.6	43.0	64.3	60.2	37.4	62.0	35.0	24.0	15.2	16.0	13.4
26.8	15.3	11.6	14.6	14.9	5.6	11.2	40.7	62.3	60.5	34.4	64.6	29.1	22.0	14.2	15.3	12.3
27.3	16.5	11.0	14.7	15.4	6.6	12.8	41.8	61.2	59.0	32.2	63.8	28.5	23.8	12.1	17.6	12.1
27.5	14.2	10.2	12.4	14.5	7.3	12.4	39.6	62.5	62.5	34.5	64.5	29.8	24.3	11.6	14.9	12.3
29.5	12.9	10.2	12.9	15.2	6.2	11.8	40.0	63.0	64.0	34.6	66.8	27.8	23.4	12.2	15.2	11.5
33.0	13.6	10.0	13.3	14.0	7.0	12.4	38.1	64.5	61.0	38.8	66.0	26.0	19.4	9.1	13.3	11.5
33.4	14.1	11.1	12.9	13.5	6.0	12.3	39.0	63.0	63.0	39.5	65.8	26.0	20.7	12.9	16.5	11.1
39.5	13.8	10.8	11.2	13.8	6.1	13.3	38.5	69.2	64.5	40.0	64.2	33.4	22.3	11.3	14.7	11.3
40.1	14.2	9.8	12.2	13.2	5.3	10.2	37.8	65.7	65.0	37.8	66.5	28.0	23.7	12.2	16.2	11.7
49.6	13.6	9.5	10.5	13.1	5.6	13.7	38.2	65.0	63.0	38.6	64.5	27.4	20.4	8.9	13.9	10.7
66.0	12.9	9.8	12.0	12.4	5.5	12.4	35.8	66.7	66.6	35.9	68.2	30.0	21.2	10.5	12.2	10.6
72.5	13.7	10.1	10.0	11.6	5.3	11.3	35.9	67.5	66.7	41.1	69.0	27.4	21.1	10.1	13.1	10.9
112.4	12.8	10.0	10.7	10.6	4.2	10.2	31.4	69.5	68.5	41.8	74.5	26.0	19.5	11.1	13.1	11.1
121.4	13.0	10.2	10.2	11.0	4.9	12.3	34.0	73.7	66.0	41.8	74.0	29.7	18.8	9.5	11.5	11.2
124.8	13.1	10.4	10.3	9.6	4.4	11.1	32.5	63.0	69.0	41.9	74.6	24.9	18.7	9.6	13.4	11.4
125.0	13.6	11.2	11.2	9.6	4.5	10.4	32.0	69.5	?	40.7	76.0	29.6	21.6	10.4	12.8	11.2
138.8	13.3	10.6	11.1	11.0	4.7	11.2	33.5	68.9	66.5	39.9	73.5	28.6	20.5	11.8	14.0	11.1
139.3	13.6	10.7	10.8	9.9	4.9	11.2	32.5	65.9	69.1	41.0	75.8	27.1	17.4	9.6	10.2	11.5
140.5	13.0	10.8	10.7	9.3	4.6	10.5	31.1	65.1	69.0	41.6	76.0	22.7	18.6	9.0	11.4	11.0
150.0	14.0	12.0	11.7	10.0	4.3	10.7	32.7	63.0	72.5	37.5	73.5	30.0	19.3	8.9	11.4	10.7

Table 3. Lengths of Head and Body characters as percentages of Standard Length.

first anal spine. The counts range from eight (1), nine (16) and ten (2) above the lateral line and eighteen (1), nineteen (10), twenty (5) and twenty-one (3) below.

Body Proportions: The head and body characters, measured as percentages of the standard length are listed in Table 3. The following measurements were used:

Postorbital—the distance between the hind border of the orbit and the most distal projection of the operculum; Suborbital—the vertical distance between the lower border of the orbit and the lower margin of the preoperculum; Interorbital—the width of the frontal bones at the most superior edge of the orbits; Eye—the horizontal diameter of the orbits; Premaxilla—the length of the toothed ramus of the premaxilla; Snout—the distance between the symphysis of the premaxillae and the anterior edge of the orbit; Head Length—the distance between the symphysis of the premaxillae and the hind border of the operculum; Depth—the vertical distance between the base of the ventral fins and the base of the dorsal fin; Body Length—the length of the trunk between the upper edge of the pectoral fin base and the base of the caudal fin; Dorsal and Anal Fin Bases—the shortest distance between the front of the first spine when held erect and the back of the last ray; Pectoral Fin—the length of the longest branched ray (usually the second) from its base at the pterygials. For the ventral, dorsal and anal spines, the total length of the spine was measured.

Allometric Growth: As can be seen from table 3, there is a distinct change in the body shape with growth. The hind border of the head (i.e. the posterior margin of the operculum) has a net anterior displacement due to the progressive elongation of the trunk as measured by the body length. The depth of the body also increases with growth but not as rapidly, with the result that the adult has a relatively smaller head and is more ovoid than the juvenile.

All the fin spines measured, as well as the caudal peduncle, postorbital, interorbital and eye diameter have negative allometric growth curves.

COLOUR PATTERN

Ocular band: In the young stages to about 35 mm. standard length (Plate VIII, fig. 1), the ocular band is distinct, grey-black and reaches to below the suboperculum. It does not join across the isthmus. At about 40 mm. standard length (Plate VIII, fig. 2), it is becoming restricted to the osseous protuberance, which is beginning to form on the nape, the remainder of the band getting much lighter in colour. From about 70 mm. on (Plate VIII, figs. 4 and 5; Plate IX), the black mark on the osseous protuberance becomes segregated from the rest of the ocular band which remains as a dark area on the frontal and subocular regions.

Dorsal ocellus: In the juvenile (Plate VIII, figs. 1 and 2), situated normally between the seventh and sixteenth dorsal rays, is a distinct, black, dorsal ocellus. As the fish grows, this ocellus gradually becomes absorbed until at about 70 mm. standard length (Plate VIII, fig. 4), it is virtually continuous with the dark, vertical, pre-caudal band which passes from the beginning of the soft dorsal to the anal spines, where it becomes more diffuse. This disappearance of the juvenile dorsal ocellus is not uncommon among the Chaetodontinae. *Chaetodon setifer* Bloch, *Chaetodon lunula* Lacépède (Gunther 1873: pl. 33) and *Chaetodon vagabundus* Linnaeus (McCulloch 1923: 3, pl. 1, figs. 1 and 2) also follow this pattern of development.

According to Eibl-Eibesfeld (1964: 74) there are certain small sabre-toothed blennies that attack the eyes of other fish; and he proposes that in conjunction with the ocular band (which tends to conceal the eye), the "eye-spot" serves the purpose of deflecting these attacks to a

harmless region on the back. The larger chaetodonts may be able to avoid these attacks, making the "eye-spot" unnecessary in the adults.
Marginal black band: The soft dorsal and anal fins have a golden border in the young stages. Beneath this is a submarginal black band which is continuous with a similar band across the caudal peduncle. With growth, the submarginal black band moves to the edge of the fins (Plate VIII, fig. 3), excluding the golden border and finally becomes marginal, but discontinuous; the section on the caudal peduncle having moved relatively further out on the caudal fin.

There is also, in the juveniles, a golden band which passes through the dorsal spines beneath the submarginal black band, through the anal spines, ventral fins and onto the throat region.

By about 50 mm. standard length, the submarginal black band has become marginal, it then spreads anteriorly to encompass the outer edge of the dorsal spines (Plate VIII, fig. 3), the anal spines and the ventral fins; the golden band being restricted to the lower portion of the dorsal spines and disappearing from the ventral fins and anal spines, which darken with age, being almost black at maturity. In specimens of 100 mm. or more, this golden band is restricted to the bases of the soft dorsal and anal fins, and the caudal peduncle, becoming much paler along the base of the spinous dorsal; it is then bisected by a red band which passes through it in an analogous position to the submarginal black band of the juvenile.

There is also in the juvenile a golden band which passes vertically from the middle of the base of the anal fin to the dorsal ocellus. As the fish matures, this gets restricted ventrally and spreads dorsally becoming diffuse, gradually merging with the blackish-brown of the body.
Snout and Interorbital Region: These remain yellow throughout life.

It is interesting to note here that *Chaetodon capistratus* Linnaeus has a juvenile stage with a strikingly different colour pattern which was named *Chaetodon bricei* by Smith (Bull. U.S. Fish. Comm. 17, 1897: 102).

DISTRIBUTION AND HABITAT DATA

Except perhaps for the southern end of the Great Barrier Reef, the species is apparently nowhere abundant. It is mainly restricted to the South Pacific region—New South Wales, Queensland, Norfolk Island, Lord Howe Island, New Caledonia, New Hebrides, Tonga, Cook Islands and Samoa. The literature has only one reference to its occurrence in the Philippine region (Fowler and Bean, 1929: 83). Herre makes no mention of it in his check-list of Philippine fishes and it is also not yet recorded from Darwin (Taylor, 1964) or New Guinea (Munro, 1958). It is evidently uncommon in the Indo-Malayan Archipelago and to the north of Australia.

