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PROCEEDINGS
OF THE
**Royal Zoological
Society**
OF
NEW SOUTH WALES
for the Year 1953-54

Price, 4/-
(Free to all Members and Associates)

Sydney:
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March 4, 1955

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ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES

Established 1879

REGISTERED UNDER THE COMPANIES ACT 1899 (1917)

Patron:

His Excellency Lieutenant-General Sir John Northcott, K.C.M.G.,
K.C.V.O., C.B.

Vice-Patrons:

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

COUNCIL, 1953-54

President: James Roy Kinghorn, F.R.Z.S., C.M.Z.S., F.C.A.S.

Vice-Presidents:

Sir Edward Hallström, K.B., F.R.Z.S.
Garnet Halloran, M.D., B.Sc., F.R.C.S. (Edin.), F.R.A.C.S., F.R.Z.S.,
Emil Herman Zeck, F.R.Z.S.
Aubrey Halloran, O.B.E., B.A., LL.B.

Honorary Secretary: Mrs. Leone Harford.

Honorary Solicitor: Aubrey Halloran, O.B.E., B.A., LL.B.

Honorary Editor: Gilbert Percy Whitley, F.R.Z.S.

Honorary Treasurer: Geoffrey Alan Johnson

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Norman Chaffer	Theodore Cleveland Roughley, B.Sc., F.R.Z.S.
Ernest Jeffrey Gadsden	Ellis Le Geyt Troughton, F.R.Z.S., C.M.Z.S.
Percy Fincham Harvey	John Waterhouse.
James Allen Keast, M.Sc.	
Charles F. Laseron, F.R.Z.S.	

OFFICERS (Non-Councillors)

Acting Honorary Treasurer: R. Murnin.

Honorary Auditor: M. S. Davies, F.C.A. (Aust.).

Honorary Librarian: Mrs. P. R. Johnston.

Assistant Honorary Secretary: Miss J. M. Coleman.

OFFICERS OF SECTIONS

Avicultural Section:

Chairman: L. Webber
Hon. Secretary: P. Harvey

Marine Zoological Section:

Chairman: F. McCamley
Hon. Secretary: L. Walters

Budgerigar Section:

Chairman: H. Yardley
Hon. Secretary: J. Bright

Ornithological Section:

Chairman: J. Francis
Hon. Secretary: A. McGill

General Section:

Chairman: E. J. Gadsden
Hon. Secretary: P. R. Johnston

ROYAL ZOOLOGICAL SOCIETY

OF

NEW SOUTH WALES

The Seventy-fourth Annual Meeting was held at Taronga Park, Mosman, on 31st July, 1954. Approximately 150 members and friends were present. The Hon. Secretary presented the

74th ANNUAL REPORT

Membership at 1st July, 1954.—The total membership of the Society is 559, consisting of:—1 Endowment Member, 3 Associate Benefactors, 7 Honorary Members, 57 Life Members, 350 Ordinary Members, 4 Honorary Associate Members, 90 Associate Members and 29 Junior Members. During the year the Society lost 13 members by death, 24 by resignation, and 34 in terms of Article 9 of the Constitution, a total of 71.

It is very pleasing to note that, for the first time in some years, the membership has increased, and that the increase has been due to full Members and Juniors.

The Royal Visit.—In honour of the visit to Australia of Her Most Gracious Majesty, Queen Elizabeth II, an Official Dinner was held on February the 17th. This was attended by Councillors and their wives, Section Office Bearers, and members of the Ladies' Auxiliary; in all about 40 members. Our Patron, His Excellency the Governor, was unable to attend, but gave permission for decorations and medals to be worn in honour of the occasion.

Council.—Eleven Council meetings were held during the year with an average attendance of 12 members. Extended leave of absence was granted to Lieut.-Col. H. Burgh, who is serving overseas in Korea, and to Mr. Alan Keast, who is doing a post-graduate course at Harvard, U.S.A.

Fellowship.—The Qualifications Committee recommended to Council that Mr. A. R. McGill be made a "Fellow" of the Society for his studies and general work in Ornithology. The Certificate was presented at the meeting by the President, who referred to the extensive research done by Mr. McGill.

The President informed the meeting that one of our distinguished members, Miss Elizabeth Pope, M.Sc., F.R.Z.S., was awarded the C.M.Z.S. of London for her research in Marine Zoology.

14th International Zoological Congress.—Sir Edward Hallstrom, Miss J. K. Allan and Mr. A. J. Keast represented the Society at the 14th International Zoological Congress, held at Copenhagen, Denmark; this was followed by a Session of the International Committee for Zoological Nomenclature, to which Miss Allan was invited, and from whom the Council received a valuable and important Report covering the activities and resolutions of both meetings.

Publications.—The *Australian Zoologist*, Vol. XII, Part 1, was published in March. The *Proceedings* 1952-53 was published on 24th May, 1954. A new handbook on Turridae (Mollusca) by C. F. Laseron, was completed by the end of July, copies being tabled at the Annual Meeting.

Bequests.—The Society has been advised that it will receive £100 from the Estate of the late John Thomas of Shellharbour; by this, his Estate becomes an Associate Benefactor. Also £50 from the late A. W. Rigby. Both of these bequests are awaiting final probate, and have been allocated to the building fund.

Appointments.—Miss J. M. Coleman was appointed Assistant Honorary Secretary on the resignation of Mrs. B. Lane. Mrs. Lane was presented to the Council by the President and was thanked for her very willing and efficient assistance over the years. Mr. R. B. Murnin, who offered to look after the accounts of the Society, was appointed Acting Honorary Treasurer. The position of "Acting" Treasurer arises from the fact that the Council already has its full 18 members, and by its Articles of Association, cannot exceed that number, the Treasurer normally being a member of Council.

Special General Meeting.—A Special General Meeting was held in the Society's rooms, 28 Martin Place, on Wednesday, 25th November, to alter Article 5, by adding a new section, "(e), Country Associates residing not less than 30 miles from the G.P.O., Sydney."

Stamp Tax and Sales Tax.—During September the Society was granted both Stamp Tax and Sales Tax exemption. This was back-dated, and we were able to recover £102/12/11 rebate Sales Tax paid by the Society. Our thanks are due to the Honorary Secretary, Mrs. Harford, for being instrumental in bringing this about.

Ladies' Auxiliary.—Several successful functions were held during the year, and a cheque was presented to the Society at the Annual Meeting.

Financial.—The balance sheet for the year 1952 was published in the *Proceedings*. It will be noted that the financial position of the Society has improved slightly over the previous year.

The adoption of the Annual Report was moved by Mr. Aubrey Halloran and seconded by Mr. E. J. Gadsden, and carried.

The six retiring members of Council were re-elected unopposed.

The President welcomed the Guest of Honour, Mr. F. C. Griffiths, Chief Guardian of Fauna.

PRESIDENTIAL ADDRESS

The President addressed the meeting for a few minutes on some research in hand, and on some activities of the Society. He said:—

Having attended quite a number of the Section meetings during the year, I am pleased to note that the general standard of administration and research had reached a high plane, and that Sections were more inclined to restrict their activities to zoological subjects in which they are more directly concerned.

The General Section was completely reorganised, and even though covering a wide field, it can now be planned to provide for zoologists interested in conservation, economic and systematic zoology. It is hoped that all Sections will endeavour to follow the general plan set by this Section in having mostly short addresses followed by discussion, except of course where special zoological lectures are deemed best. I would again suggest that all scientific papers for publication either in the *Zoologist* or the *Proceedings*, be presented at the appropriate Section meeting, as done in other scientific societies. It is pleasing to note that the Bird List of the Sydney Area is well in hand, and that the Avicultural Section is well ahead with a booklet as suggested by me last year.

Our representative on the Fauna Protection Panel, Mr. E. L. Troughton, has attended all meetings of the Panel and has reported any matters of special interest to your Council.

As mentioned in the Annual Report, we had three delegates to the Fourteenth International Zoological Congress, held in Copenhagen, but I would like to make special reference to a lengthy and valuable Report submitted to Council by Miss Joyce Allan. In this Miss Allan said the organisation of the Congress was superb, and was under the Presidency of Professor R. Sparck, University of Copenhagen, and the Secretary General, this Society's old friend, Dr. Anton Bruun. There was a magnificent band of helpers including many of Bruun's *Galathea* companions, all well known to R.Z.S. members.

The Congress was attended by 1,100 scientists of international repute; they represented 27 countries and some 600 papers were read. Both Miss Allan and Mr. Keast submitted papers and took an active part in some of the discussions.

During the Congress Miss Allan was invited to attend the Colloquium of Zoological Nomenclature, at which many taxonomic problems were settled and made available to zoologists taking part in the Congress. Miss Allan was the only Australian invited to take part in the Colloquium, a decided honour to her and to this Society. A letter of appreciation has already been sent to Miss Allan from the Council.

For many years it has been the practice at Section meetings to pass round an attendance book, but apart from recording the names of visitors, I fail to see the value of this. I would like to see a book for visitors only, and the same book used for all sections. This is a matter for further investigation. I offer my congratulations and thanks to the Honorary Secretary, Mrs. Harford, for the interest she is taking in the Junior Members, even to conducting special classes of instruction for them. I wish to thank the Ladies' Auxiliary for the social activities arranged for members during the year, and the Council and Officers for their unstinted support. Our little difficulties and problems are gradually being ironed out through mutual co-operation, and I feel sure that because of this, and the increase in the standard of scientific research, the future is bright for the Society.

J. R. KINGHORN,
President.

Mr. A. E. Stephen moved the vote of thanks to the President, seconded by Dr. Garnet Halloran and carried by acclamation.

OFFICERS FOR THE YEAR 1954-55

President: Mr. J. R. Kinghorn.

Vice-Presidents: Sir Edward Hallstrom, Dr. G. Halloran, Messrs. A. Halloran and E. H. Zeck.

Honorary Secretary: Mrs. L. Harford.

Honorary Treasurer: Mr. G. A. Johnson.

Honorary Solicitor: Mr. A. Halloran.

Honorary Editor: Mr. G. P. Whitley.

Honorary Librarian: Mrs. P. R. Johnston.

Honorary Auditor: Mr. M. S. Davies.

Assistant Honorary Secretary: Miss J. M. Coleman.

Assistant Honorary Treasurer: Mr. R. Murnin.

ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES

BALANCE SHEET AS AT 30th JUNE, 1953

LIABILITIES.		ASSETS.	
£	s. d.	£	s. d.
Accumulated Funds:		Furniture and Fittings:	
Balance as at 30th June, 1952 ..	3,429 4 2	Office, Lecture Room, Furniture and Equipment at cost	494 7 11
Add Surplus for year ended 30th June, 1953—		Library Books at cost	503 4 6
General Account ..	37 6 8	“Parrot” Paintings at cost	500 0 0
Publication Account 144 1 6	181 8 2	Investments at cost:	1,497 12 5
Building Fund:		Australian Commonwealth Inscribed Stock	1,104 7 6
Balance as at 30th June, 1952 ..	873 5 10	Australian Commonwealth Treasury Bonds	100 0 0
Add Interest Received for Year	26 15 7	Commonwealth Savings Bank	1,204 7 6
Subscriptions paid in advance ...	900 1 5	Current Account	924 17 4
Marine Section Fund	21 17 0	Cash in Hand	14 18 3
	9 6 2	Building Fund Investments:	939 15 7
		Australian Commonwealth Treasury Bonds	700 0 0
		Commonwealth Savings Bank ..	200 1 5
	£4,541 16 11		£4,541 16 11

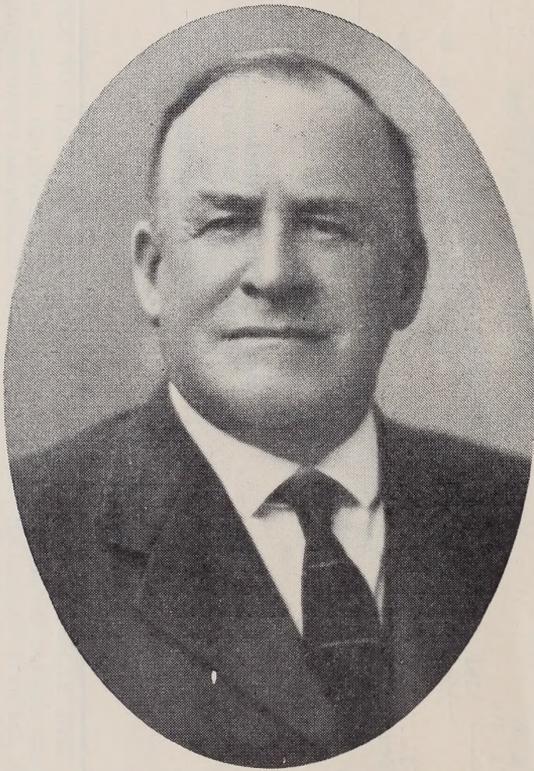
AUDITOR'S REPORT TO THE MEMBERS OF THE ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES

I hereby report that I have audited the books and accounts of the Royal Zoological Society of New South Wales for the year ended 30th June, 1953, and have obtained all the information and explanations I have required, and, in my opinion, the above Balance Sheet exhibits a true and correct view of the state of the Society's affairs as at 30th June, 1953, according to the best of my information and the explanations given to me and as shown by the books of the Society.

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

(Signed) M. S. DAVIES, F.C.A. (Aust.)
Hon. Auditor.

Sydney, 2nd April, 1954.



The late E. F. POLLOCK.

OBITUARY

ERNEST FREDERICK POLLOCK, J.P., F.R.G.S.

The death last year of Mr. E. F. Pollock at the age of 87 deprived this Society of an old friend. He joined us in 1922, and because of his photographic skill was appointed Honorary Photographer. He was a councillor from 1923 to 1938 and Honorary Secretary from 1924 to 1926. He wrote on Animal Photography in the third volume of the *Australian Zoologist*, illustrated with fine photographs taken at Taronga Park. He was widely travelled, having crossed the equator 27 times, and he exhibited selections from his large collection of lantern slides and photos before overseas societies, particularly those dealing with his favourite subject, ornithology. Mr. Pollock organized several field or collecting expeditions for Australian naturalists, notably a Great Barrier Reef excursion in 1925, the results of which formed the subject of a special memoir in the *Australian Zoologist* iv, 4, 1926.