Chaetodon flavirostris is primarily a reef fish, being found both on the reef crest and in the deeper water at the edge of the reef (to about 10 fathoms); however the young have been recorded along the New South Wales coast as far south as Wollongong (latitude 34° 25' S.), where they are found in moderately shallow water (to about 7 fathoms) in protected bays and inlets. It seems probable that the young arrive in the spring, survive through the warm summer months, then die off when the water temperature drops at the onset of winter, but until further data are available, no definite conclusions can be expressed. No adults have yet been recorded from southern New South Wales.

This pattern of seasonal appearance has also been observed, but not well documented, in such related forms as *Chaetodon setifer* Bloch, *Chaetodon vagabundus* Linnaeus, *Chaetodon guntheri* Ahl, *Pomacanthops semicirculatus* (Cuvier and Valenciennes) and also *Zanclus canescens* Linnaeus and *Forcipiger lol* (Montrouzier).

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DESCRIPTIONS OF TWO NEW SPECIES OF **OKENIA** (Nudibranchia, Doridacea) FROM SOUTH-EASTERN AUSTRALIA

By Robert Burn

(Honorary Associate in Conchology, National Museum of Victoria, Melbourne).

(Plates X-XI, text-figs. 1-5).

SUMMARY

The phanerobranch doridacean genus *Okenia* is recorded for the first time from Australia. Two new species are described, *O. pellucida* from Sydney Harbour, New South Wales and *O. mija* from central Victoria.

INTRODUCTION

For the past few years, the presence of the genus *Okenia* among the Australian Opisthobranchia has been known to the writer from specimens collected at two localities on the central Victorian coastline. These were recognized as a new species and set aside for description. More recently, specimens of a second species from Sydney Harbour were received for identification from Miss Isobel Bennett. Though common on its polyzoan habitat, this second species proved to be a new species also.

Okenia Menke[1] (1830) is a well known genus with about 20 species distributed throughout the Atlantic, Pacific and Indian Oceans. The diagnostic characteristics uniting the species are (a) the presence of papillae along the notal or pallial brim and (b) two teeth on each side of the bare rhachis of the radula. Two subgenera are recognized: *Okenia* s.s. with papillae or appendages in the middle of the back and *Idaliella* Bergh (1881) with a bare middle back. As both species described here have papillae in the middle of the back, they belong to *Okenia* s.s.

The writer is deeply indebted to Miss Isobel Bennett for the specimens of *O. pellucida,* as well as notes on its habitat, colour transparencies of the living slugs, and the black and white photographs reproduced below. This paper is part of a wider study of the Opistobranchia of Australia. The research for this paper was completed while the writer was in receipt of a grant from the Science and Industry Endowment Fund, C.S.I.R.O.

DESCRIPTIONS

Order NUDIBRANCHIA
Suborder DORIDACEA
Section EUDORIDACEA
Tribe PHANEROBRANCHIA
Superfamily SUCTORIA
Family GONIODORIDIDAE

Hitherto this family was represented in Australian seas by *Goniodoris meracula* Burn (1958: 27) and *Eucrairia mapae* (Burn, 1961: 102), both from Torquay, Victoria.

Okenia pellucida sp. nov.

(Pls. X-XI; text-figs. 1-3).

Material: NEW SOUTH WALES. Neutral Bay, Sydney Harbour, 20 April 1966, 3 specimens, Miss Isobel Bennett, Australian Museum reg. nos. C.63092 (Holotype) and C.63093 (Paratypes).

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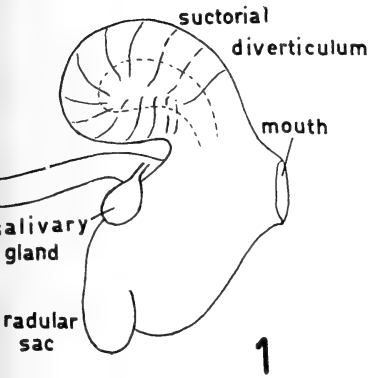
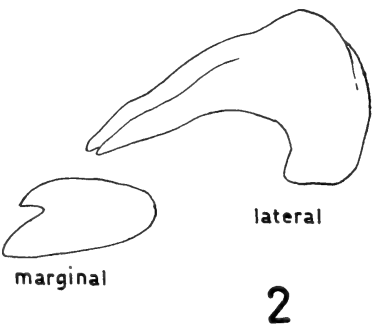
[1] Menke, 1830, Synops. method. mollusc., ed. 2, p. 10. Type-species, *Idalia elegans* Leuckart, 1828.

Habitat: In numbers on long clumps of the Polyzoan, *Zoobotryon pellucidus,* which grows on wharf piles, floating pontoons, under small boats, etc.

Description: The live slugs are about 10 mm. in length; the three preserved slugs examined are 7, 7, 6 mm. long. Live coloration (pl. X) is translucent yellowish, the viscera darker; everywhere except upon the sole with an anastomosing pattern of dark brown lines, even between the branchiae and on the inner and outer sides of the branchial stems. In one specimen, these lines are thicker and more numerous, and consequently the animal appears to be darker. The rhinophores have a chocolate-brown band at the third quarter and white tips. The branchiae are wholly transparent. Preserved animals retain the brown patterning of lines.

The body (Pl. X) is slender throughout and higher than wide at the pericardial eminence anterior to the branchiae. The notum is set off from the sides and the long tail by a notal brim bearing seven to ten simple conical papillae along each side. The two papillae in front of the rhinophores are somewhat longer than the others. The middle line of the notum bears three papillae between the rhinophores and branchiae and often a smaller papilla behind the branchiae. On each side of the middle line anterior of the branchiae stands another series of one to three papillae. The oral tentacles are distinct and ear-shaped as in *O. distincta* Baba (1940: 195, fig. 3). The rhinophores are long and tapering, with seven to twelve cup-like lamellae projecting from the rear edge of the upper half. Branchiae six, simply pinnate and standing in a small circle on the notum.





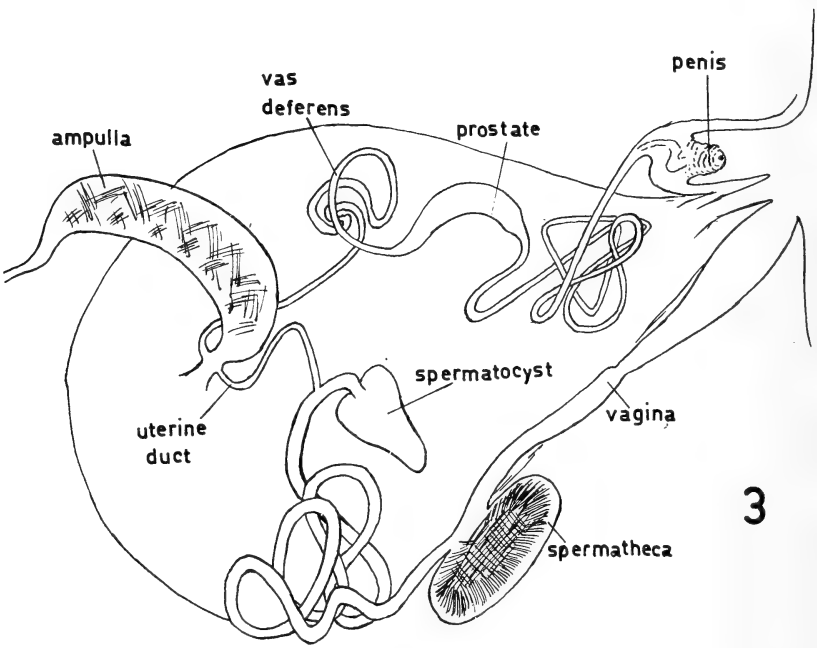
Okenia pellucida Burn.

Figure 1. — Pharynx from right side

Figure 2. — Half row of radula

The small pharynx (text fig. 1) is oval in shape with the radular sac projecting beyond the posterior ventral wall. The suctorial diverticulum is nearly equal in size to the pharynx, its neck is narrower. The salivary glands are flat and broadly oval. The whole of the anterior pharynx and the lumen of the diverticulum is lined by a strong hyaline cuticle. A pair of small thickened pads stand at the mouth, their surface is smooth. The radular formula is 28 x 1.1.0.1.1; lateral tooth (text fig. 2) hook-shaped, the tip appearing bifid at certain angles, with a smooth cutting edge along one side of the cusp. Marginal tooth smaller, wider than high and with two blunt cusps on the outer side.

The genital organs (text fig. 3) have a large lunate ampulla branching to male, female and gland mass ducts. The vas deferens is extremely slender, very long and much coiled. At its inner third there occurs a small short prostatic dilation. The penis is short but capable of extension, conical, smooth and wholly unarmed. The vagina has strong muscular walls at its wider section near the atrium and is narrower at the inner section. The ovoid spermatheca is filled with dark brown matter in the three examined specimens and is visible without dissection. The inner vagina is narrower again, very long and much coiled; at its end lies the pyriform spermatocyst. The uterine duct is very slender and short.



Okenia pellucida Burn.

Figure 3. — Genital organs.

The egg strings (Pl. XI, fig. 2) are laid haphazardly among the branches of the Polyzoan *Zoobotryon pellucidus* (Pl. XI, fig. 1). The diameter of the strings is about 1 mm. The eggs are extremely small.

Discussion: *O. pellucida* is a very distinctive species in a number of ways: (a) translucent yellowish body with the patterning of brown lines all over, (b) the absence of jaw plates or elements, (c) the smooth cutting edge on the lateral tooth, (d) the small prostrate gland, very long vas deferens and unarmed penis, and (e) the very long and coiled vagina.