G.P.W.

RAYMOND GEORGE SWANN

To his many friends in the Royal Zoological Society of New South Wales, on the sudden passing of Mr. Raymond George Swann on 12th April, 1954, at his home in Marrickville, came a poignant feeling of loss.

By his great enthusiasm in the field work of the Marine Zoological Section, and practical study of Conchology, he built up a very fine collection of Shells, his cabinets containing many rare and beautiful specimens.

Mr. Swann was also an executive member of the Royal Horticultural Society of N.S.W. for many years, and was chosen as Judge at many leading Flower Shows. He was also secretary of the Marrickville Horticultural Society.

The many glorious flowers he produced demonstrated a fine sense of artistry and extensive Horticultural knowledge.

E. E. DUFF.

REPORTS OF SECTIONS

Avicultural Section

The Avicultural Section has continued to hold the interest of those members of the Society who are specialists in the study and breeding of our feathered friends in the aviary, for it is in the aviary under controlled breeding that the most accurate data can be obtained.

During the year the section meeting attendances averaged 17, with a maximum of 27, when the Rev. A. Raywood gave a very interesting and enjoyable talk on Parrots.

Mr. L. Webber gave two talks, one on hybrids and the second on the visual identification of Gouldian finch types, dealing with the genetics and dominant and recessive factors in Red and Yellow and Black headed Gouldians, illustrated with coloured slides.

Mr. J. R. Kinghorn, F.R.Z.S., with his illustrated "Economics of Bird Life," gave those present an idea of the work birds do for the farmer and gardener by keeping in check the pests that are always with us.

Mr. Field, President of the Ornamental Pheasant Society, told of the various methods of breeding the Pheasant and of gradual dying out of these beautiful birds in Australia owing to the ban on importation of any birds into this country.

A very interesting evening was spent with Mrs. F. Blaxland's experiences in breeding the Scarlet Chested Parrakeet, published in these *Proceedings*.

During the year the bogey of Ornithosis cropped up and the Secretary, Mr. P. Harvey, contacted the Agricultural Department and gathered all the information possible in regard to symptoms, incubation-period and length of illness and passed this on to members as a lecture.

To all those who have assisted in making our meetings enjoyable and a success, the Section extends thanks.

The Section lost two of its oldest and most regular members by the deaths of Mr. A. Barker and Mr. W. Barrie, two very old friends and members of the Society for over twenty years, and to their families we extend our sincere sympathies.

It is not only at the meetings the Section has had a successful year, but also in our aviaries, in the breeding of some of the rarer birds and in the scientific work accomplished, namely the Genetics of the Gouldian Finch, to be published shortly.

Mrs. G. Blaxland had outstanding success with her parrots, raising 8 Scarlet Chested, 6 Hooded and 17 Bourke Parrakeets during the year.

Mr. B. Read is endeavouring to increase the dwindling African Waxbills' population in Australia, and he has reared 30 Fire Finches from an original 2 pairs, 18 Aurora Waxbills and 8 Cordon Bleu Waxbills, 6 Pictorella and 2 Rainbow Lorriquets.

A remarkable hybrid was raised by Mr. D. Shearing; a Blood finch male mated to a Cut-throat (*Loxia fasciata*) produced one offspring, but sad to say it met with an accident in the aviary when about three months old. At the time of death the bird was almost through its first moult.

Mr. E. Fletcher has also had a successful year breeding and rearing amongst others 32 Bourkes Parrakeets from 3 pairs, 16 Pictorella, 12 *Caylena picta* and 96 King Quail from 4 pairs.

We enter the coming year with hopes of still further avicultural successes, and a request for more members to attend our meetings, and we feel sure we can help in all your bird and aviary troubles.

The section received a number of requests through the medium of the Australian Museum, Land Newspaper and Nature Speaks, from members of the public seeking aid for their sick and ailing pet birds.

The President has already indicated the need for a booklet on this subject, and the Section already has this in hand.

General Zoology Section

The activities of this Section cover a very wide field of zoology, and it is hoped that members will give it greater support.

A thorough reorganisation is being planned, but only minor changes are being made at present. Later, this Section will provide for zoologists interested in the conservation of fauna and the economic, systematic, and practical approach to zoology. This should provide for a wider dissemination of zoological knowledge to the layman.

Short addresses followed by discussions will replace lengthy lectures. Regular reference will be made to publications added to the library, and when of interest, a precis of the papers will be given. Other papers on recent zoological research will be brought before the notice of members.

There will be special exhibit nights for members, who are invited to submit notes or specimens at any meeting for report by specialists.

From this it will be appreciated that only by your attendance and active support will the revised zoological programme be a success.

E. J. GADSDEN,
Chairman.

The Budgerigah and Marine Zoological Sections had not submitted Reports at the time of going to press.—Ed.

Ornithological Section

Judged through enthusiastic field work, attention to conservation matters and well-attended meetings, the Ornithological Section has had a successful year. Members of the New South Wales Branch of the Royal Australasian Ornithologists Union joined with the members of the Section according to previous procedure. Regular monthly meetings were held during the period. The average monthly attendance of 48 was quite good, although slightly less than that of the previous year.

The Section wishes to record its thanks to those who screened films, and prepared helpful lectures. Amongst the subjects for addresses, most of which were excellently illustrated, were—"The Royal Albatross," by Dr. L. E. Richdale; "National Parks," by Mr. A. A. Strom; "As Dead as the Dodo," by Mr. Tom Iredale; "A Motor Trip to Cairns," by Mr. N. Chaffer; "The Romance of the Lyrebird," by Mr. A. H. Chisholm; "Birds and Flowers of Sydney," by Mr. J. D. Waterhouse; "Tragedies of Migration," by Mr. J. E. Roberts; and "Evolution of Bird Conservation in New South Wales," by Mr. J. J. Francis. Messrs. H. Dumpleton and N. Chaffer screened films.

Visitors were welcomed to each meeting. Amongst these were Mr. and Mrs. Bradley, of the British Museum; Dr. and Mrs. Richdale,

of New Zealand; Mr. Jim Willis and Mr. Roy P. Cooper, of Melbourne, and the Chief Guardian of Fauna, Mr. F. C. Griffiths. The President of the R.Z.S., Mr. J. R. Kinghorn, also attended a number of meetings.

During the year the Fauna Protection Panel considered the case of some of our vanishing pigeons of the coastal brushes, resulting in the gazetting of the Red-crowned (*Ptilinopus regina*), Purple-crowned (*R. superbus*), Wompoo (*Megaloprepia magnifica*) and White-headed (*Columba norfolciensis*) as "Rare Fauna." Through the endeavours of a number of interested societies to preserve the natural beauty of the Hawkesbury River foreshores, the "Hawkesbury Scenic Preservation Council" was formed, and the New South Wales Branch of the R.A.O.U. appointed Mr. J. A. Palmer as its representative. Other societies also collaborated and forwarded supporting letters in connection with (a) the retention of as much as possible of the natural flora in the replanning of the Kurnell Peninsula, and (b) the protection of the interesting swamp vegetation surrounding Dee Why Lagoon.

Support was given to Miss Crommelin in her efforts to secure more active interest in the Biological Station and preserve the Warrah Sanctuary at Pearl Beach. Further approaches were made for a Mallee National Park in New South Wales, and requests to investigate Mallee and Mulga type habitats for Fauna Reserves. The declaration of 380 square miles in the South Coast Tourist Area as an "Absolute Sanctuary" was received with considerable satisfaction. A request was made to proclaim Lion Island a Fauna Reserve, because of its unique distinction as the breeding ground of two species of shearwaters (mutton-birds), and its close proximity to Sydney.

The work of the Gould League deserves commendation. Because of its large membership and its watchword that "education is more potent than legislation," it is difficult to estimate the good it does among the younger Australians in protecting our valuable and interesting birds. Their annual magazine, "Gould League Notes," records the various activities. Schools where there are sympathetic teachers are prominently represented in the large number of contributions to the various sections of prize-winning competitions. Short articles and photographs by various State ornithologists are also prominent. A good attendance of Section members was noticeable at the League's Annual Concert, whilst one or two adjudicated the team and individual bird-call competitions.

At the Annual Meeting the following officers were all unanimously elected for 1954-1955:—

Chairman: Mr. W. R. Moore.

Vice-Chairman: Mr. E. J. Gadsden.

Secretary: Mr. A. R. McGill.

Assistant-Secretary: Mr. F. G. Johnston.

Committee: Messrs. N. Chaffer, A. H. Chisholm, N. C. Fearnley, K. A. Hindwood, J. A. Palmer and J. D. Waterhouse.

ARNOLD R. MCGILL.
Secretary.

FIELD REPORT FOR 1953-1954

The various observations of special interest made by members of the Section, and mentioned at monthly meetings are herein briefly summarized. Seasonal conditions in the coastal areas of the State were generally good. However, there was evidence of a state of semi-drought in the far-western areas. No reliable news, however, has been received of its effect on bird-life.

Three Sydney members (Dr. Pockley, Messrs. Palmer and Dobson) attended the R.A.O.U. Camp-out at Lake Barrine, Cairns district, Queensland, in September. A few weeks later, Messrs. Chaffer, Moore

and Waterhouse travelled to the same locality, where they successfully photographed the Golden Bower-bird (*Prionodura newtoniana*) and Tooth-billed Bower-bird (*Scenopoeetes dentirostris*). Messrs. Hindwood and Hoskin made a survey of the central tableland area and western slopes, securing more information of Rock Warbler (*Origma rubricata*) populations. The Lewin Water-Rail (*Rallus pectoralis*) and Little Eagle (*Hieraetus morphnoides*) were conspicuous in an interesting list. Messrs. Roberts and Bourke were among the personnel of the Gould League Camp at Paterson, and reported the Musk Duck (*Biziura lobata*) and Rifle-bird (*Ptiloris paradiseus*) in that locality. Messrs. Johnston and Brinsley visited the Riverina and reported the Southern Scrub-Robin (*Drymodes brunneopygia*), Mallee Fowl (*Leipoa ocellata*) and Yellow-tailed Pardalote (*Pardalotus xanthopygus*) breeding in the vicinity of Griffith. A further visit to the Manning River district was made by Mr. McGill. A small flock of White-breasted Wood-Swallows (*Artamus leucorhynchus*), seen on an island at the mouth of the river, was noteworthy in a compiled list of 140 species.

Messrs. Hindwood, Lane and McGill paid visits to the South Coast and made observations in company with resident members at Ulladulla. The Field-Wren (*Calamanthus fuliginosus*) was found breeding in an elevated area west of Milton, extending its known range some distance northwards. The Ground Parrot (*Pezoporus wallicus*) was seen later in the same locality. The Rock Warbler was found in the same vicinity and also near Conjola, representing its furthest south known range. Brush Island was visited and the Sooty Oyster-Catcher (*Haematopus fuliginosus*), Little Penguin (*Eudyptula minor*) and Wedge-tailed Shearwater (*Puffinus pacificus*) noted nesting. Both the Shy Albatross (*Diomedea cauta*) and Yellow-nosed Albatross (*D. chlororhynchos*) were observed in the locality. The Ground Parrot was reported nesting in an elevated area south of Wollongong and was eventually photographed by Mr. Chaffer.

In the Sydney district there was a number of noteworthy observations. Amongst migrating waders a Wandering Tattler (*Tringa incana*) at Long Reef was outstanding. A flock of 16 Greenshanks (*T. nebularia*) was seen at Pitt Town, and the species was also recorded at Baker's Lagoon and the Cook's River area. Other rarer waders included the Black-tailed Godwit (*Limosa limosa*), Great Knot (*Calidris tenuirostris*) and Broad-billed Sandpiper (*Limicola falcinella*), all at Botany Bay. Evidence that the Red-capped Dotterel (*Charadrius alexandrinus*) bred at Pitt Town and an Autumn breeding record (April) there of the Black-fronted Dotterel (*C. melanops*) were noteworthy. Unusual numbers of White-headed Stilts (*Himantopus leucocephalus*) were seen in the Hawkesbury region, one being in distinct immature plumage. A party of five birds was surprisingly seen on the tidal reef at Boat Harbour, a most unusual habitat for the species.

The Caspian Tern (*Hydroprogne caspia*) was observed a few times on the Botany foreshores, and also over swamps in the Hawkesbury area. Interest was shown in some smaller black-billed terns at Botany Bay during October-December, which were thought to be the Common Tern (*Sterna hirundo*). One seen on October 11 had the black cap and forehead typical of the breeding plumage of the eastern Asiatic race of that species. An immature Sooty Tern (*S. fuscata*), which flew into a lighted room at Shoal Bay and eventually became a museum specimen, caused unusual interest. It was thought that flocks of from 30 to 40 Little Terns (*S. albifrons*) in non-breeding plumage, and seen here during the normal breeding season of the species, could be migrants from some nesting-colony north of Australia. Silver Gulls (*Larus novae-hollandiae*) and Crested Terns (*Sterna bergii*) were found nesting on Little Island, at the mouth of Port Stephens. An interesting ocean-wanderer was a Common Noddy (*Anous stolidus*), in adult plumage, seen at Boat Harbour on February 28. A Black-

browed Albatross (*Diomedea melanophris*), ringed at Heard Island, was caught in a fishing net, approximately two and one-half years later, and later released, near Broughton Island.

It was difficult to secure any previous captivity association with a Plumed Tree-Duck (*Dendrocygna cytoni*) seen with domestic ducks in a yard at Liverpool. The species has not been previously recorded for the Sydney district. The Chestnut Teal (*Anas castanea*) and Blue-winged Shoveler (*A. rhynchotis*) were seen on Hawkesbury swamps. A pair of Jabirus (*Xenorhynchus asiaticus*) appeared at Pitt Town in January, and were again seen at the same place in June. A member reported their presence in the Sackville area during the intervening six months. A conveniently built nest of the White-bellied Sea-Eagle (*Haliaeetus leucogaster*) over the Hawkesbury River was well patronized by photographers, and the Wedge-tailed Eagle (*Uroaetus audax*) was seen at Cattai and other near-Sydney areas. The Plumed Egret (*Egretta intermedia*) appeared on Wheeney Lagoon. The Hoary-headed Grebe (*Podiceps poliocephalus*) was also seen a few times in Hawkesbury localities, and a flock of ten, all in excellent plumage, on Iron Cove on May 9.

A Shining Bronze-Cuckoo (*Chalcites lucidus*), which breeds in New Zealand, was taken alive at Collaroy, but soon succumbed and the specimen was later identified by Mr. Hindwood. Larger numbers of the Fork-tailed Swift (*Apus pacificus*) than usual were recorded. Somewhat of an influx of Topknot Pigeons (*Lopholaimus antarcticus*) occurred in central coastal areas between December and June, flocks up to 70 birds being reported. The Little Cuckoo-Shrike (*Coracina robusta*) was recorded from about six different localities near Sydney, and may be increasing its range. Nesting of the Crescent Honeyeater (*Phylidonyris pyrrhoptera*) at Bundeena; a flock of Galahs (*Kakatoe roseicapilla*) at Centennial Park; a Drongo (*Chibia bracteata*) at Cammeray; an albino Blue Wren (*Malurus cyaneus*) at Vaucluse; and a further nesting record of the Regent Bower-bird (*Sericulus chrysocephalus*) at McMasters' Beach were all noteworthy.

Regular visits to the Dee Why area were made by Mr. Chisholm to observe the breeding activities of the Fantail Warbler (*Cisticola exilis*), and the surprising number of 38 nests was found in that locality during the season. A party of 13 members visited Lion Island in February, there finding the Little Penguin breeding, and the Sooty Shearwater (*Puffinus griseus*) colony in a satisfactory state (three young were examined in the few burrows examined), but, unfortunately, no young of the Wedge-tailed Shearwater were present.

ARNOLD R. MCGILL,

Hon. Secretary, Ornithological Section.

SYLLABUS OF SECTIONAL MEETINGS FOR 1954-55

Visitors are welcome and members are invited to bring their friends to any of the Society's meetings.

Avicultural Section.

Meets on the fourth Tuesday of each month. Lectures, films, etc.

Budgerigar Section.

Meets on the third Tuesday of each month. Exhibits, discussions.

General Section.

Meets on the second Tuesday of each month. Syllabus:

1954—

- August 9: Museum Educational Work, by Miss P. McDona'd.
- Sept. 14: Some Zoological Problems, by J. R. Kinghorn.
- Oct. 12: Experimental Zoology—Frogs, by A. Colefax.
- Nov. 9: The Dingo, by Dr. N. W. McIntosh.
- Dec. 14: Fauna Protection in N.S.W., by F. C. Griffiths.

1955—

- Jan. 11: Members' Exhibit Night.
- Feb. 8: Studies in Crustacea, by F. A. McNeill.
- March 8: Biological Problems Overseas, by Miss E. Pope.
- April 12: Bats, by Miss B. Dew.
- May 10: An Entomological Night, by I. Slater.
- June 8: Annual Meeting: Chairman's Address.

Marine Zoological Section.

Meets on the first Tuesday of each month. Lectures, etc.

Junior Members' Study Group.

Meets on the second Thursday of each month at 7 p.m.
Demonstrations, exhibits, discussions, etc. (see page 14).

Conchology Study Group.

Meets on the second Thursday of each month at 7.30 p.m.

Ornithological Section.

Meetings, to which members of the Royal Australasian Ornithologists' Union are invited to be present, are held at 7.45 p.m. on the third Thursday of each month. Syllabus:—

1954—

- July 15: Illustrated Address, by Norman Chaffer.
- Aug. 19: "The Story of John Gould," by A. H. Chisholm.
- Sept. 16: Illustrated Address, by J. D. Waterhouse.
- Oct. 21: "Birds of the Kermadecs," by Tom Iredale.
- Nov. 18: General Discussion.
- Dec. 16: R.A.O.U. Camp-out Memoirs.

1955—

- Jan. 20: Illustrated Address, by W. R. Moore.
- Feb. 17: "Some Aspects of Bird Ecology," by J. R. Kinghorn.
- Mar. 17: Films in Colour, by Norman Chaffer.
- April 21: "Waders of Other Lands," by Arnold McGill.
- May 19: "Haunts to Remember," by K. A. Hindwood.
- June 16: Annual Meeting: Chairman's Address.

JUNIOR MEMBERS' STUDY GROUP MARINE SECTION, R.Z.S.

Children will play contentedly for hours on a beach, and they are always fascinated by sea-shells. Some retain their interest until educational studies and exams intervene, when their beautiful shells must be shut up in a box, and probably forgotten. Later, maybe in three or four years, or even longer, on visiting one of Australia's lovely beaches, shells cast up and left along the tide lines will catch the eye and the "fever" is with them again, to stay for life. Once a person has really contracted "shell fever" it becomes necessary to learn all about shells so that the collection may be named, labelled and put in order; and here the young collector is apt to lose heart as the terminology appears difficult and he does not know where to begin.

The senior members are naturally used to scientific terms, and often assist beginners to name the shells they bring in. This merely scratches the surface and still leaves the beginner bewildered by the strange and startling terms used, terms which do not seem to be related to beautiful shells. The Marine Section has not been able to cope with so many members in various stages of learning, and it appeared impossible to rectify the situation, but we believe we now have the solution.

The Secretary of the Royal Zoological Society, Mrs. Harford, being particularly interested in the welfare of Junior Members, has generously offered her time and services, so that a Junior Group may be formed. In the informal atmosphere of her office, juniors discuss their ideas and bring up all their problems.

A set of papers has been prepared in which is explained, in very simple language, the scientific classification of Mollusca, or shells, so that a student may understand, from the beginning, how to use a check-list and the manner in which a collection should be arranged. Various other papers will deal with the living animal and the different kinds of shell they construct, collecting notes, and the cleaning and preservation of specimens. Beginning in this way, a student feels confident that he knows what he is doing, and at his own pace he can go a long way towards classifying his own collection and, eventually, join the seniors with a fair measure of confidence.

The Junior Study Group is under the direction of Mrs. Harford and meets in her office at 7 p.m. on the second Thursday in each month.

Will members wishing to join please contact Mrs. Harford for further details.

LEE WOOLACOTT.

A REVISION OF THE GENUS PSEUDECHIS

BY ROY D. MACKAY.

The species concerned in this review are *Pseudechis australis*, Gray, *P. cupreus*, Blgr., *P. darwiniensis*, Macleay, *P. denisonioides*, Werner, *P. platycephalus*, Thomson, *P. porphyriacus*, Shaw, *P. guttatus*, de Vis, *P. mortonensis*, de Vis, *P. colletti*, Blgr., *P. papuanus*, P. & D., *P. wilesmithii*, de Vis, *P. ferox*, Macleay, and *P. microlepidotus*, McCoy.

In a recent paper G. Mack and S. Gunn,⁽¹⁾ after examining de Vis' types, declared *P. mortonensis* to be synonymous with *P. guttatus*, and that *P. wilesmithii*, cannot be distinguished from *Oxyuranus scutellatus*, Peters, so little further discussion is warranted here.

Two other species that can be set aside are *P. ferox* and *P. microlepidotus*, because the type of *P. ferox* apparently is lost, a search of various collections having failed to locate it. However, from all descriptions and available notes, and from my examination of the type and cotype of *P. microlepidotus* in the National Museum, Melbourne, it appears that *ferox* and *microlepidotus* are identical and may have to be removed from the genus *Pseudechis*. The problem concerning the exact status of these two species is under examination by Mr. J. R. Kinghorn.

Pseudechis australis (Gray) Mulga Snake or King Brown

For many years there has been a good deal of discussion and uncertainty among herpetologists regarding the status of *cupreus*, *darwiniensis*, *denisonioides*, *platycephalus* and *australis*. My object here is to tabulate characters with evidence collected during my investigations to show that all of these are synonymous with *australis*.

Examination of a large series of specimens of various ages and sizes shows clearly that *P. australis* is extremely variable ranging in profile from the slender and graceful *cupreus* form to the aged and massive *darwiniensis* and *platycephalus*. *P. cupreus* and *P. darwiniensis* have already been relegated to the synonymy of *australis* by Thomson⁽²⁾ who gave the following tabulation in support of his finding.

In the descriptions of the types of the species, *P. darwiniensis* was originally described as differing from *porphyriacus* and *australis* in the shape of the frontal and its width in relation to the width of the supraoculars. My examination of over twenty specimens (of which the extreme variants are indicated in Table 2.) shows that these characters cannot be regarded as typical. Thomson has previously shown this fact to be true by a comparison of his own material with the three specimens from the type locality—Port Darwin. My examinations merely corroborate his conclusions.

Table 2. will give a clear indication of the discussion that follows.

It will be seen from the above that the variation of characters in *australis* is considerable and that no group of characters can be brought together that may be regarded as a specific separation.

P. denisonioides, Werner, was described as differing from *cupreus* and *australis* by the undivided anal and small number of ventrals, but the anal is a variable character in this genus, as I have found, so that in the case of *denisonioides*, it may be regarded as an abnormality. All other characters in the description fit the characters of *australis*. Unfortunately the type of *P. denisonioides* is not available for examination but Mr. Glauert says that he checked a specimen marked *P. denisonioides*, from Dorre Island, W.A., apparently examined by Fry⁽³⁾, which had a divided anal and that in other respects, "it

(1) G. Mack and S. Gunn, Mem. Qld. Mus. 1953, Vol. XIII, No. 1, p. 61.

(2) D. Thomson, Aust. Journ. Exp. Biol. & Med. Sci. 1930, Vol. VII, pt. 3, pp. 125-133.

(3) D. Fry, Rec. W. Aust. Mus. 1914, Vol. 1, p. 197.

was within the variation of the series of *australis* in the collection." Mr. Glauert communicated this finding to Loveridge(4), who quoted the passage in his list of Australian reptiles.

P. platycephalus was described by Thomson from the head and neck of a specimen, now in the National Museum, Melbourne. This specimen had nineteen rows of scales, but, this count was made at the fifteenth ventral. It was recorded as differing further from *australis* in possessing grooved palatine and pterygoid teeth and in possessing obtuse keels on the scales of the dorsal line. An examination of the type showed these keels to be slight folding of the scales which can be seen in *australis* in the live state as well as in specimens preserved in spirit. Grooved palatine and pterygoid teeth are common features of all species of *Pseudechis*, particularly in aged specimens. Glauert(5) describes a similar head as differing from *australis* in the shape of the head and the number of scale rows, nineteen—on the neck.

During my examination of twenty specimens of *australis* I found eight of them had nineteen rows of scales at the fifteenth ventral but only seventeen rows were counted at the same place in the remaining specimens, so I regard Thomson's scale-row count as of no importance and can find no characters by which *platycephalus* can justifiably be separated from *australis*.

I have discussed this problem with Mr. J. R. Kinghorn and he agrees that, until more material is collected throughout the range of *australis*, little can be assessed seriously in the light of subspeciation. It appears that no group of characters indicates any subspecific trend in *australis* though there is a slightly lower average ventral count in specimens from south-western Australia. Since Boulenger, Kinghorn, Longman and Waite published their separate synopses of the species of this genus, the supposed differentiating characters have been found to be much more elastic.

From Tables 1. and 2. and other descriptions, it is clearly indicated that overlapping of characters and their variation in *P. australis* may be cited as follows:

Scale Rows: These number 17 at midbody. At the fifth anterior ventral they number from 17 to 23 rows and at the fifth posterior ventral, from 15 to 17 rows. A specimen from south east Queensland, said by Proctor(6) to have 19 rows, has been re-examined by Mr. Battersby of the British Museum and found to possess the normal 17 rows.

Ventrals: These vary from 189 to 220, with an average through the series of 203.5. The specimen with the lowest count was the only female examined.

Subcaudals: These range in number from 53 to 70; the majority may be single or paired, exceptionally all single or all paired.

Anal: This scale is normally divided, but in exceptional specimens may be single.

Frontal: This scale is most variable and may be as long as broad (1.0) to almost twice as long as broad (1.82). It also varies from almost as broad (0.9) to one and a half times as broad (1.5), as the supraocular.

Rostral: This varies from a little broader than long (1.25) to almost twice as broad as long (1.83).

Internasals: These do not show a very great variation but may be from one third as long as (.3), to over half the length of the prefrontals (.55).

Preocular: One, abnormally two.

Postoculars: Two, abnormally three.

(4) A. Loveridge, Bull. Mus. Comp. Zool., 1934, Vol. LXXVII, No. 6, p. 282,

(5) L. Glauert, W. Aust. Nat., Vol. 2, No. 7, p. 162, fig. 1,

(6) J. Proctor, Proc. Zool. Soc. London, 1923, pt. 2, p. 1073.



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TABLE 1

Species	Locality	Rostral	Frontal	Frontal B	Scale rows	Ventrols	Anal	Sub-caudals
		$\frac{*B}{L}$ ratio =	$\frac{L}{*B}$ ratio =	Supraoc. B				
<i>P. australis</i>	Port Darwin, N. Territory	1.57	1.44	1.50	17	209	2	65
Macleay Museum (after Thomson)	"	1.45	1.60	1.00	17	208	2	62
	"	1.58	1.62	1.08	17	217	2	34(?)

* B = breadth

L = length

(?) The tail of this specimen appears to be truncated.