Marcus (1957: 436, 438) lists 17 species and two subspecies of *Okenia*. To these have been added *O. opunta* and *O. plana* Baba (1960: 80) and *O. babai* Hamatani (1961: 117) from Japan, and *O. angelensis* Lance (1966: 76) from the Californian coasts of Mexico and the United States of America. *O. pellucida* has been compared with all these species from which it is especially distinguished by coloration, both living and preserved.

At Bermuda in the north-west Atlantic, a closely allied species, *Bermudella zoobotryon* (Smallwood, 1910: 143) lives on the same polyzoan species as *O. pellucida*. The genus *Bermudella* differs from *Okenia* only in the absence of the marginal radular tooth. The only species, *zoobotryon,* has similar body shape and papillation to *O. pellucida* but is separated by light brown irregular patches marked by darker brown streaks on a whitish body.

Okenia mija sp. nov.
(Text figs. 4-5).

Material: VICTORIA. Point Danger, Torquay, 21 November 1960, 1 specimen, R. Burn, National Museum of Victoria reg. no. F26138 (Holotype). Reef platform west of lighthouse, Point Lonsdale, 22 September 1963, 1 specimen, R. Burn, National Museum of Victoria reg. no. F26139 (Paratype).

Habitat: Holotype crawling on *Enteromorpha*-like alga at low tide level, Paratype crawling on brown kelp in large pool.

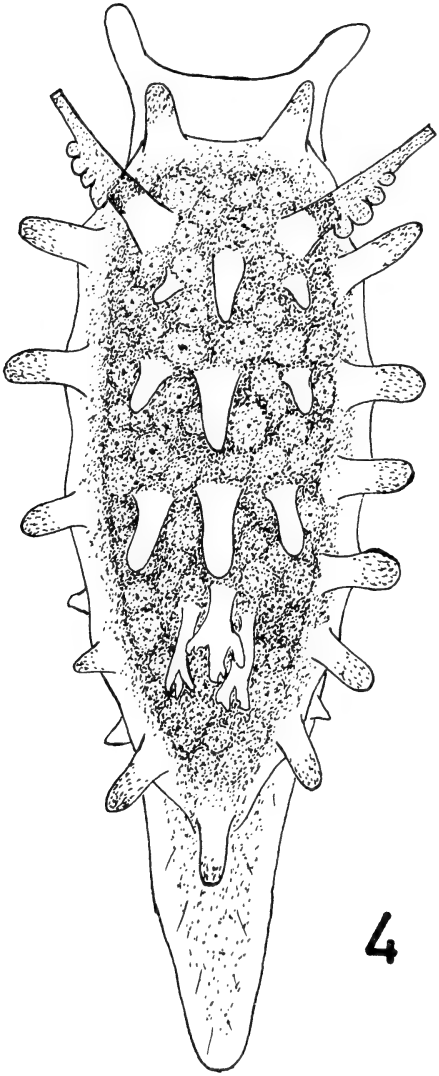
Description: The live slugs were 4.5 and 3 mm. in length. Coloration alive was pale brown body, everywhere with ochraceous yellow spots the centre of which was a black speck. Notal brim, foot edges and papillae bases speckled with white. Rhinophores with white base and brown band at second quarter. Branchiae brown and fawn with black specks. Sole of foot cream. Preserved animals fawn with some orange-brown patches.

Animal (text figs. 4-5) elongate-oval, wider than high. The notum is set off from the sides and slender tail by a notal brim bearing five to seven round-ended cylindrical papillae along each side and one in the rear middle line. The larger specimen (Holotype) had a further three papillae in a middle line series between rhinophores and branchiae and another three smaller papillae each side of the middle line series. The smaller specimen had only two papillae in the middle line series and one small papilla each side of this. The oral tentacles are digitiform and the head is wide. The rhinophores are tapering, with 4-5 bilobed lamellae on the rear of the upper half. The branchiae are three in number and bipinnate.

The jaws, radula and genital organs have not been examined.

Discussion: *O. mija* is easily separated from the New South Wales *O. pellucida* by its more oval shape, fewer notal brim papillae and the black speckled yellow and brown coloration. It is less easily separated from similarly shaped species such as *O. echinata* and *O. japonica* Baba (1949: 45-46, 138), *O. plebeia* (Bergh, 1902: 186) and *O. evelinae* Marcus (1957: 438), but in each case the coloration is different.

The specific name is formed from an Australian aboriginal word "mije", signifying little.



Okenia mija Burn.

Figure 4. — Dorsal view of living Holotype.

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Okenia mija Burn.

Figure 5. — Right dorso-lateral view of preserved Paratype.

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EXPLANATION OF PLATES X-XI

Plate X. *Okenia pellucida* sp. nov., dorsal view of the fully expanded crawling animal (fifteen times natural size).

Plate XI, fig. 1. Part of a colony of the Polyzoan, *Zoobotryon pellucidus,* on which up to 12 slugs were feeding (one-quarter natural size).

Plate XI, fig. 2. Egg strings of *Okenia pellucida* laid on *Zoobotryon* (three times natural size).

Photographs: Isobel Bennett and F. G. Myers.

SPECIAL ANNOUNCEMENTS

LECTURES ON EVOLUTION

The Royal Zoological Society of New South Wales, in conjunction with the Australian Museum, announces ten special public Lectures by Mr. Ronald Strahan, Senior Lecturer in Zoology, University of New South Wales, on "Evolution", to be held in the Hallstrom Theatre, Australian Museum, College Street, Sydney. First Lecture on Wednesday, 1st March, 1967 at 8 p.m., then each Wednesday until 3rd May. Fee: $2.50 for complete series or 25 cents per lecture—tea and biscuits included. For further particulars telephone 55-1397 or 26-6954.

APPEAL FOR BACK ISSUES

Members or their friends having duplicate or unwanted back numbers of the *Australian Zoologist* or our *Proceedings* are urgently requested to inform the Honorary Secretary (Mrs. L. Harford, telephone 55-1397), as stocks of some issues are at a low level and it is becoming difficult for the Society to fill orders for sets or to maintain exchanges.

LIFE ON A SAND BEACH

From the Diary of MELBOURNE WARD

On the northern side of Lindeman Island in Queensland, the jungle-covered hills slope precipitously to the sea extending out as promontories between which are curving bays each with sand beaches. The fringing coral reefs form a platform extending seaward and joining up each headland so that at low water the bays dry out leaving flat sand and silt beaches over which one may wander and pry into the lives of myriads of strange denizens of the sea.

Let us imagine ourselves on one of the beaches. The dark green jungle is at our backs. High above our heads the fleecy clouds sail majestically across a sky as blue as our ocean. Each cloud seems to detach itself from the high hills as though belched forth by a volcano. We feel no breeze, only the soothing warmth of the sun. Before us are the steeply sloping beach and gently lapping waves. The tide is on the fall but has not yet left the steep beach which has been built up by successive storms. Far out over the rippling waters the sphinx-like form of Lion Island raises its lofty head, an age old sentinel of the islands. Far back in the jungle a white cockatoo sets up its discordant squall lasting for a few moments and then all the world seems to be plunged again into a reverie of sunshine and gently lapping waves.

Foraging silver gulls wheel to and fro across the narrow bay, their sharp eyes searching the sunny water for unwary fish or the bodies of sea creatures which have succumbed to the unrelenting rigour of their environment. Beneath the surface of the sparkling wavelets, voracious shovel-nosed rays patrol the sand, feeding upon the luckless dwellers who have prematurely risen to the surface. Life in this tranquil bay seethes and struggles, each form of animal preying upon the other in a vicious circle.

The first sign of life which we come upon as we stroll along the high tide line is a round hole with a mass of excavated sand lying in front of it. Let us sit down beside the burrow and keep perfectly still. In a few minutes the long white and brown legs of a Ghost Crab appear suddenly and an eye of extraordinary length is raised, the crab remains thus poised for some seconds and then rushes a short distance into the open, its thick body raised high above the sand; it flings a pellet of sand which it has been carrying pressed between its big nipper and the front of its body, and then, as though terrified at its own audacity, flashes back and down the burrow. While it is down below digging more sand from its burrow, let me gossip a little about its habits.

Those long cylindrical eyes with their permanently surprised expression are made up of thousands of tiny facets which look like the panes in a leadlight window. Each is connected to a central ganglion by a thin nerve and it is said that each little facet picks up a portion of the surroundings, and that a mosaic picture is projected in the central nerve. Each eye sees the whole landscape and yet the crab does not differentiate between a flying gull and a piece of wind blown paper or leaves. While it is down the burrow I place my foot gently, right beside the burrow mouth and as the crab comes out with more sand it examines my foot with evident curiousity, touching it with its nipper and walking over it. If I blink my eyes the crab darts down its burrow again. It would seem then that the danger signal is movement, rocks and trees and all stationary objects are not to be feared. The walls of the burrow are kept from falling in by the crab pressing its rounded back against the walls and we can see it straining against one wall by pushing against the opposite side with its nippers.

Ghost Crabs play an important part in the economy of the beach; they are active and tireless scavengers. They also obtain a large amount of food by scraping the surface sand below high water mark, passing the sand through the mouth parts and at the same time extracting the microscopic wayfarers which have been left by the receding tide.