TABLE 2

Species	Locality	Rostral	Frontal	Frontal B	Scale rows	Ventrols	Anal	Sub-caudals
		$\frac{*B}{L}$ ratio =	$\frac{L}{*B}$ ratio =	Supraoc. B				
<i>P. platycephalus</i> (head only)	E. Alligator R., Arnhem Land, N.T.	1.50	1.41	1.24	--	--	--	--
Nat. Mus. Melb. <i>P. platycephalus</i> (head only)	—	1.44	1.60	1.14	—	—	—	—
Qld. Mus. <i>P. dentisonioides</i> (after Werner)	Eradu, W. Australia	broader than long	almost twice as long as broad	not quite as broad as supraoc.	17	189	1	54
<i>P. darwiniensis</i> (after Macleay)	Port Darwin, N.T.	—	as broad as long	much wider than supraocs.	17	212	2	64
<i>P. australis</i> Aust. Mus.	Mt. Hope, N.S.W. R9441	1.25	1.19	1.33	17	206	2	60
"	Yeppen Crossing, Qld. R.10248	1.36	1.70	1.00	17	189	2	56
"	Mundadoo, via Girilambone, N.S.W., R.7083	1.57	1.82	1.10	17	198	2	59
"	Eidsvoid, Burnet R., Qld., R.6345	1.31	1.21	1.40	17	198	2	58
"	Simpson Desert R.13903	1.42	1.50	1.09	17	215	2	41+
"	Groote Eylandt, N.T. R.10232.	1.54	1.80	1.25	17	211	2	67
"	Eidsvoid, Burnet R., Qld., R.6206	1.38	1.54	1.37	17	194	2	54
"	*Lower Coleman R., N. Qld.	1.64	1.18	1.31	17	—	—	—
"	*Lockhart R., N. Qld.	1.83	1.58	1.09	17	206	2	62

* From Table I in Thomson's paper 1930-31.

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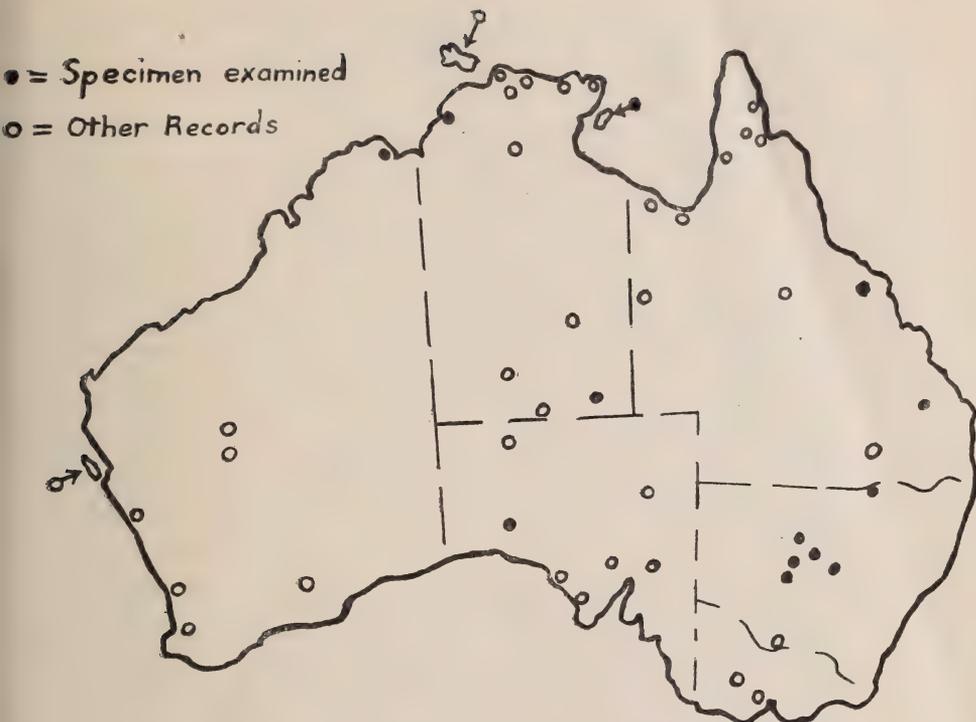
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Map showing distribution of *Pseudechis australis* Gray.

Tempora's: Normally 2:2 but in a couple of abnormal specimens 2:3 on one side only.

Colour: This is extremely variable but most specimens are a uniform shade of brown or red-brown above. A few of the scales may be edged with black, giving a network appearance. The colour is most intense along the mid-dorsal line. The ventral surface may be whitish, cream or deep orange, with or without brown or orange spots. The head is usually a lighter shade of the dorsal colouring.

Size: Specimens up to nine feet have been recorded.

Pseudechis porphyriacus (Shaw) Red-bellied Black Snake.

Pseudechis porphyriacus is very closely allied to *P. australis*, its principal points of difference being a lower average ventral and subcaudal count and its striking coloration.

Waite and Longman⁽⁷⁾ confused the dark bellied form of *P. porphyriacus* with the dark bellied form of *P. guttatus* when they regarded *P. mortonensis* as a subspecies of *P. porphyriacus*. The two species can be separated by the midbody count; 17 rows in *porphyriacus*, 19 rows in *guttatus*. Both species are found in the same area in south-east Queensland. During the examination of this species I found several specimens with a single anal scale. The frequency of this aberration indicates that the condition of the anal scale is of little diagnostic value, at least in this species.

(7) E. Waite & H. Longman, Rec. S. Aust. Mus. 1920, Vol. 1, No. 3, p. 175.

As can be seen in Table 3, the scalation of *P. porphyriacus* falls within the following extremes of variation:—

Scales: These number 17 rows at midbody. At the fifth anterior ventral there may be from 17 to 23 rows, and at the fifth posterior ventral, 15 to 17 rows.

Ventrals: These range in number from 175 to 210 with an average through the series of 70 specimens, of 186.3.

Anal: The great majority of specimens possess a divided anal, but, as shown in Table 3, specimens with a single anal are frequently found.

Subcaudals: These range within fairly narrow limits, i.e. 42 to 60. Usually the first few are single, the rest paired; exceptionally, they may be all entire or all paired.

Frontal: This scale varies considerably in size and shape and may be as long as broad (1.00) to twice as long as broad (2.00). It also varies from three-quarters the width (0.78) to one and three-quarter times the width (1.75) of the supraocular.

Rostral: It may be slightly broader than long (1.10) to one and three-quarter times broader than long (1.78).

Internasals: These may be slightly less than half (0.43) to almost two-thirds (0.58) the length of the prefrontals.

Preocular: Invariably one.

Postoculars: Normally two but three specimens showed three on one side only.

Temporals: Normally 2:2 but odd specimens show 2:3 on one side only.

Colour: The dorsal colouring is invariably black, either dull and dirty or with a shining satin appearance, depending on the condition of the snake. The ventral colour is usually a shade of red or pink. It varies from bright crimson to pale pink though each ventral scale is edged with black. At the northern extent of the range of this species, most specimens are very pale on the ventral surface, some being white, but they still show the black edging. In the MacPherson Range area of south-east Queensland many specimens show the blue-black colouring and an occasional specimen from Sydney also shows this colouring. In all specimens, the under-tail surface is invariably black. Mr. G. Cann, Reptile Keeper at Taronga Park, has captured a few specimens with a few crimson scales scattered on the dorsal surface.

Size: The largest specimen recorded measured eight feet four and a half inches and is believed to have come from the Mitta Mitta River of Victoria. Specimens over seven feet are seldom seen.

Pseudechis guttatus (de Vis) Spotted Black Snake

In support of the conclusions of Mack and Gunn that *P. mortonensis*, de Vis, is synonymous with *P. guttatus*, de Vis, I submit Table 4 showing the duplicity of scale characters.

As more specimens were brought into collections a graduation in colour was seen from specimens with uniform blue-black dorsal and ventral colouring to almost white specimens with only the tips of the scales black.

The extreme variation of scale characters in *P. guttatus*, de Vis, should now be quoted as:—

Ventrals: These number from 183 to 199 with an average through the series of thirteen specimens examined of 191.6.

Anal: This scale was divided in all specimens examined.

Subcaudals: These number from 49 to 61; the majority of specimens possess more single than divided subcaudals.

Frontal: This scale varies from one and a quarter times (1.25) to two and a quarter times (2.25) as long as broad, and may be a little less than the width of the supraocular (0.88) to one and two-thirds as broad (1.67) as the supraocular.



TABLE 3

Species	Locality	Rostral	Frontal	Frontal B	Scale rows	Ventrols	Anal	Sub-caudals
		$\frac{*B}{L}$ ratio =	$\frac{L}{*B}$ ratio =	Supraoc. B				
<i>F. porphyriacus</i>	Uni. Mus., Melb.	1.10	1.50	0.80	17	184	2	54
"	Victoria	1.78	1.40	0.91	17	180	2	—
"	R.391, Aust. Mus. Coogee, Sydney	1.33	1.14	1.40	17	185	2	50
"	R.10521	1.71	2.00	1.00	17	183	2	54
"	Rutherglen, Vic. Nat. Mus. Melb.	1.63	1.43	0.78	17	178	2	53
"	Maroubra, N.S.W. R.2535	1.25	1.00	1.20	17	191	2	55
"	Hillgrove, N.S.W. R.2742 (juv.)	1.33	1.43	1.75	17	182	2	56
"	Victoria	1.63	1.33	0.90	17	175	2	53
"	Towra, N.S.W.	1.36	1.36	1.16	17	185	1	55
"	Clifton, Caroda, N.S.W. R.9247	1.60	1.45	1.10	17	194	2	55
"	Sydney, N.S.W. R.6521	1.25	1.75	1.14	17	188	2	42
"	Gosford, N.S.W. R.9895	1.25	1.25	1.33	17	190	2	60
"	Lake Barrine, N.Q. R.11333	1.38	1.57	1.40	17	190	2	55
"	Tweed R., N.S.W.	1.33	1.50	1.00	17	183	2	52
"	—	1.46	1.50	1.00	17	185	1	54
"	Aus. Mus. Somersby, Gosford, N.S.W., R.8707	1.11	1.55	1.00	17	190	1	54

TABLE 4

Species	Locality	Rostral	Frontal	Frontal B	Scale rows	Ventrols	Anal	Sub-caudals
		$\frac{*B}{L}$ ratio =	$\frac{L}{*B}$ ratio =	Supraoc. B				
<i>P. guttatus</i> (type)	Cecil Plains, S.Q.	1.50	1.40	1.25	19	183	2	52
<i>P. guttatus</i>	Bell, S.E. Qld.	1.50	2.25	1.33	19	190	2	55
"	Colyville, S.E.Q.	1.50	1.57	1.00	19	190	2	55
"	Beaudesert, S.E.Q.	1.50	1.45	1.35	19	188	2	56
"	Moree, N.S.W.	1.45	1.40	1.11	19	—	2	59
(parts only)								
<i>P. guttatus</i>	Scone, N.S.W.	1.43	1.25	1.67	19	199	2	61
"	Wallangra, N.S.W.	1.43	1.50	1.20	19	199	2	59
<i>P. mortonensis</i> (type)	Brisbane, Qld.	1.60	1.33	1.20	19	191	2	60
<i>P. mortonensis</i>	Warra Stn., Willow Tree, N.S.W.	1.33	1.50	1.00	19	193	2	50
"	Moree, N.S.W.	1.60	1.60	1.00	19	190	2	55
"	Kalbar, via Ipswich, Qld.	—	1.60	1.25	19	194	2	51+
"	Eidsvold, Burnett R., Qld.	1.28	1.50	1.20	19	177	2	58

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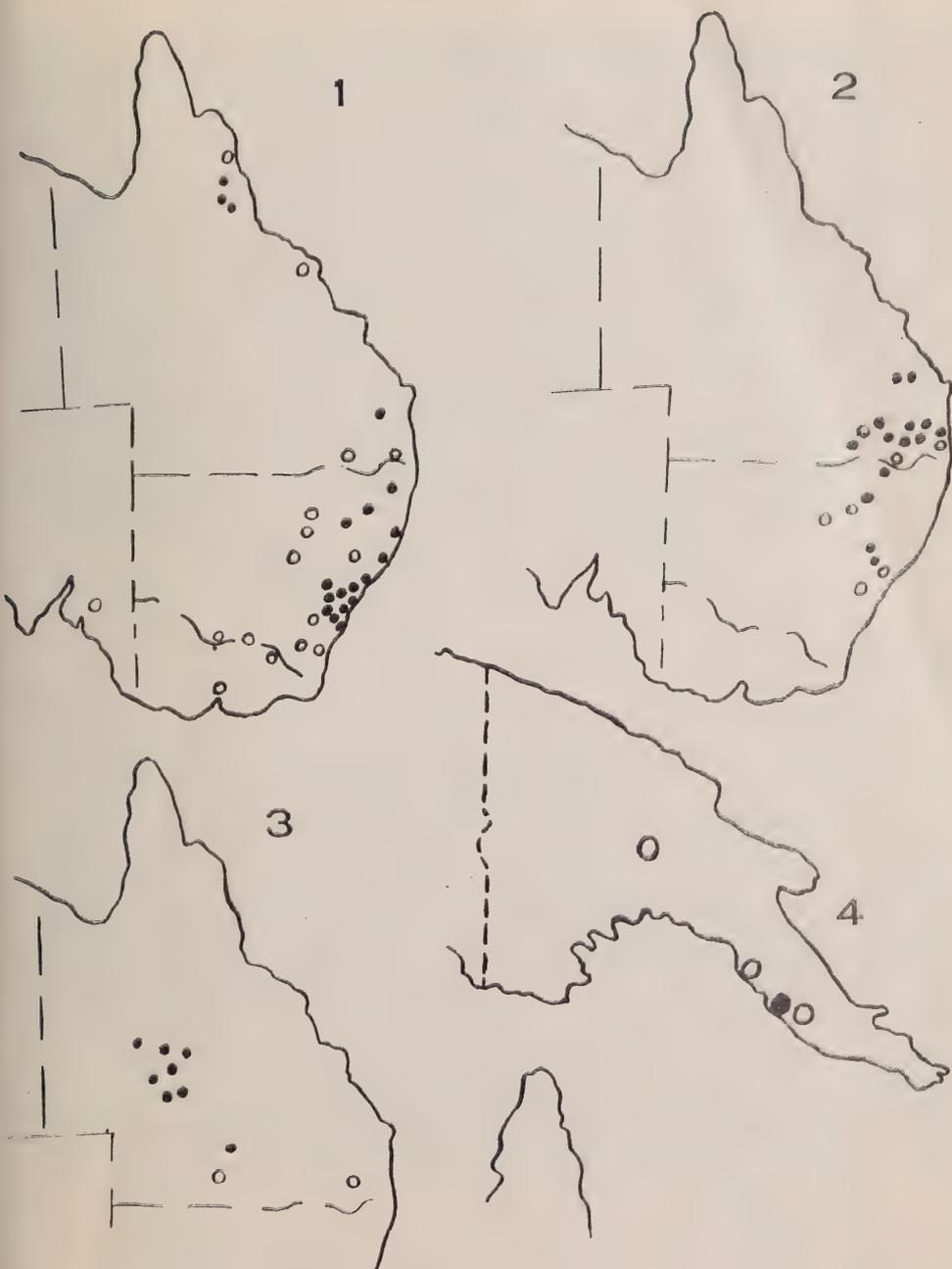
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Maps showing distribution of four species of *Pseudechis*:
 1, *P. porphyriacus* Shaw; 2, *P. guttatus* De Vis; 3, *P. colletti*
 Boulenger; and 4, *P. papuanus* P. & D.

Rostral: This scale may be a little broader than long (1.28) to one and two-thirds as broad as long (1.60).

Internasals: These may be slightly more or less than the length of the prefrontals.

Preocular: Invariably one.

Postoculars: Two in all specimens examined.

Temporals: These are normally 2:2 but one specimen gave a formula of 2:3 on the right side and, as mentioned by Mack and Gunn, one specimen in the Queensland Museum shows a formula of 2:0. Whether the latter condition occurs on both sides is not indicated.

Colour: The extreme variation in colour of this species led early workers to believe that there were two species. Now that a workable series exists in museums, the extreme range may be seen as follows. Specimens may be uniformly black above and blue-black ventrally. Similar specimens occur with a light scattering of cream spots on a few of the dorsal scales, the ventral scales being lighter in colour. An intermediate stage occurs where the spots are spread evenly over the dorsal surface to produce a coarse network pattern. In this case, the ventral surface may be mottled blue-grey and cream. The opposite extreme comes with specimens which are almost creamy white above and below with only the edges of the scales black.

Size: Specimens up to 5 feet are not rare.

Pseudechis colletti (Boulenger) Collett's Snake.

The status of this species remains unchanged. Its colour, scalation, distribution and comparative rarity are distinctive. However, specimens examined and published notes and descriptions show the following interesting variation in scalation:—

Scales: These number 19 rows and may be 19 or 21 at the fifth anterior ventral and 17 or 19 at the fifth posterior ventral.

Ventrals: These range in number from 220 to 230 with an average for the five specimens examined of 224.5.

Anal: Normally divided.

Subcaudals: These may be from 56 to 61 in number with more than two-thirds of these single, the rest paired.

Frontal: This may vary from one and a half times (1.55) to one and three-quarter times (1.75) as long as broad and may be almost as wide (0.90) to slightly wider than (1.12) the supraocular.

Rostral: This scale may be slightly more (1.6) or less than (1.44) one and a half times broader than long.

Internasals: The few specimens examined show that these scales are approximately half the length of the prefrontals.

Preocular: Invariably one.

Postoculars: Invariably two.

Temporals: So far there are no deviations from the 2:2 formula.

Colour: This usually is in the form of irregular narrow bands of cream and light brown or tan on the dorsal surface. The ventral surface is cream coloured and the head is usually dark grey to black.

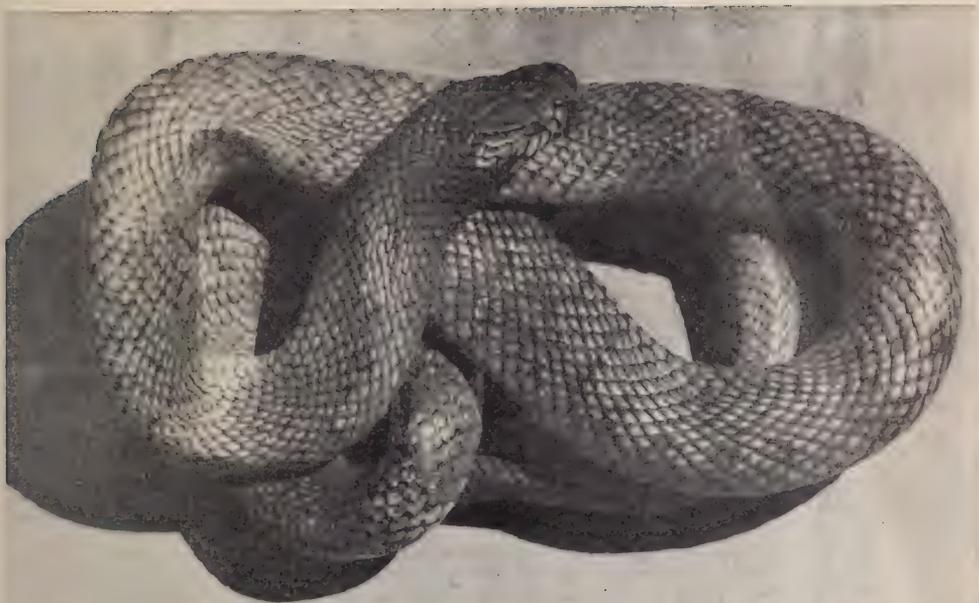
Size: A specimen recently captured at Longreach, Queensland, measured 6 feet.

Pseudechis papuanus (Peters & Doria) New Guinea Black Snake.

Pseudechis papuanus (Peters and Doria) has not been recorded from the Australian mainland but records occur from the islands between Australia and New Guinea as well as New Guinea and off-shore islands.

An examination of one specimen in the Australian Museum together with information from published descriptions indicate the scalation to be:—

Scales: These may be in 19 or 21 rows.



The Spotted Black Snake, *Pseudechis guttatus* De Vis. Upper: spotted form, originally known as *guttatus* De Vis; lower: blue bellied form, originally known as *mortonensis* De Vis.

—Photos by Margaret and Roy D. Mackay.

Ventrals: These range in number from 221 to 224.
 Anal: Invariably divided.
 Sub-caudals: These number 49 to 61.
 Frontal: This scale is usually small but is longer than broad and at least as broad as the supraocular.
 Rostral: As in other species of this genus this scale is broader than long.
 Internasals: These are approximately half the length of the prefrontals.
 Preocular: Invariably one.
 Postoculars: There are two in all records examined.
 Temporals: Formula 2:2.
 Colour: This species is usually dark brown above and cream below,
 The dorsal colour may be light brown in occasional specimens.
 Size: Specimens up to 5 feet are recorded.

The preceding review of the species of *Pseudechis*, involving the examination of over one hundred specimens, indicates the need for an amendment to the description of the genus. An examination of several skulls shows that grooving may be present, though indistinct, in nearly all teeth of the upper jaw and that grooving is well marked in the large anterior mandibular teeth in all species.

Genus *Pseudechis* Wagler, 1830.

Maxillary extending as far as, or slightly beyond the palatine, with a functional pair of large, grooved poison fangs followed by two to five small teeth which may be slightly grooved. Palatine and pterygoid teeth may be slightly grooved; mandibular teeth, anterior three to five longest and well grooved. Head not or, but slightly, distinct from the neck. Eye moderate, round pupil, nostril either between two nasals or semidividing a single nasal. Temporals normally 2:2; lower anterior wedged between 5th and 6th supralabials. Six supralabials, six infralabials. Distinct canthus rostralis. Body cylindrical, slender to thick. Scales smooth, in 17 to 21 rows (mid-body), belly rounded.

Habitat: Australia (excluding Tasmania and Bass Strait Islands), New Guinea and Torres Strait Islands.

KEY TO THE SPECIES

- A. Scales in 17 rows.
 Ventrals 189 to 220. Subcaudals 53 to 70. Colour, a shade of brown or red-brown above, white to orange below with or without buff or orange blotches *australis* (Gray)
 Ventrals 175 to 210. Subcaudals 42 to 60. Colour, black above, crimson to pale pink beneath. Subcaudals invariably black,
porphyriacus (Shaw)
- B. Scales in 19 rows.
 Ventrals 183 to 199. Subcaudals 49 to 61. Colour, black or dark brown with or without creamy spots above. Blue-grey ventrally but may be broken up by creamy blotches, head usually darker,
guttatus (de Vis)
 Ventrals 220 to 230. Subcaudals 56 to 61. Colour, irregular brown and cream wavy crossbands above; uniform cream colour below. Head often darker *colletti* (Boulenger)
 Ventrals 221 to 224. Subcaudals 49 to 61. Colour, uniform brown above, cream below. Not found on the Australian mainland,
papuanus (Peters and Doria)

ACKNOWLEDGMENTS

Without the expert guidance and criticisms of Mr. J. R. Kinghorn, President of the Royal Zoological Society, this study could not have been made. To Mr. Kinghorn I express my sincere thanks. I am grateful to Mr. G. Mack, Director of the Queensland Museum, and to Mr. C. Brazenor of the National Museum, Melbourne, for making their

collections available for this study. For valuable assistance and notes I wish especially to thank Miss S. Gunn of the Queensland Museum, Mr. F. J. Mitchell of the South Australian Museum, Mr. Battersby, British Museum, London, and Mr. A. Loveridge, Museum of Comparative Zoology, Harvard, Mass., U.S.A.

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THE AUSTRALIAN NETTING SPIDER, DEINOPIS SUBRUFUS

BY N. L. ROBERTS.

Spiders have evolved many curious devices for snaring their prey with silk secreted from special organs, and one of the most ingenious of these is the little rectangular net made by *Deinopis subrufus* (L. Koch, 1878). The name of the genus is often written *Dinopus*, but *Deinopis* is the original form (W. S. Macleay, Ann. Nat. Hist. II, 7, Sept. 1838, p. 8, pl. ii, fig. 3).

As a group, Deinopids are confined to the warmer regions of the world, and nine species have been recorded from Australia, including one, described by Rainbow in 1920, from Lord Howe Island. Only one species (*Deinopis spinosus*) is found in the United States, in the south-eastern States, where it is known as the "ogre-faced" spider because of the extreme development of the posterior median eyes. There are no Deinopids in England.

Deinopis subrufus was first recorded from Bowen and Brisbane, Queensland, but is now known to have a wide Australian distribution, and is common in the Sydney district, although its interesting habits have been largely overlooked, probably because its activities are nocturnal. The flashlight photographs accompanying this article are, I think, the first ever taken in Australia, and the only published notes are those of the late Dr. Jeri Baum, of Prague, who hatched some egg sacs that were sent to him and recorded the habits of the young Deinopids, one of which survived for nearly eight months.

Deinopis subrufus belongs to the single subfamily Deinopinae of the family Deinopidae. Like other members of the family, it has a long body, as well as long legs, and a characteristic abnormal development of the two posterior median eyes. The family name itself is derived from two words meaning "terrible appearance."

On an exaggerated scale this goggle-eyed ogress would be indeed a fearsome creature with her stony, expressionless stare. But her long body, tapering from the "humped" middle to the face in front and the spinnerets behind, and the weird ocular bulge, are ideal attributes for her highly specialized mode of living, and are perfectly correlated for biological ends.

So far as my observations are concerned, *Deinopis* is active only in the warmer months of the year. She makes her appearance in a hedge in my garden in September, and disappears early in May, apparently hibernating, or remaining inactive, during the winter months. I have had as many as six spiders under observation at the same time, all of them "fishing" at night over a cement path.

MAKING THE NET

Many spiders have developed food-catching devices that enable them to wait for prey instead of hunting it, the commonest and best known being the webs of the orb-weavers. *Deinopis* has become a specialist in making a sticky, elastic net which she uses with a high degree of precision and accuracy. It appears to be constant in size and shape, is roughly rectangular when completed, and is woven across a framework of sloping threads attached to supporting guy-threads. Silk secreted for its construction is very distinctive, being a thick, bluish, crinkled type with highly viscid and elastic properties, which is combed out of the cribellum—a perforated plate in front of the spinnerets—by a series of curved spines on the upper margin of the metatarsus of the hind legs. So far as I know, the *Deinopis* net has been described only by the late Dr. Jeri Baum, who kept some young

Deinopids in cages. Spiders in captivity, however, lack space to spin the long threads that provide *Deinopis* with the means of a speedy retreat to cover, and the male with important lines of communication in his courtship ritual; for both superstructural and groundwork "architecture" is an essential preliminary to net-making when the net is suspended near the ground. This somewhat extensive scaffolding does not snare insects, so that the net is really the culmination of the craftsmanship of *Deinopis*.

It is difficult to follow the ground plan, for the colour of the cement path obscures the attachment discs, and I intend to cover sections of the path with black paper next summer and study the "foundations" in detail. The plan of the upper portion of the framework can be seen very clearly in the flashlight photographs, which were taken after portions of the hedge had been removed to allow the insertion of a black background. In addition to making the framework and guy-threads, *Deinopis* deposits silk lines over a section of the hedge above the central guy-thread, which may indicate her presence to a wandering male, for they have no relationship to the framework and net.

Having made the framework, *Deinopis* reverses her normal "upside down" position and, with head up and her two huge eyes staring into space, firmly holds supporting threads with the claws of the first and second pairs of legs. Then, crossing the long fourth pair, she literally shuttles the thick adhesive silk from the cribellum, moving from left to right and right to left, tying in the corners with a deft touch of the spinnerets, and using the tarsi of the fourth pair of legs alternatively. Never once does she even glance at her handiwork, the whole miracle of instinct being focused in the mechanical motions of the long legs, which fashion an intricate and highly efficient death-trap in complete darkness. Touch, not sight, is the unerring guide. Some of the horizontal strands of the net are so close together that it is extremely difficult to count them accurately, but close observation of several nets revealed an average of approximately twenty strands, the period needed to complete each net ranging from twenty-two to thirty-four minutes.

Movements of the third pair of legs are difficult to follow, but they appear at times to be holding a new line and drawing it in to the spinnerets for "knotting" at the corners. I saw a *Deinopis* make three nets one night, and I have several records of two. If disturbed before the net is finished, *Deinopis* will seek safety, but she invariably returns and completes it, her instinct being sufficiently plastic to enable her to resume a half-finished task.

The retreat line is not the only safeguard from danger, for there is no better exponent of "shamming dead" than *Deinopis* when handled. With fore and hind legs paired, she remains apparently lifeless even when rolled about gently in a glass jar and this realistic pose as a "corpse" no doubt has survival value at times when adopted under natural conditions, although it is not an invariable reaction to danger.