During the day Ghost Crabs usually remain close to their burrows and any excursions from their havens of refuge are made with lightning speed. They rely upon their protective coloration, for when surprised at a distance from the burrow the crab will press itself close to the sand and remain perfectly motionless until such time as the way to the burrow is clear. If the crab has gone too far from its burrow it will dash into the water and bury itself in the wash of the waves. At night they leave their burrows and make for the sea, one can see them with the aid of a torch as they enter the water to moisten their gills. Some say that these crabs are phosphorescent but I have not observed the phenomenon personally; their coloration at night is different from that of the daytime.

The species we have been observing on the Lindeman beach, *Ocypoda ceratophthalma,* has a sound-producing organ with which it emits a noise rather like a cricket's. There is a long line of granules on the inner surface of the larger hand which plays across a single ridge at the base of the nipper, thus producing a grating sound. This form of sound organ occurs not uncommonly amongst the crabs and their allies as we will see when we eventually get onto the sand flats away from the shore.

While I have been gossiping beside this crab burrow the tide has been rapidly falling and we may now set out for the next sand dwellers. At the foot of the steep beach we come upon very small vertical burrows; the surrounding surface is covered with pellets which are in rows, radiating in all directions from the burrow mouth. This is the work of a small crab called the Sand Bubbler, *Scopimera inflata.* It has extraordinarily enlarged mouth-parts into which it shoves the sand with its nippers, using a surprisingly rapid alternate movement, tossing the sand away over its back in the form of a pellet or bubble. It moves sideways away from the burrow as it feeds and, like its relative the Ghost Crab, will dart away to safety when disturbed. It soon rises to the surface again and starts to feed once more, but in a different direction, thus forming the often radiating lines of pellets.

The Sand Bubbler, in common with the Ghost Crab and other related forms living an amphibious existence, has a secondary method of obtaining water for respiration. As well as the usual method of drawing water in at the base of the nippers, circulating it through the gill chambers and out at the mouth, the secondary method is to draw the water from wet sand through special apertures placed between the walking legs, a single aperture on each side of the body. The crab presses itself against the sand and absorbs the moisture, all sand grains being sieved out by bunches of stiff hairs placed around the apertures.

Close by the Sand Bubbler we see small narrow, deep trenches with no evidence of life. By digging at the ends of the trench we will find a small white bivalve mollusc rather like a pipi. It digs its way through the sand with its tongue-shaped foot and forms a basic food of the carnivorous denizens.

We leave the coarse sand of the steep beach and enter upon the exposed wave-ribbed area. Through the surface silt dozens of small, fast-moving *Nassa* snails travel with their questing siphons held erect before them. Several have found a small stranded jelly fish and are hard at work feeding upon it, each has thrust its proboscis or feeding tube into the victim and we can see the round aperture enlarging and reducing like an iris diaphragm as the jelly is sucked in. The feeding proboscis of

these small molluscs is much larger than the siphon which is only used in respiration and as the ghoulish feast is indulged in it is directed away from the victim.

Another of the snails, *Natica,* extrudes an enormous foot covering a much larger area than the shell and the whole animal ploughs its way just below the level of the surface silt and we see them first as a moving mound of silt. These snails lay their eggs in a curious collar shaped mass known as a nidus which is made up not only of eggs but sand grains as well.

As we walk we will notice broad shallow depressions in the smooth surface of the silt, so formed that one can realise that whatever is responsible for them is moving, though very slowly. Upon digging, we find the curious flat biscuit urchin whose spines are as fine hairs. On the upper surface we can trace the outline of a star. The colony of biscuit urchins is quite close to the steep beach and many are to be seen, or their presence detected, by the shallow pits mentioned. Their progress through the sand is accomplished with the aid of the coat of fine spines.

Everywhere over the sand and especially in the shallow pools left by the tide, are dozens of small hermit crabs, *Diogenes* sp., scuttling along and joining in feasts upon dead animals side by side with the rapacious *Nassa.* The love affairs of these small hermits are tempestuous, one will frequently see the impetuous male dragging the female along by the nipper. They often bury themselves in the sand along with their mollusc shell home. Several larger hermit crabs occur and have their legs striped with green and yellow, these are *Clibanarius taeniatus* M. Edw.

As we progress across the flat we come upon patches of short, fine Eel Grass, *Zostera,* and if we pause and look ahead of us we can see dozens of pairs of small stalk eyes thrust up and the moving forms of small crabs, *Macrophthalmus* sp. These dig sloping burrows in shallow depressions where small pools are left. Their bodies are very wide and adapted to a burrowing existence. They feed upon the microscopic life deposited near the burrow.

The faint sounds of tiny lives rise to our ears from the sands; mysterious clickings and tiny subterranean gurglings here and there are from low volcano-like mounds from the craters of which black sand and water gush periodically like minute eruptions, though merely caused by a large worm.

Where sheets of very shallow water are retained we will notice three small circular apertures placed close together and surrounded by a little mound of silt; as our tread shakes the sand these apertures suddenly close and leave no trace in the surface. There is quite a large colony of these strange disappearing holes and if we examine them we will find the Tongue Shell, *Lingula,* which in the true sense of the term is not a shell. Zoologists seem to be divided in their opinion as to the relationship of these retiring creatures; some place them near a worm called *Sipunculus.* They belong to a very ancient order of animals which were far more numerous in the primordial seas than they appear to be today. *Lingula* is unique in its tribe in that it inhabits sand flats instead of being attached to solid objects. Now let us dig one out. The set of three holes disappears from the surface and we find upon digging that there is a perpendicular burrow formed to accommodate the narrow, flat, elongate shell. The broad burrow extends downward four or five inches and we find the shell at the bottom whence it has been drawn by the muscular stalk upon which it is attached. Below it, the burrow can only accommodate the stalk and the walls of this lower burrow have been somewhat hardened to give a grip to the stalk, while the walls of the upper broad burrow are held in place by a mucous secretion.

Lingula spends its adult life within the burrow, rising to the surface, protruding the bristle-protected tips of its shell above the level of the sand and drawing the water down the outside holes, exhaling through the central one. One species has been found to be bisexual or having each individual of one sex only. In that species the sperm and ova are formed in a simple fashion and extruded into the water for fertilization, an apparently haphazard method at first sight, but when it is realized that *Lingula* is a gregarious animal one will understand that the chances for the future welfare of the species are really much better than the method might at first suggest.

Examine one of the shells we have dug out. We find it a long, flat bivalve shell, about as large as my thumb though not as thick. The valves are flattened and close neatly, the sides are parallel and taper abruptly to meet the worm-like stalk. The actual composition of the shell is different from molluscan shells in that it is formed for the most part of chitin, a substance used to build up the bodies of insects and crustaceans, whereas molluscan shells are of lime.

Some authorities say that *Lingula* and its allies have existed for countless ages largely on account of their being useless as food, though it is recorded that almost one hundred years ago they were used by the natives at Manila as food. They appear to have been very numerous there at that time, for one man records collecting 20 bushels of them on a beach after a storm.

By this time we have reached the edge of the water and although the sand is crawling with small shells and hermit crabs our attention is drawn by a curious tree-like creature, brown in colour, standing almost a foot above the sand. It is situated in the centre of a shallow crater. Its lowest branches are widest and the remainder taper away toward the top, the whole creature is reminiscent of a densely foliaged pine tree. Actually it is an animal, the Stinging Anemone, and on being disturbed it retracts itself into the sand with surprising speed. The sting cells with which it is armed are extremely powerful, having a painful effect upon a human being. Another anemone lives on the sand and appears flat upon the surface, spreading the top of its body into a disc; its tentacles are very minute.

A large shell inhabits this area and spends its life partially buried in the sand. It is known as the *Pinna* or razor clam, and is a bivalve. It is narrowly triangular in outline and is held in place by a bunch of fibrous threads attached to a stone or piece of coral. These threads occur in other genera and were used by the ancient Greeks and Romans to make fishing lines.

Upon opening the *Pinna* we find a pair of commensal crabs, *Pinnotheres,* living within the body cavity. The crabs are pale yellowish-white in colour and their exoskeleton is very thin and fragile. The female is larger than the male and has the abdomen enormously enlarged to receive the extruded eggs. The eyes are rudimentary and the whole adult life of the crab is spent within the body of a host.

The curious coral, Pennatulid or sea pen occurs hereabouts; at a distance it looks like a twig stuck in the sand and its removal proves quite a difficult problem. The lower part of the colony can be inflated to form a secure anchor and one must pull hard in order to extricate it. The fronds of the colony are small and only one form has been observed so far at Lindeman Island. I remember collecting several distinct species at Cape York and upon one of these I found the commensal *Porcellanella triloba,* a small elongate porcelain crab, occurring in pairs, the females larger than the males. The host had broad, flat fronds which partially hid the crabs.