A DIGESTIVE FEAT

Perhaps the arachnid equivalent of the endless argument about marsupial birth may be expressed by the question: "Do spiders eat silk?"

As a former sceptic, I can appreciate the forthright "anti" viewpoints expressed by the late Keith McKeown in his last book on Australian spiders, and I offer no explanation of a digestive feat I have observed at very close range, except to state that spider silk is a protein and that some enzyme in the spider's digestive fluids may be the dissolving agent. On several occasions I have deliberately severed the threads holding a net, which twists immediately into a solid

vertical ribbon. *Deinopis* scurried into the hedge, but returned later, surveyed her damaged net in the normal position of "head down," and promptly proceeded to roll it up and eat it. A powerful electric lamp made it possible to watch her mouth movements closely, and scepticism vanished as the mass of silk disappeared in the remarkably short period of three or four minutes. Baum records that his captive *Deinopids* would leave the net when disturbed and "sometimes even roll it up in a small bundle and eat it." Theuer, who has made a most comprehensive study of the American spider, *Deinopus spinosus*, also confirms (*in litt.*) the statement that the spider eats its silk, having witnessed the feat "many, many times."

AN ANT MENU

Having completed her net, *Deinopis* climbs the central guy-thread for a short distance, then turns and approaches the net head down, and having found the four corners with the claws of the first and second pairs of legs, she tests its efficiency by stretching it several times its normal size. Satisfied that it is now in working order, she contracts it to a quarter or a third of its original width, and awaits a passing insect. It is now that the value of the bulging eyes becomes evident for suspended vertically, she must stare at a very circumscribed area for food and see clearly and quickly any insect that enters it. Her ogre-face violates perhaps the conventional canons even of spider beauty, but at least it gives her a practical, food-finding outlook on life. She may lack what Falstaff called "something of a round belly," but her long body and legs, plus the momentum provided by the resilient framework, enable her to swing forward with ease and use her net to the greatest advantage.

The staple food of the *Deinopids* which make their nets over my path is ants. In two seasons of watching, extending over some months, the menu of black-and-yellow *Camponotus* ants has been varied by one grasshopper, which was captured by a spider "fishing" in the hedge itself, and one moth, the latter being impaled on the claws of a front leg and not picked up by the net. If the habit of netting near the ground is normal—and I can write only of my own observations—ants would be the commonest and most natural prey, but the net no doubt can be used efficiently in a hedge or a bush for catching flying insects. Ants rarely get into orb-webs, but are frequently caught in snares set in the angles of walls. I do not know whether *Deinopis* will accept ants indiscriminately but that she relishes the *Camponotus* workers is established beyond doubt, and their abundance and nocturnal habits ensure an ample food supply. Netting them seems to be so successful that a spider will fish in the same spot for many nights in succession.

In capturing the ant, *Deinopis* stretches the net with a rapid lunge and the slightest contact enmeshes the insect hopelessly, the spider allowing it to struggle before adding a swathe of silk to make it completely immobile. On several occasions I have found her leisurely "munching" an ant and making a new net at the same time. McKeown states that a close relative, *Deinopis bicornis*, extracts her prey from the net and uses it again. *Deinopis subrufus* leaves her prey in the net and make a new one after each capture. I have never seen *Deinopis* release, or throw, the net to enmesh a passing insect. It is always held firmly by the claws.

Theuer's observations lead him to believe that *Deinopis spinosus* places little reliance on eyesight, and is extremely sensitive to aerial vibrations which impel it to spread its net in the path of a flying insect. My observations of *Deinopis subrufus* have convinced me that it relies very largely on visual acuity for food, for it must dab the net quickly on a moving insect, and frequently makes what I can describe only as anticipatory movements when an ant approaches. Baum writes: "The vision of the spider seems to be quite good and it is able to see

objects not too distant, perhaps one inch and a half." I would double this distance for I have seen females pick up ants at least three inches away from the net. Their aim is not infallible, but they rarely miss a prospective victim.

DEINOPID COURTSHIP

I cannot trace any records of the behaviour of the male *Deinopis*. Like the female, he also is born to wait, the difference being that whereas she waits for her food, he waits patiently for her on a few threads of silk in the hedge above her fishing reserve. I have not seen an adult male with a net, nor observed one feeding, but Theuer, who reared young *Deinopids* in special cages, states that immature males make nets right up to the penultimate stage of growth. I have noticed only one young *Deinopid*, with a body length of half an inch, fishing with a net in the hedge.

Being a wanderer, the male *Deinopis* must find a female by chance, although preference for a particular habitat such as a hedge, or the spreading of silk threads by the female, would facilitate the meeting of the sexes. Apparently, as soon as a male *Deinopis* discovers a female, he adopts the role of attendant, varying the monotony of waiting by visiting the female suspended over the path. He is lighter in colour and has a smaller and narrower body, but his first pair of legs are proportionately longer and serve amatory as well as ambulatory functions.

Courtship activities are wholly tactile, the oft-repeated ritual of leg-tapping being a highly diverting spider version of the famous "Barkis is willing." Slowly and cautiously the male descends the central guy-thread at the bottom of which the female is dangling her net, and with rotatory movements of his first pair of legs touches the tarsi of her fourth pair, now holding the thread that supports the weight of her body. This rhythmic and graceful tapping usually continues, increasing in speed, until the female registers disapproval with some sudden movement. I have never noticed her give him the slightest encouragement—though the tapping may have value as a stimulus—and, as his survival may depend on caution, he heeds her warning and climbs back to the hedge. This tactile courtship follows a stereotyped pattern and may be repeated several times the same night. Leg movements are characteristic of the courtship of many spiders and there is more in them, of course, than meets the eye; for while the human leg has a simple pedestrian function and is difficult to wave under any circumstances, the spider's flexible leg is a highly specialized sensory organ, capable not only of walking and running, but of "talking," or, in short, conveying those few standardized "messages" that comprise all the spider's language.

At one stage there were three males attending three females in my hedge, and the only mating I witnessed took place after a wait of thirty-nine days, during which the male appeared to be without food. In the final courtship, the female took the initiative while still in the hedge, using exactly the same leg-tapping technique as the male, who now approached her ventral side up and with both pedipalps fully extended. Both male and female gave a vigorous exhibition of waving and twitching legs. Four times the male advanced and retreated before mating and retiring, the female being the aggressor until the final stage, during which she appeared to be in a kind of catalepsy. This state has been recorded of the females of other species during mating, and may be a safeguard for the male. After mating, I never saw the male *Deinopis* again, and two nights later the female had also appeared.

Thus, with courtship consummated and the prospect of more *Deinopids* assured, it seems appropriate to bring this plain narrative, which has revealed some of the important events in the life of an adult male and female *Deinopis*, to a close.

I have still to discover the egg sacs, which are round and hard and marked with black spots, to fill in many other gaps in the "biography" of this interesting spider, and to complete a series of photographs that will confirm all the main facts of the life-history.

My thanks are due to Professor B. Theuer, of New York, who sent me the original manuscript of his thesis on the American spider, *Deinopis spinosus*; also to Professor V. V. Hickman, Hobart, who has encouraged my field work.

Explanation of Figures

1. The male *Deinopis* is smaller than the female and uses the long first pair of legs for "tapping" in the courtship ritual.
2. The female *Deinopis* begins her net, shutting the thick bluish silk out of the cribellum, or perforated plate, in front of the spinnerets.
3. The net nearing completion. It is woven on a framework, and is the product of instinct, the spider staring upward into space while making it. Note the large posterior median eyes.
4. The finished net is rectangular in shape, and is held by the claws of the first and second pairs of legs after the spider has contracted it to a narrow band of silk. It can be stretched several times its normal size.
5. This photograph was taken immediately after *Deinopis* had picked up an ant in her net. More than 90 per cent. of the food of the Deinopids under observation consisted of the black-and-yellow *Camponotus* ants.

—Photos, N. L. Roberts.



Figure 1.

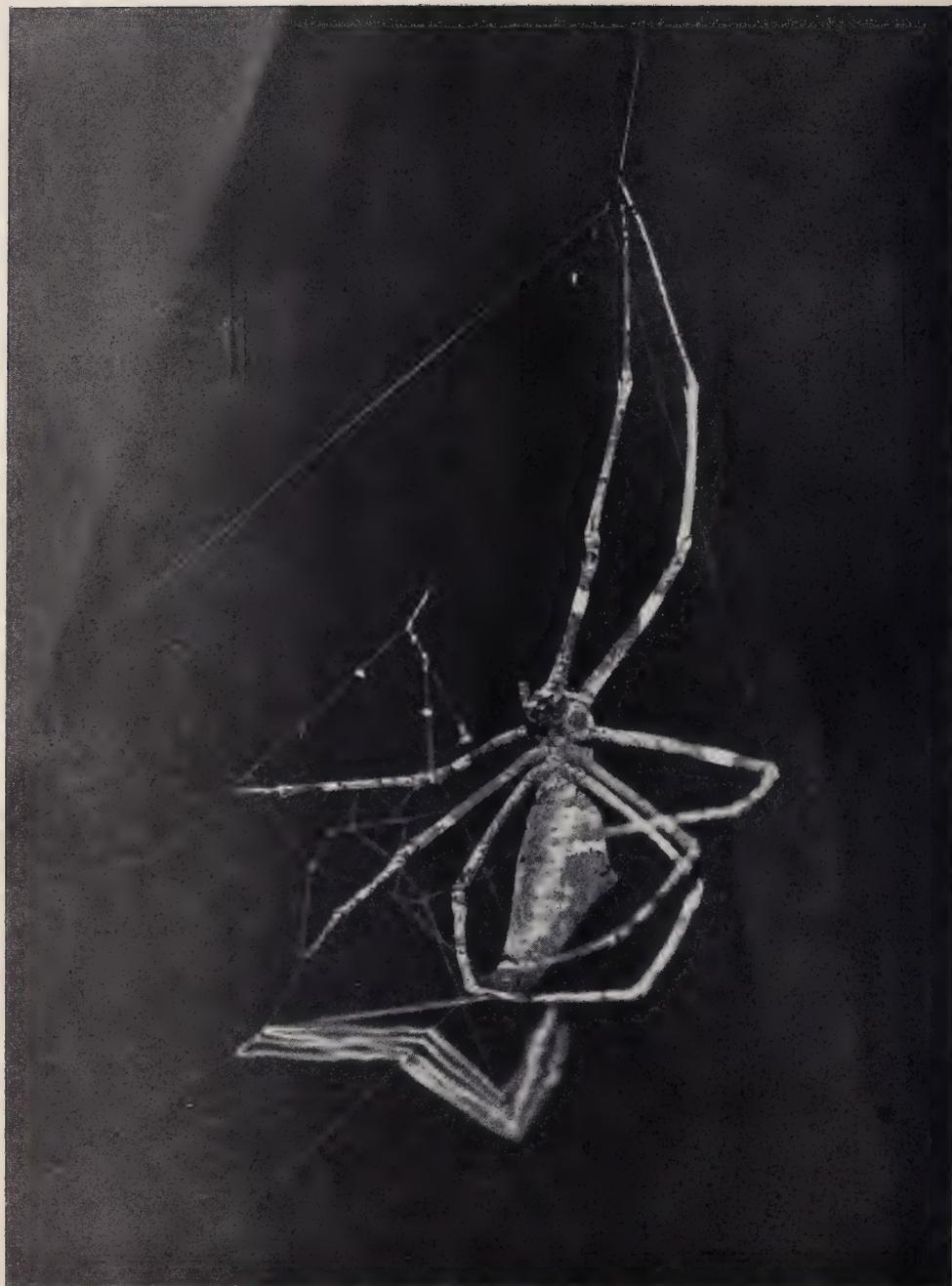


Figure 2.

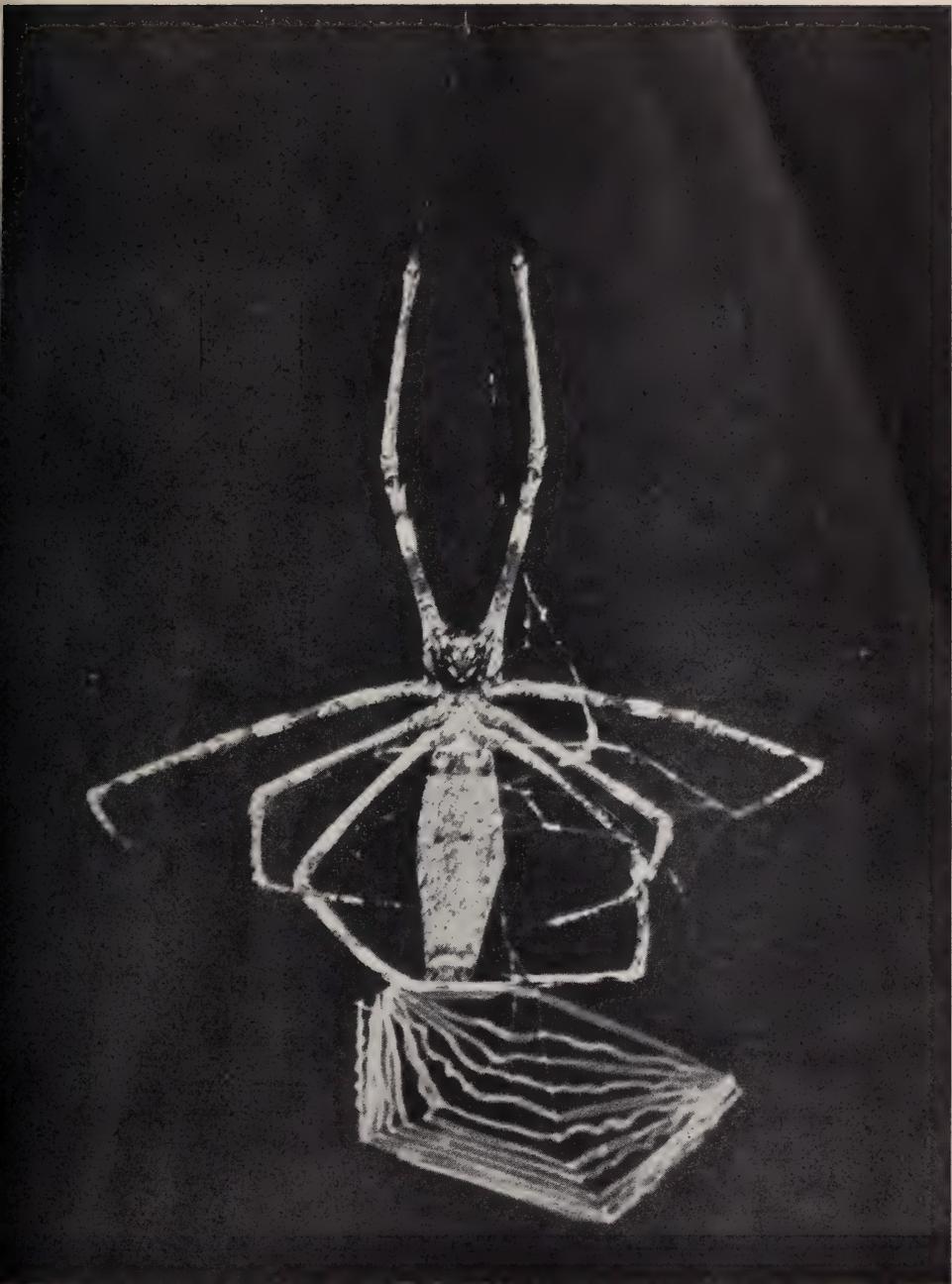


Figure 3.

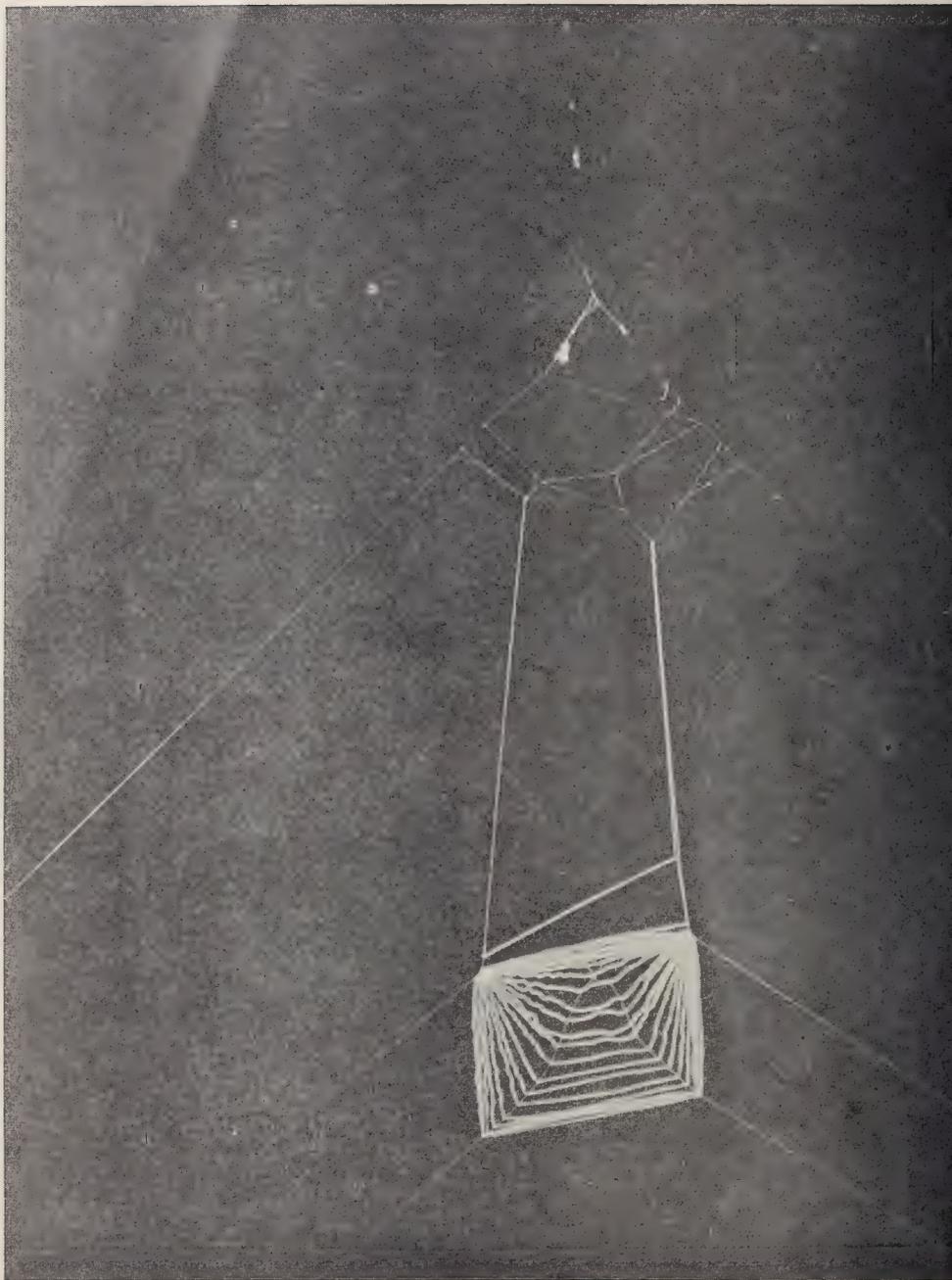


Figure 4.

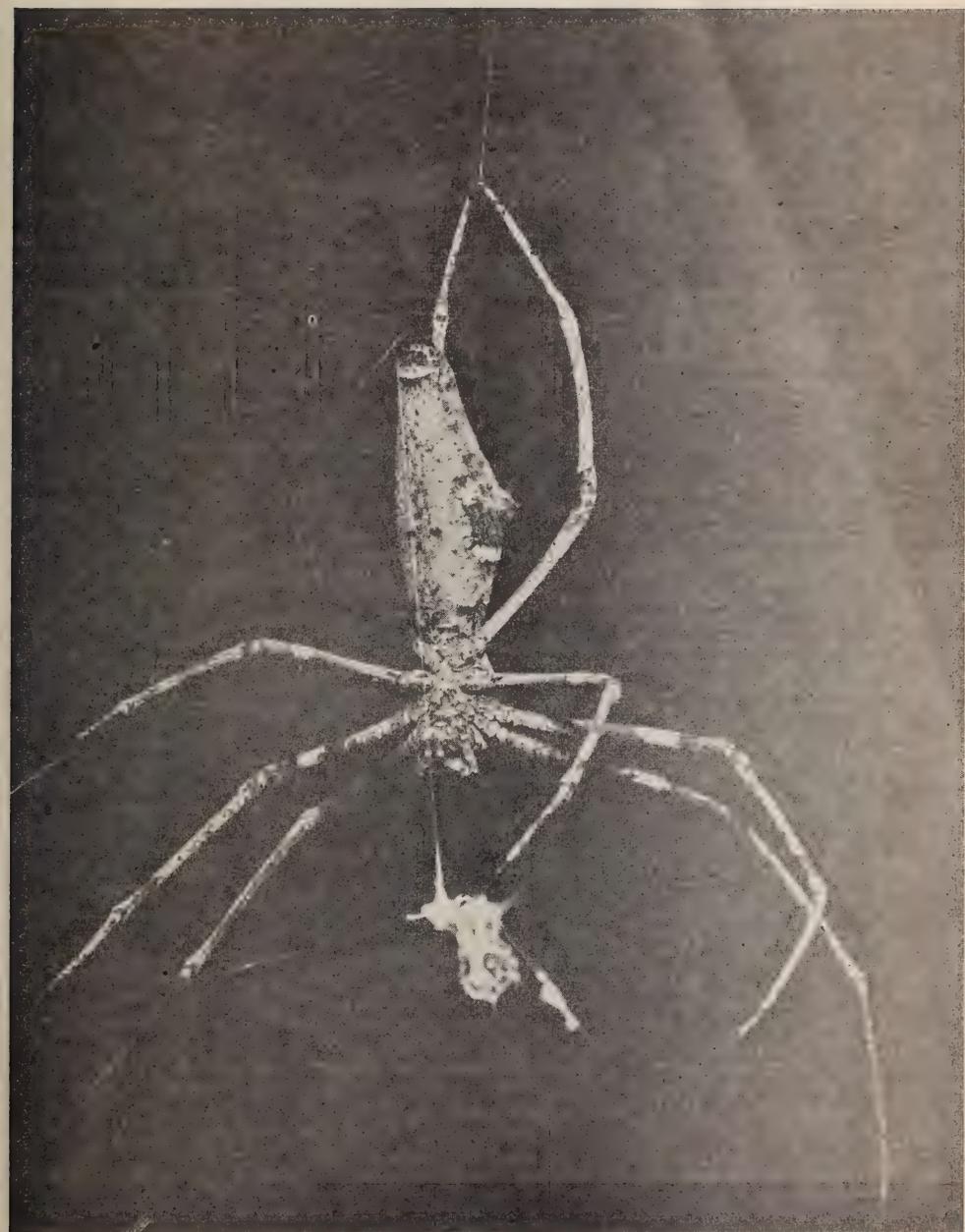


Figure 5.

BELLINGSHAUSEN IN AUSTRALIA

BY TOM IREDALE.

In 1820 four Russian exploring vessels called in at Sydney, the first two, *Otkryitie* under Captain Wasiljeff, and *Blagonamyrenny* under Captain Schismaneff arriving March 1 and 2 and leaving March 27. There is difficulty in translating the names of the vessels and officers, *Otkryitie*, the y being sometimes dropped, the other *Blagonamerenei* while the first Captain's name is also written Vasilev, so that little attention may be taken of the spellings. The dates are also recorded differently as the local and British reports use the new style, while the Russians at that time retained the old style. This means a difference of twelve days. These two ships travelled to the North Pacific and at present we have no account of their visit to Sydney.

Three weeks later another pair of vessels, the *Mornoy* (*Mirnyi*) and the *Wostock* (*Vostok*) under Captains Bellingshausen (Billinghausen) and Lazarew (Lazarev), the former being the leader of the expedition, arrived March 30 (April 11) and sailed May 19, returning from a New Zealand cruise on September 21 and leaving November 12. All four vessels had left St. Petersburg on July 4, 1819, the former pair for the North Polar Regions of the Pacific, the two latter for discovery in the Antarctic Regions.

Thaddeus Thaddeivitch Bellingshausen was an hereditary nobleman, hence he appears in English works as Baron, in French as "de," and in German as "von," but in the lastnamed his first names appear as Fabian Gottlieb.

Bellingshausen had been born on Oesel Island, Livonia, in 1778, commissioned in the Russian navy in 1793, circumnavigated the globe as a junior officer under Kruzenstern, 1803-1806, and thence was given charge of the Antarctic expedition. He navigated a circum-Antarctic route, equalling Cook in his audacity, and is regarded as the greatest Antarctic navigator after Cook. An account of this expedition was published (in Russian) in 1831 in two volumes 8vo, with a folio atlas. No reference to Bellingshausen, as regards Australasian seas, had been made, until McNab, the inestimable New Zealand historian, included accounts of his visits to New Zealand in his invaluable publications, "Murihuku and the Southern Islands" 1907, and revised as "Murihuku," 1909. McNab had translations made from the Russian edition, noting that there was also an abridged German edition. McNab mentioned that the vessels had been to Sydney, but no one seems to have been interested. My colleague G. P. Whitley referred to them in his "Some early Naturalists and Collectors in Australia" (Journ. & Proc. Royal Austr. Hist. Soc. Vol. XIX, pt. 5, pp. 291 et seq., 1933) as well as another pair, *Apollo* (Captain Chroolstoff) Sydney, June 7-25, 1821, and *Rurick* (Captain Rhochoff) August, 1821, dates inaccurate.

Continuing his investigations, Whitley recently found that the Hakluyt Society has issued an English translation in 1945, but owing to the war years this had been overlooked, and is now already scarce. Whitley noted birds, and made a list which he graciously handed to me for investigation and publication. The English title is "Voyage Bellingshausen Antarctic Seas 1819-1821." (Hakluyt Society (2) XCI & XCII, 1945.)

Bellingshausen complained that as naturalists "Russian volunteers had been rejected in favour of unknown foreigners," (Danish Martens and Kuntze, who when the Russian vessels arrived at Copenhagen, declined to take part in the expedition), and no official naturalists accompanied the expedition. The surgeons Bergh (*Vostok*) and Galkin (*Mirnyi*) took over the task of skinning and mounting specimens, while the artist Paul Mikhailov made drawings from the birds and

animals in the flesh. Many pictures of seabirds were made, while at Sydney were painted a view of Sydney with ships at anchor, Aborigines in camp, waratah flower, the Aboriginal Boongaree and his wife, and four birds. No copy with the Russian paintings is available, but the Mitchell Library has the first volume of the text, and photostats of the atlas, but lack of coloration does not assist identity. This is rather unfortunate as in the Hakluyt edition these paintings are printed in black and white in much reduced size, half an octavo page. The identification of the subjects is supposed to have been made with the assistance of British Museum officers, but this is technically unlikely. Thus plate xvi shows copies of the Russian plates 24 and 25, and the subjects are entitled Prince Regent Bird and Abbott Bird; pl. xvii, Banksia, Blue Tit, Honeyeater, Waratah, Russian plates 26 and 27. It is unfortunate that the text of the second volume in Russian is unavailable as there has been difficulty in translating it into English, probably a better translation is that by Gravelius in German.

It may be mentioned that neither the Russian nor the German translation is listed in the British Museum (Natural History) Library Catalogue, nor in Casey Woods' "Introduction to the Literature of Vertebrate Zoology," 1931.

At Sydney Bellingshausen records that he "Met Boongaree and wife Matora with their two children, boy and girl" and told them that "they would receive clothes and ropes" if they brought fish, live birds, a kangaroo and other animals.

Later "The Governor invited me to go for a drive with him on the Windsor Road. Flocks of white parrots continually flew across the road with shrill screams. Small birds flitted from tree to tree gladdening us with their song. Red lorries with variegated rose-coloured plumage, and the particularly fine Blue Mountain parrots were perched in the trees in pairs or in flocks. After 7 miles we turned back." . . . "The officers went ashore daily, for the most part to go shooting on the north shore. They always returned with their game bags full of birds, chiefly red parrots, quails and various kinds of swift flying birds, of which the largest were of a beautiful colour and are known as 'Kingfishers'."