The agile crabs found in a few inches of water on the Lindeman flats are of considerable interest, all are carnivorous and fierce and as we

walk through the water we continually disturb them. The most common are the young of the common edible crab, *Portunus pelagicus,* these wander over the sand occasionally excavating burrows under dead coral blocks. Usually they have their lairs amongst the rocky shores bordering the beaches to which they retreat upon being disturbed. The most beautiful of the sand crabs, however, is *Matuta.* They appear to be gliding over the sand with a half swimming half walking movement, stopping ever and anon to investigate some small object. The body of *Matuta* is circular in outline, somewhat flattened with a sharp spine on each side. All the walking legs are flattened to expedite its digging into the sand. This crab buries itself under the sand with extraordinary speed, one moment it is walking quietly along, the next it gives a spasmodic jerk of all the walking legs and disappears. While buried, *Matuta* obtains water for the gills by drawing it down a small aperture in the floor of the eye-socket, then over a surface of the body against which the nippers are closely applied and the sand grains are strained out by the stiff hairs on the surface of the body and nippers. They have sound-producing organs on the nippers and under surface of the body resembling those described for the Ghost Crab, but the ridges are smaller and placed on both nippers instead of on one. We find in our rambling over the sand flats that *Matuta* are more apparent, moving about in search of food as the tide nears the full extent of its ebb, and do not appear on a rising tide, probably because of the voracious shovel-nosed rays which glide shorewards with the rapidly inflowing water.

Another of the beautiful denizens of the sand flat is a tube building worm. Some of these build a chimney-like case, an inch or more in diameter, rising several inches above the sand and formed of a silky material, black in colour and having the outside covered with silt. Into the water the worm protrudes a mass of tapering tentacles resembling a chrysanthemum bloom. Each tentacle is cylindrical and smooth and the whole mass is retracted into the tube when the worm is disturbed.

One of the most retiring and rare denizens of the flat is a giant mantis shrimp, *Squilla* sp., whose burrows extend vertically into the sand. The mouth of the burrow is smaller than the burrow itself and the margin is formed of a thin layer of sand held in place by mucous secretion. The burrow is wide enough to allow one's forearm to be trust down without disturbing the walls. The Mantis Shrimp stations itself at the top of the burrow, thrusting its eyes and antennae above the surface. From this vantage point it will pounce upon a passing fish, seize it with its powerful forelimbs and retreat into its refuge again, drawing the captured fish in after it. I have seen garfish over one foot long partially drawn down the burrow.

Associated with the *Squilla* is a unique bivalve mollusc which does not develop protecting shells, but lives a commensal existence on the walls of the mantis shrimp's burrow. The *Squilla* itself is a strange looking animal, its body divided into two main portions, the hinder being by far the longer of the two; the small anterior portion carries the eyes, sensory organs, mouth-parts, and the huge raptorial limbs resembling those of the mantis, with which the prey is seized. Unlike the prawns and lobsters in which the gills are carried in the anterior portion of the body, the *Squilla* has the gills attached to the leaf-like swimming appendages on the under surface of the abdomen. The tail or telson is fan-shaped and armed with sharp spines. The water is aerated in the burrow by the continual beating of the swimming appendages which create a current.

Since writing these notes upon the burrows built by *Squilla* I have dug out several and find that the burrows are vertical for about 18 inches, then take a sharp turn and continue on parallel with the surface. After extending for almost six feet the burrow branches into two, and these are under submerged masses of corals. During the process of excavation

the *Squilla* created a powerful current in order to clear the fine sand which was falling into the burrow. On several occasions I tried introducing various heavy chemicals into the burrow with an idea of dislodging it but failed at each attempt, probably on account of the shape of the tube and the strong current of water maintained by the *Squilla.*

In certain parts of the sand flat the narrow tubes of the Horseshoe Worm, *Chaetopterus,* are to be seen. The ends stand two or three inches above the sand and taper to a very narrow opening at the top. We find them standing six or eight inches apart and upon carefully digging, discover they belong to one horseshoe-shaped fragile tube. The worm is delicately formed and lies in the bottom of the tube. Two crabs, *Polyonyx transversus,* usually found in association dwelling within the tube appear to get in when the crab is very small. These crabs are capable of folding the nippers and legs so that they can move up and down the narrow tube, but cannot pass out of the narrow openings. Competing in this association is a small crab, *Lambdophallus,* modified for its peculiar existence being much broader than long and barrel-shaped to allow easy movement in the tube. The strangest thing about this crab is the fewer pairs of walking legs than usual amongst crabs. The group is known, in a broad sense, as Decapoda, or ten-legged, but in *Lambdophallus* and several other allied genera the pairs of walking legs are reduced to three pairs instead of four and the last pair are the longest. *Lambdophallus* was first described by Alcock from Indian Seas and it is interesting to observe the genus from Australian flats.

Females of *Lambdophallus* have stridulating ridges or sound-producing organs situated upon each hand; the sound is produced in a manner similar to that of *Matuta,* a quick rubbing movement of the hands against the under surface of the body.

In some parts of the flat we find an extraordinary octopus lying upon the surface of the sand in shallow pools, spreading its tentacles over the surface, like the spokes of a wheel. Its body is very small, about the size of the last joint of one's little finger, but the tentacles are at least eight inches long and very slender. When disturbed the octopus vanishes quickly down a burrow in the sand. The limbs are extraordinarily fragile and are easily detached in handling the creature, the cast tentacle wriggles about for some time, having the appearance of an agitated worm.

If we are lucky we may find the giant Bailer shell, *Melo amphora,* wandering along the surface or half buried under the sand. It feeds upon other molluscs and I have found several in the act of killing the Spider Shell, *Lambis lambis.* The other giant mollusc is known locally as the Bugle Shell, *Syrinx aruanus,* and is found on the sand near the inner edge of the fringing reef. Like *Melo* it feeds upon other mollusca and I have also found one which had caught one of the great worms and was feeding upon it, the shell was almost entirely buried in the sand in its pursuit of the worm.

As we pass one of the stinging anemones we may notice one of the biscuit urchins lying upon its back close to the anemone and if we turn it over we find an extraordinary crab underneath. This is called the man-faced crab, *Dorippe,* on account of the perfect replica of a Japanese mask upon its back. The crab has the last two pairs of walking legs directed over the back so that foreign objects such as shells, sea stars or urchins may be held as a covering over the crab. This is made possible by the subchelate form of the last two portions of the walking legs.

Where *Zostera* abounds we may find several interesting spider crabs. After the tide has left, the flat small pools occur, filled with *Zostera,* and by combing the weed and surface silt with the hands we find two long armed crabs, *Rhinolambrus* and *Aulacolambrus.* The first is masked

with a light coating of silt and the crab moves very slowly so that it is perceived with difficulty. *Aulacolambrus* is flatter and is covered with a dense coating of silt and lies buried in the surface silt. It has a highly specialised method of respiring on the same principle as the box crab, *Calappa*. *Rhinolambrus* appears to be the commoner of the two, but both are different species from the related Parthenopids found in deep water.

The event which I am now going to describe has something of the unbelievable in it, reminiscent of a Walt Disney film. A friend of mine living in Cairns had taken up moving picture photography, using a large aquarium tank. He would set his camera facing the glass, put some strange marine animals in the water and then set his camera going as the action developed within his small section of submarine world.

On one occasion he had obtained two hermit crabs, *Dardanus megistos*. One was larger than the other and by a lucky coincidence the larger of the two was carrying a shell slightly small for its size, the other smaller crab had a shell too large. When he dropped them in the tank both crabs drew back into their shells; he started his camera off as they began to emerge.

There is always something ludicrous in the "pop eyed" expression of a hermit crab and these two were laughable. After a few moments of looking about, the larger crab caught sight of the smaller one and seemed to realize that its shell was too large for it so scuttled over to have a closer view. The little hermit shot back out of sight and the big one put its eyes into the mouth of the shell as though making sure that it had seen alright. Apparently convinced that there was a crab inside, the big one stood back and seemed to cogitate, then deciding that the shell was more commodious than its own, it began to expel the small owner. Grasping the rim of the shell with its great nipper, it lifted it off the bottom of the tank and gave it a tentative shake. The small occupant stayed well out of sight. The big crab took another peep inside, followed by another shake more vigorous than the first. Still the owner refused to vacate, so after another pause the larger crab, still holding the smaller shell, began shovelling sand into the beleagured home much to the discomfort of the owner, who showed its agitation by waving the ends of the walking legs.

The hermit crabs carry long, soft, rather worm-like tails which have to be protected, and the coarse coral sand was obviously very irritating to the owner of the disputed shell. In fact only a few "handfuls" of sand and some vigorous shaking were needed to make it pop suddenly out into the open and scuttle off to the shelter of a nearby mass of dead coral.

The victorious crab stood motionless for a few moments and seemed to be making sure that the coast was clear. He carefully upended the shell to get rid of the sand grains which had proved the undoing of the previous owner, then, quick as a flash, he pulled his own tail out of his own shell and inserted it into the new, larger shelter and settled in. My friend's camera only just caught the entire action, the film giving out as the big bully settled in.

Years later while visiting Heron Island in Queensland, I did a considerable amount of night collecting on the reef and the hermit crabs moved about in numbers in the dark. At the time of my visit there were many specimens of a sea star scattered among the crabs; most of these stars were damaged, with new legs growing, but all displayed evidence of mutilation and I wondered what the cause might be. On my first night on the reef I discovered that the big hermit crabs, *Dardanus megistos*, were commonly seen holding the stars and cutting the arms off and eating them.

SYDNEY CAPTURES OF THE BUFF-BANDED HAWK-MOTH **HERSE GODARTI**, W. S. MACLEAY, 1827.

By L. Courtney Haines
(Honorary Associate (Lepidoptera), Australian Museum).

(Plate XII)

The Buff-banded Hawk-moth, more generally known to the moth collecting fraternity as Godart's Hawk, has always been regarded as a northern "thing"; and an examination of the labels attached to specimens housed in Australian Museum cabinets certainly seems to suggest that this rather fine hawk-moth has indeed a liking for the warmer parts of our continent. In Queensland, specimens have been taken at Cunnamulla, Carnarvon, Bulimba, Eidsvold, Kensington Downs, and Gordonvale; while in New South Wales several captures only have been made: one at Buck's Creek near Cangai, upper Clarence River, collectors D. K. McAlpine and R. Lossin; and four at Murrurundi, collector Dr. B. L. Middleton.

I now wish to place on record the capture of two specimens of *Herse godarti* in the Pittwater District, 20 miles north of the City of Sydney, and the taking of one specimen in Sydney itself.

On November 20th, 1965, that very keen lepidopterist, Mr. Donald Sands of Newport, pill-boxed a female *godarti* which had been attracted to his home mothing-lamp. This specimen, in nearly perfect condition was very kindly photographed for me by Mr. C. V. Turner of the Australian Museum, and now serves to illustrate this paper.

A second capture of this species, also a female, but in slightly worn condition was made by myself at light on February 1st, 1966, at Bayview.

The third specimen, a male, and reasonably presentable in appearance was collected on February 5th, 1966 by a Mr. C. Yeo in Balmain, Sydney. Mr. Yeo was interested enough to take his remarkable capture along to the Australian Museum for identification.

There is no doubt that *H. godarti* could possibly be overlooked by collectors; for when viewed in the rays of artificial light such as those produced by the Mercury Vapour lamp, one cannot detect the buff markings on the abdomen and wings, which instantly distinguish *godarti* from the closely allied pink marked *H. convolvuli,* the latter being a common Sydney species.

The Newport and Bayview specimens are both in the author's private moth-collection.

The Balmain specimen is in the Australian Museum moth-collection.

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BOOK REVIEW

Australian Birds in Colour, by Keith Hindwood—Published by A. H. and A. W. Reed, Sydney—Wellington—Auckland. Price $3.25.

This book consists of 52 coloured photos mostly of the smaller passerines, some of which will not be readily observed by bird-watchers. However when the text is examined besides the information on habits and breeding of the species illustrated, much information is given on the whole group to which the bird belongs. Their distribution inside and outside Australia is also given so that an idea is obtained on how the birds fit into the Avifauna of the world.

Much of the information on habits and plumage is not yet to be found in any other book.

The photos chosen, and taken by eleven different photographers, are mostly taken with the aid of flash. The printed reproductions of the colours are very good, even the exact colours of the soft parts, like the legs and irises can be seen.

There are also many interesting historical notes and it is felt this book should be on the bookshelf of all interested in Australian birds.

— H. J. de S. DISNEY.

Royal Zoological Society of New South Wales, 1965-66

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Lucey, Master D. J., 14 McKinnon Avenue, Padstow.
McRae, Mrs. E. L., 1 Bradley's Head Road, Mosman.
Moore, Mr. R., 17 Bain Place, Dundas.
Newman, Mr. R. O. M., 41 Redan Street, Mosman.
Pyke, Mr. G. H., 13 Havilah Street, Chatswood.
Riddell, Mr. T. L., 19 Rickard Avenue, Mosman.
Roberts, Miss J. R., 27 Bay Street, Mosman.
Sandifort, Mr. A. F., 7 Ireton Street, Malabar.
Trenerry, Mr. W. L., 3/48 Middle Head Road, Mosman.
van Brink, Mrs. R. C., 19 Kirkoswald Street, Mosman.
van't Hoff, Mrs. M. R., 13a Whiting Beach Road, Mosman.
Weakley, Miss C. E., 44 Hopetoun Avenue, Vaucluse.

Juniors

Bishop, Master R., 54 Tobruk Avenue, Cremorne.
D'Apice, Master J., 5 Telegraph Road, Pymble.
van't Hoff, Master N. H., 13a Whiting Beach Road, Mosman.

Alterations in Addresses (as at the end of 1966)

Burns, Mr. W. J., 495 Main Road, Trentham, Upper Hutt City, N.Z.
Cook, Mr. J. E., 20 Achilles Road, Engadine, N.S.W
Connell, Mrs. E., 65 Mountview Avenue, Beverly Hills.
Day, Mrs. C. S. D., 47 Gordon Road, Long Jetty.
Francis, Mr. J. J., P.O. Box 35, Gymea.
Goodrick, Mr. C. B., 15 Victoria Street, Katoomba.
Gray, Mrs. S. E., 165 George Street, Rockhampton, Qld.
Greenup, Mr. L. R., Unit 15, 50 Solander Street, Brighton-le-Sands.
Griffin, Dr. D. J. G., c/- Australian Museum, P.O. Box A285, Sydney South.
Healy, Mr. A., 42 Bristol Street, Merrylands.
Hoffmann, Mr. G. F., P.O. Box 14, Cammeray.
Hunt, Mr. A. C., Murrlumbing Station, Charters Towers, Qld.
King, Mr. R. C., Public School, Menangle.
McDonald, Miss P., 33 Holdsworth Street, Neutral Bay.

McDonald, Mr. R. W., 24/45 Walker Street, Redfern.
Mackay, Mr. R. D., Papua and New Guinea Museum, c/o Supreme Court, Port Moresby, Papua.
Nardi, Miss L. A., 52 Fitzroy Place, 204 Jersey Road, Woollahra.
Oldham, Mr. R. V., 20 Woodcliffe Crescent, Woody Point, Qld.
Paterson, The Hon. J. G., 21 Kardinia Avenue, Mosman.
Rogers, Miss A. J., 15/216 Blue's Point Road, North Sydney.
Schluter, Miss Y., 7 Albert Street, Edgecliff.
Sharland, Mr. S. R., 1 Erina Place, Hobart, Tas.
Slater, Mr. K. R., c/o Animal Industry Branch, Northern Territory Administration, Alice Springs, N.T.
Webster, Sir Robert, 2 Buena Vista Avenue, Mosman.
Weingott, Mr. L., 5 Durham Street, Hunters Hill.
Wilson, Mr. H. H., 3 Warrawidgee Road, Villawood.
Young, Mr. D., 4 Jason Place, North Rocks.

Removed from Register

Allan, Miss Joyce K., 72 Cremorne Road, Cremorne.
Blackmore, Miss S. M., 26 O'Connell Street, Sydney.
Brezzo, Mr. V. K., 12 Bueno Vista Avenue, Clifton Gardens.
Clayton, Mr. N. A., 87 Albert Drive, Killara.
Dawson, Mr. J. B., 92 Johnson Avenue, Seven Hills.
Dowling, Mr. W. McK., "Canningalla", Bandon Grove, via Dungog.
Fletcher, Mr. G. H., Barker College Junior School, Hornsby.
George, Dr. C. W., 2 Edwards Bay Road, Mosman.
Halloran, Dr. Aubrey, 38 Brighton Boulevarde, Bondi.
Hardy, Mr. G. H., 68 Cliff Avenue, Northbridge.
Jones, Mr. C. N., Unit 2, 64 Thorn Street, Kangaroo Point, Brisbane, Qld.
Keeling, Mr. A. J., 17 Silex Road, Mosman.
Lewis, Mr. G. O., 273 Dora Street, Hurstville.
Macdonald, H. A., 2 Milton Avenue, Mosman.
Morris, Mr. E. G., 762 King Georges Road, Penshurst.
Morris, Mrs. N. D., 762 King Georges Road, Penshurst.
Parker, Mr. B. S., P.O. Box 109 City, Canberra, A.C.T.
Rogers, Miss E., c/- Ludowici & Caldwell, 57 York Street, Sydney.
Thompson, Mr. J. C., 45 McLachlan Avenue, Rushcutter's Bay.
Thompson, Mrs. I., 45 McLachlan Avenue, Rushcutter's Bay.
Vance, L. W., 14 Lennox Street, Mosman.
Vance, Miss A. L., 14 Lennox Street, Mosman.
Walsh, Miss J., 20 Fletcher Street, Bondi.
Ward, Melbourne, Gallery of Natural History & Native Art, Medlow Bath.
Wheelright, Mr. A. H., "Rosedale", Narrawqua, Private Bag via Crookwell, N.S.W.

Members are requested to inform the Honorary Secretary (Mrs. L. Z. Harford — telephone 55-1397), of any change of address.

Authors alone are responsible for the opinions expressed and for the accuracy of the facts in their contributions.

Dr. Aubrey Halloran

Miss Joyce Allan drawing a shark at the Australian Museum in 1931.

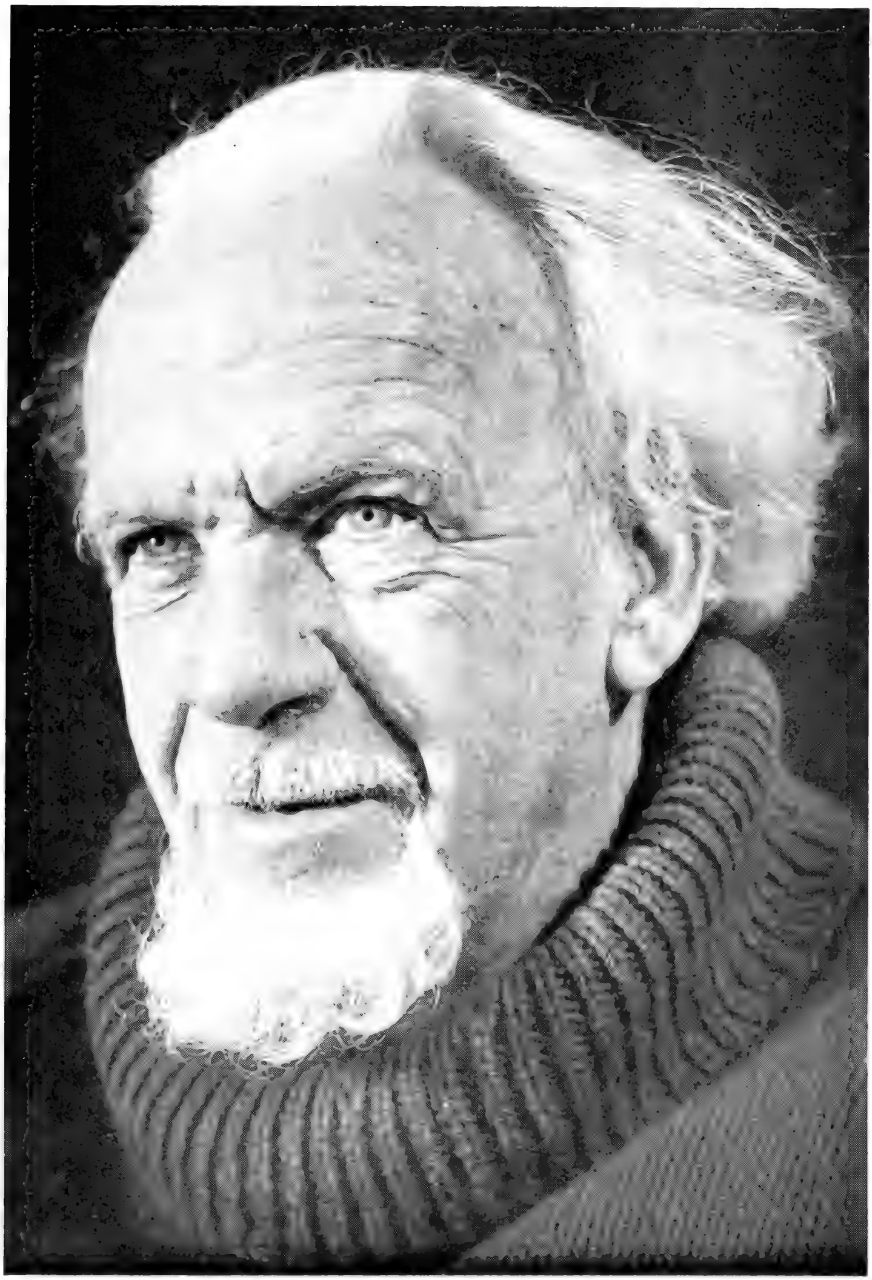
Miss Joyce Allan

Block by courtesy of the Malacological Society of Australia.

Mr. and Mrs. Melbourne Ward outside their Museum on Lindeman Island, Queensland, in 1935.

Interior of Mel Ward's Museum, Lindeman Island.

In background (*left to right*):- G. P. Whitley, Mel Ward and Professor W. J. Dakin.

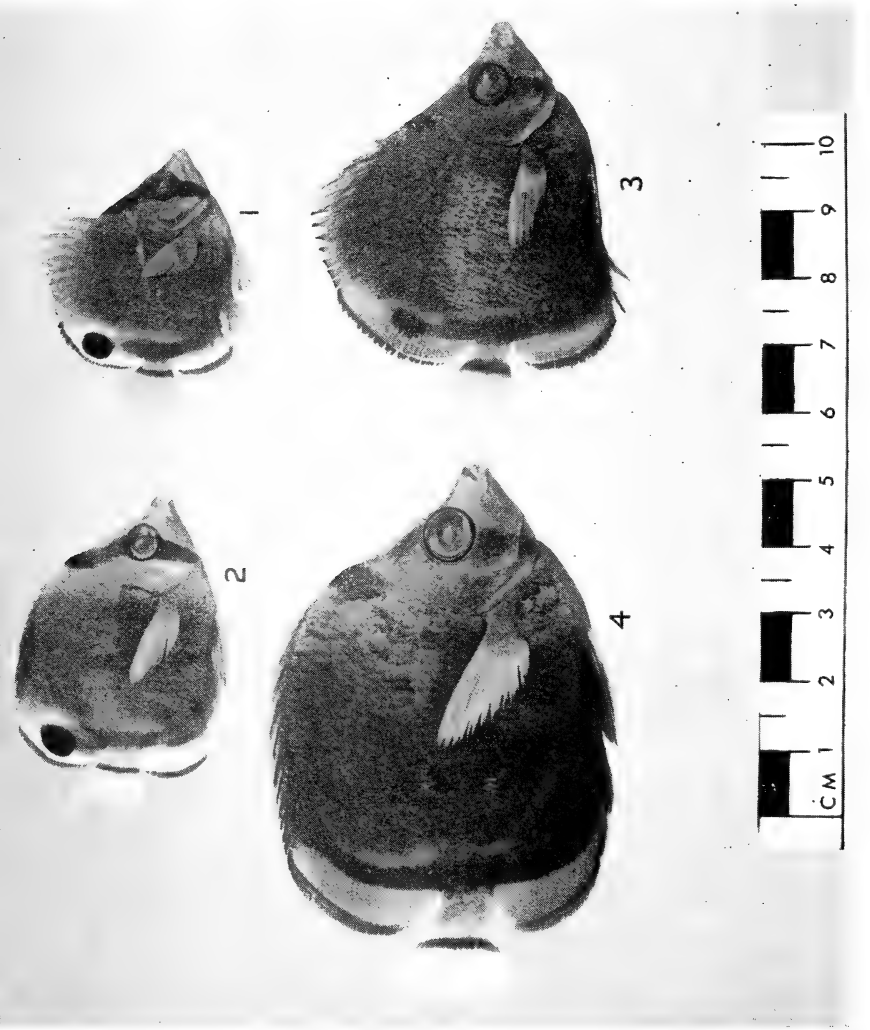


Mel.

Ornithological Section—Field-day, Long-neck Lagoon, Richmond, N.S.W.
From left to right, back row: Mr. L. Courtney-Haines (Chairman); Mrs. Gadsden; Messrs. Roberts; Rice; Battam (Hon. Secretary); Fordham; Mote; Mrs. Fordham; Messrs. West; Dibley; Alcorn; McKay, Scotchmer and Dr. Hartnett.
Middle Row: Misses Hartnett; Fay; Mrs. Hartnett; Miss Black and Master Peach.
Front Row, seated: Master Hartnett; Mesdames Rice; Graham; Dewar; Dibley; McKay and Miss Nock.
— Photograph by Dr. Bruce Hartnett.

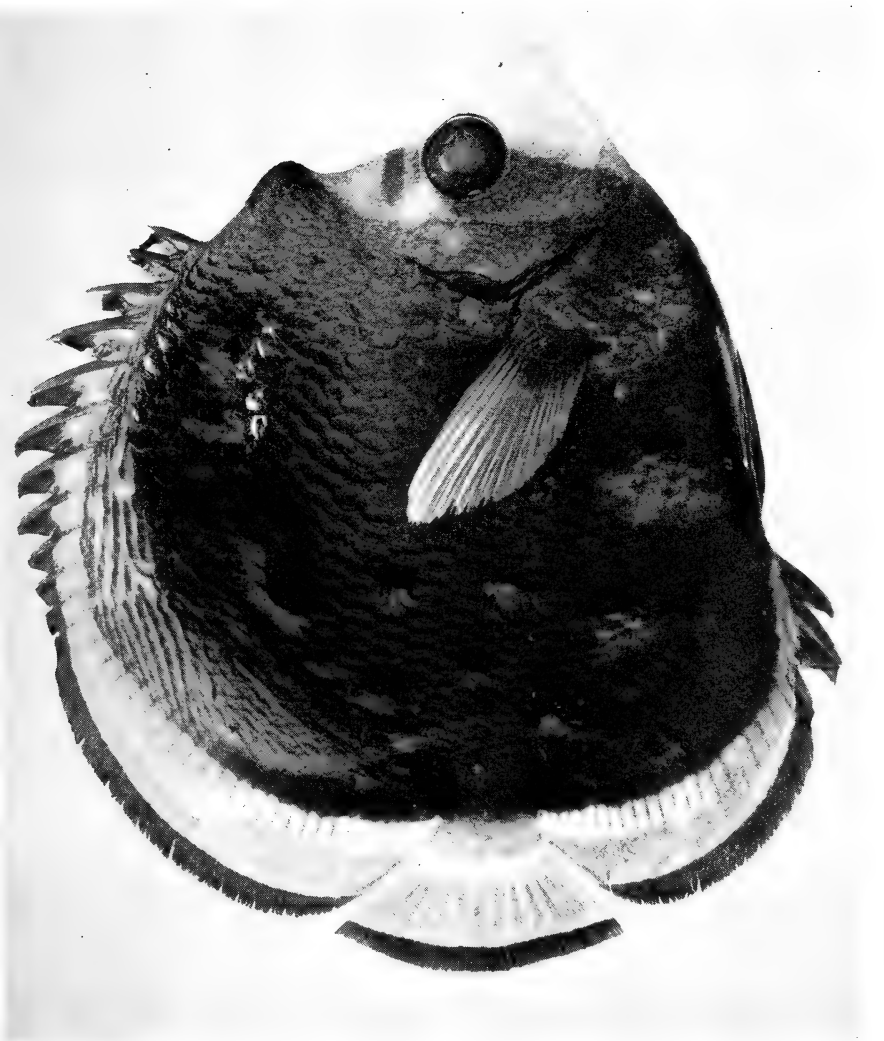
1. William Sheridan Wall.

2. Thomas Wall's tomb. From the original woodcut of 1854 in the Public Library, Sydney (For explanation, see page 44).



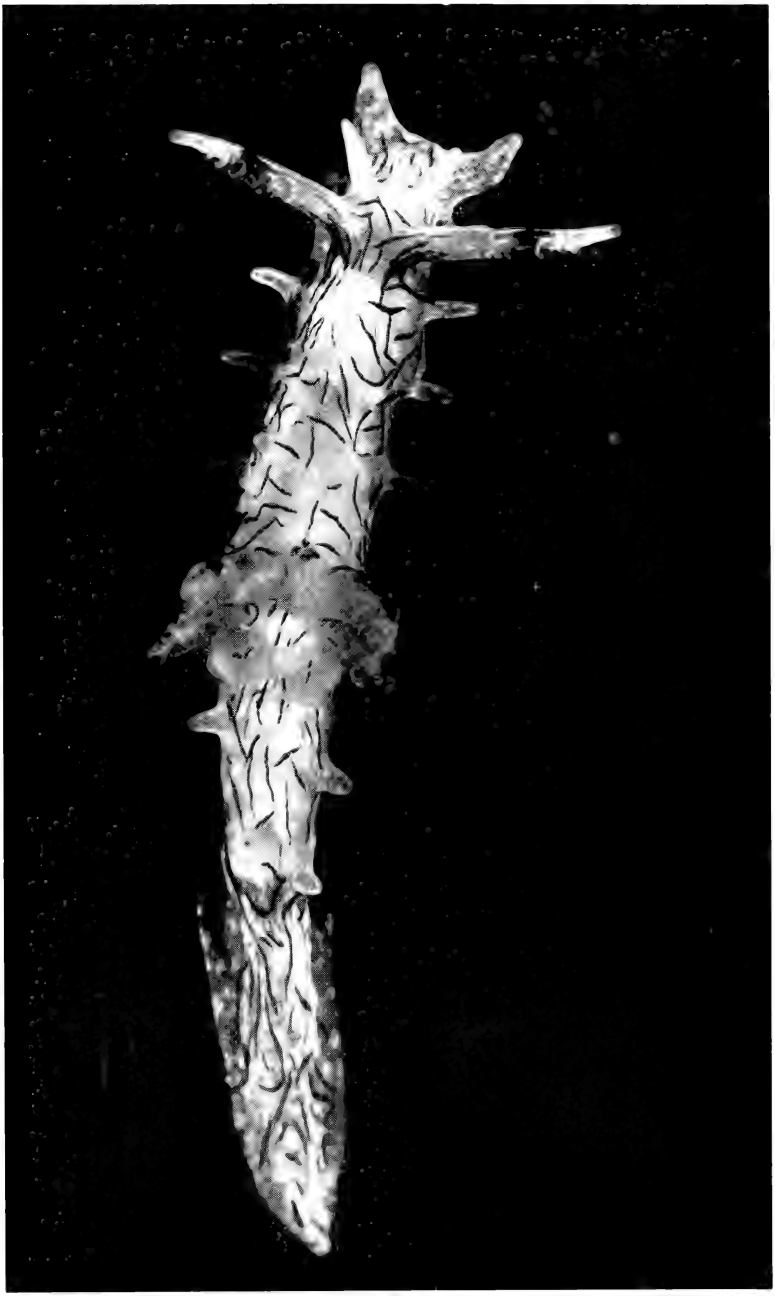
Chaetodon aphrodite = *C. flavirostris*.

Photo — C. V. Turner,
Australian Museum.

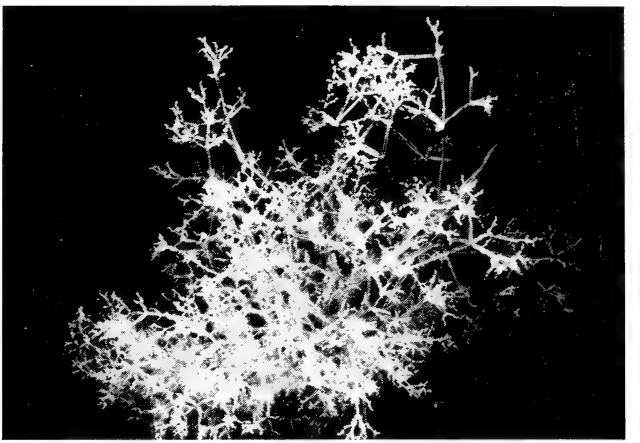


Chaetodon flavirostris.

Photo — C. V. Turner,
Australian Museum.

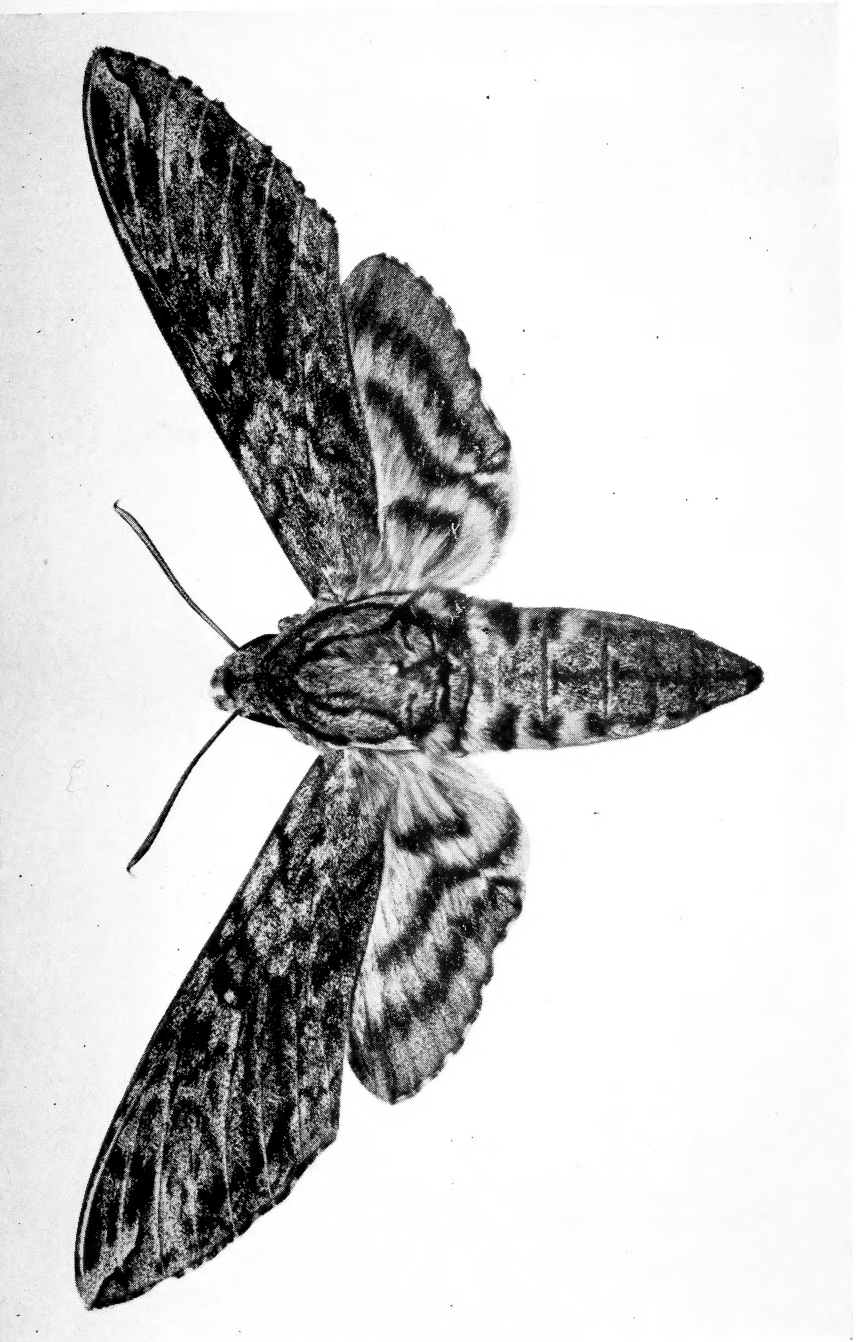


Okenia pellucida Burn.
(Magnified fifteen times).



1. Polyzoan, *Zoobotryon pellucidus.*

2. Egg-strings of *Okenia pellucida.*
(For explanation, see page 57).



Buff-banded Hawk-moth, *Herse godarti.*

Photo — C. V. Turner, Australian Museum.

ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES

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"A Check List of the Birds of Paradise and Bower Birds," by T. Iredale, 1948.
"Revision of the New South Wales Turridae," by C. F. Laseron, 1954.
"The Published Writings of Tom Iredale, with an Index of his new Scientific Names," by D. F. McMichael & G. P. Whitley, 1956.
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CONTENTS