Then he recorded as "Quadrupeds. The Opossum. There are different sorts. The Kangaroo, the Rat, Wild Dogs, Wombat and Ornithorhynchus. The Secretary who accompanied Commissioner Bergh relates that they dissected one of these creatures and found eggs in it." "Of various birds New Holland possesses great numbers which are distinctive and of magnificent plumage, as, for instance, the emu or New Holland Cassowary, the black swan, the New Holland pheasant, white and black cockatoos, a few different species of parrots, such as Royal red, the Blue Mountain, and many different kinds of parrakeets, different kinds of kingfishers, some of a remarkable size, and Abbott birds, about the size of a pigeon, grey in colour with bare necks and heads, and a small protuberance on the beak. Besides these there are quails, pigeons, sparrows and many other species. Noteworthy is the change of their plumage at different times, especially in the case of certain parrots, so that two birds of the same species may easily be taken for two quite different species. I will give an instance: The young Royal red parrot is green and has only a few thin red feathers underneath, but after the third year, the whole head, neck and breast assume a red colour. I myself observed this in some Royal red parrots which I had with me on the voyage; after my return to St. Petersburg in August 1822 they moulted and after that they grew red feathers on the head and neck, instead of green ones."

The ships left Sydney on October 31, 1820 and "On the 6th Nov the weather was fine, and we brought the numerous birds which we had bought in Port Jackson up to the quarter-deck, viz several white

cockatoos, and one black one, a lory, parrots from the Blue Mountains and Royal Parrots, as well as one small parrakeet which had been brought from Macquarie Island to Port Jackson, where I bought it. This last bird and the black cockatoos were prized more than all the rest put together. We had also two doves from the Blue Mountains, and one from Tahiti. Altogether we had eighty-four birds on board the *Vostok*. They all made a great deal of noise, some of the parrots knew a few English words. the other birds screeched and whistled in their native way. We also had a kangaroo, which ran about loose, was very tame and clean, and often played with the sailors; it required very little care and ate everything that was given to it." "On this day, to the great disappointment of all, the young black cockatoo died in violent convulsions; this was the only parrot we had of this kind. The convulsions were caused by greed as the parrot nibbled at everything it saw, and it came upon the stuffed kingfisher from New Holland, the skin of which was unfortunately poisonous."

The preceding notes are taken from the English translation by Frank Debenham, and a curious retranslation is of the Russian word for King as Royal, as in the parrot above. Here it is easily recognized, but has caused error in the case of the penguins. In that instance Bellingshausen correctly records the habits of the King Penguin, but the word King being translated Royal, the editor carefully points out that Bellingshausen was here in error as the Royal Penguin does not have these habits. There is today also a Royal Penguin, which the editor was referring to, and which is the bird Bellingshausen regarded as the Mandarin ("Macaroni"). Perhaps the most amusing instance is that under the excellent figure of the Regent Bird is printed "Prince Regent Bird (Magpie)" the bracketed word being the explanation given the editor by his advisers. Some of the colours are apparently doubtfully translated as in explanation of the coloration of a Polar or Antarctic Petrel the English translation reads "Above light brown" and the footnote reads "*Thalassoica antarctica*," but the plate shows the bird to be another species, *Priocella antarctica* or *glacialoides*, which is blue-grey above, and reference to Gravelius' German translation shows the Russian word is translated "blaugrau" which is correct.

The notes on the Sea Birds and the plates are worthy of study.

BILL MOULT IN PRIONS

BY TOM IREDALE.

It has long been known that some birds, such as the Puffin and American Pelican, cast off or moult some ornamental portions of their bills. There has recently (July, 1954) been an abnormal number of Prions, small birds of the Petrel assemblage, thrown up on the New South Wales coast, through a sudden cyclonic storm. This event will be reported upon by others elsewhere. While I was examining a number cast up, to discriminate the species, the upper covering of the mandible slipped off one, disclosing below a new covering. All students know that the bills of petrels of all kinds, from the small Prions up to the largest Albatrosses, show the bill-covering to be composed of well distinguished sections. When the bill is allowed to decay naturally, the sections fall off separately, so that the whole upper mandible slipping off in one piece astonished me. It has been suggested that some of the Petrels moult all their primaries at once, similar to the well-known members of the Duck tribe. As this moult appears to take place over the open sea in the winter time, it may be that the bill-moult happens simultaneously. It should be noted that the new upper mandible covering was already developed under the moulting one, whereas when the bill is macerated normally, there is only bone when the sections peel off.

NOTES ON THE BREEDING OF THE SCARLET CHESTED PARRAKEET

BY MRS. FALKNER J. BLAXLAND.

The scarlet chested Parrakeet (*Neophema splendida*), native to Australia, was first described by Gould in the *Proceedings* of the Zoological Society in 1840. It is perhaps the most beautiful grass Parrakeet of the genus. These glorious little Parrakeets inhabit some of the most desolate country in Australia—spinifex covered sandhills with stunted mallee gullies. The true range of this lovely bird is uncertain, it appears mainly to inhabit central Australia and northern South Australia, with an extension of its range down into Eyre's Peninsula and the west coast of South Australia. It has also been reported from northern N.S.W. Unfortunately very few are to be found at all now. A feature of this genus is that one rarely sees more than a pair at a time, never a flock.

The country in which they are found in most cases is waterless. Neville Cayley in his book "Parrots of Australia," says he is puzzled to know how they obtained water. One hot day he saw a pair among some low shrubs, and watching them through a pair of field glasses, saw one of them move its beak along the leaves and on examining the bush found that it had a very sappy round leaf about $\frac{1}{2}$ in. long, and pressing it between his fingers discovered it contained a small drop of quite palatable juice.

In their wild state scarlet chested Parrakeets live on seeds of grass, spear-grass, spinifex and the seeds of various shrubs. They are wonderful aviary birds owing to their glorious colouring and lack of unpleasant screeching, and they do not chew the woodwork. The scarlets and the turquoisines are the smallest of the genus. The great charm of the "Splendid" lies in its superb feathering coupled with its many winning ways. The colours are incredibly vivid and intense with a highly luminescent quality. The crown and face are royal blue with

the feathers surrounding the beak bluish-purple; the chest and upper breast are bright scarlet. The sides of the lower parts of the neck, chest and breast are bright green. The remainder of the under-surface and under-tail coverts are dark blue-black—paler on the outer margins. Upper wing—coverts are cobalt. Tail blue, green and yellow.

The hen is rather a drab little thing as compared with her magnificent consort. She rather resembles a hen Turquoise, but is smaller and paler. The nesting habits are similar to other species of *Neophema* except they select as a rule a fairly low ragged-edged hollow, and there are no external signs to show that the hollow contains a nesting place. The eggs are pure white, almost lustreless, the average clutch in the wild state is about three, the highest number being five according to Cayley.

Incubation continues for 18 days and the young leave the nest about the 30th day, when they look like very dull hens, and at that stage are very difficult to sex; however, in about three months a few red feathers begin to make their appearance on the chests of the young cocks.

Now, I would like to tell you of my experiences in rearing these delightful little birds.

First of all I obtained a pair of scarlet chested Parrakeets in December 1950. They went to nest in September 1951. This was their first nest and six eggs were laid, and six chicks were hatched. There were three other nests, and they produced eleven chicks altogether (6 cocks and 5 hens).

Next season, August 1952, they went to nest again. This time they had another four nests and produced eleven chicks (6 cocks and 5 hens). That season, 1952, I had four pairs nesting in all; they produced 27 chicks. One pair laid eight eggs in their third nest and hatched seven chicks. Amongst these pairs were two pairs of first year birds—they only nested once. This season that has just ended I mated five pairs, all first year birds. They do not do as well in their first year. Some do not go to nest at all. Only eight chicks were hatched. My original cock injured his leg, which put him out of court for the season.

Aviaries are approximately 10ft. x 6ft. x 3ft., an ideal size for *Neophema*. Wood construction for flights. Roof corrugated fibro. Fibro shelters. Shelter 5ft. earth floors. Nests: An elongated box type 14in. x 9½in. x 6½in., with hinged lid and spout. Decayed wood is used for nesting. Treatment of nests to guard against lice and mites—kerosene and sump-oil are used inside and out. Spray outside with gammawash, also shelter between each nest (hatch). Dusting powder used—1 pt. Pyrethrum to 3 parts Derris Dust. The nest is hung in front part of shelter. Ti-tree is placed in each aviary and renewed from time to time. This is hung in the front part of the shelter. Sandstone rock is placed at each water-vessel, to keep the birds' claws and beaks in trim.

Iodine nibbles, cuttle bone, charcoal and medicated grit with a little oyster grit added are always before them, also sand and a lump of rock salt which is placed on a board. Roots and earth are given—they contain minerals and salts, also antibiotics, which play an important part in minimising disease. For this reason I am not in favour of concrete floors in Aviaries. The birds love to dig holes in the earth. They chew decayed wood and love to chew the bark off ti-tree limbs. They also like to chew the bark of the River Oak. All this gives them an occupation. Ti-tree leaves are picked off and put on their backs and under their wings, which is most interesting to watch.

Food plays a very important part. Mixture given: 6 pts. Hungarian Millet, 1 pt. Jap, 2 pts. White, 2 pts. Plain Canary, ½ pt. Hulled Oats, ½ pt. Rape, ½ pt. Linseed. Peanuts, raw once a week put through a

mincer. Sunflower seed occasionally. Biscuit food, Honey Cod and egg biscuit food once a week. Mutton fat, especially during moulting. Large amounts of green food are extremely important for successful breeding. This is necessary all the year round, not only at breeding time. The two main contributions of green feed to the diet are Vitamin A, essential for health, egg production, fertility and resistance to infection and Riboflavin (Vitamin B2 or G) essential for maximum hatching of eggs. Vitamins exist in a large number of unspoiled natural foods such as greenstuffs, grains and fruit, and are absolutely essential elements in the diet of both birds and man.

I feed daily many types of seeded grasses, amongst them, chick weed, which is said to contain Vitamin E, very valuable in all stages. oats, thistles, dandelions (valuable oil), lawn clippings, and I grow large quantities of millet for them, given in the green stage just about to drop. I also grow broccoli, green sprouting type, for them, which they look for every morning. It is a very valuable green food. Dark greens contain the most vitamin value.

Lucerne is unique among green foods. It contains almost every general and accessory nutritional factor required by birds in quality as well as quantity. Once the birds get used to it they like it very much. I feed them raw vegetables, particularly carrots, peas (also pods for the minerals they contain), also fresh fruit. All vegetables and fruit must be thoroughly washed. Although vegetable acids are not, strictly speaking, foods, they play so important a part in the preservation of health that a diet is hopelessly incomplete which does not include them. One of the chief among them is malic acid, which is found in considerable quantities in the fruits of plants belonging to the rose family, such as apples and pears; these I give to my birds, also oranges Pyracantha and cotoneaster berries, when I can get them, also privet berries are given them.

After the nesting season is over I do all I can to get the parent birds fit and through the moult. When moulting commences I give them an iron mixture (Douglas mixture) three times a week for three or four weeks at a time, then spell for three weeks. Earthenware, china or glass drinking vessels only can be used. Birds must be well fed while producing their new coat of feathers. Experiments have shown that during the moulting season birds may be in a state of negative sulphur balance, particularly birds that moult to a considerable extent. Birds that lay freely suffer from loss of sulphur. This explains why birds do not lay during the moulting season, because the drain on their sulphur reserves is so great through feather loss and fresh growth of feathers that no sulphur is available in the body for eggs, even in a diet rich in the correct sulphur compounds. Egg yolk and milk powder are very rich in sulphur compounds. It is their valuable sulphur content that explains a great part of their dietetic and food value. Peanuts are rich in sulphur. Hemp seed is also rich in valuable sulphur compounds, but unfortunately is unobtainable. Peas and beans and egg biscuit foods are high in protein and foods high in protein are generally rich in sulphur, therefore it is always safe to feed protein-rich foods during the moulting season. Feathers are very rich in protein. V12, the anti-anemic factor, is contained in milk powder and is absolutely necessary for growth. If I have to hand-rear any of the chicks I always include it in their food. Ground-up egg-shells are good at this time as extra calcium is needed, especially for hens who have been laying eggs and feeding young. During the winter months I give Vetemul (Vitamin A and D3), one teaspoon to a pint of seed, well rubbed in. One inch to an inch and a half of the treated seed is put in the hopper and the untreated seed is put on top of it. Care must be taken to see that the treated seed does not go rancid.

HAND REARING PARRAKEETS FROM THE NEST

The parent birds sometimes neglect to feed their chicks and this is due to some chicks being a little backward or too many chicks in the one brood. I have had as many as seven scarlet chested Parrakeets in a brood. I inspect them after the evening meal and if I find any that are not getting sufficient food I take these over entirely and hand-feed them, also the chicks that the parents neglect because they want to go to nest again. I have saved many each season and I use the following food with excellent results .

A mixture of seed which consists of millet, Hungarian, Japanese and White millet, plain canary, hulled oats, rape and linseed is crushed on a board with a bottle and the husks blown off. A portion of these kernels is added to Farex and powdered milk with warm water into a porridge-like substance, but not too mushy. To this is added beaten raw egg and a sprinkling of cuttle-bone powdered. If the chick is very weak due to lack of food I add a little Glucose to the first few feeds. A portion of this mixture is put into a Stern's eye-dropper and fed to the bird. Two drops of cod liver oil or Halivol are added to one feed a day. To one feed are also added a little orange juice and a small quantity of apple rubbed through a sieve. The fruit is well washed before use. I sometimes add a little grated cooked carrot, rubbed through a sieve. Later I give raw grated carrot, also finely chopped broccoli until the chicks' beaks are strong enough to pick it themselves; the same applies to the fruit. The chick gradually progresses to the stage where it can feed itself on seed, etc., but I still continue to hand feed, gradually reducing the number of feeds. When they reach this stage they have access to fine sharp sand, shell grit and also cuttle-bone.

I find at first the chicks need feeding two hourly and after the first few feeds four hourly. The food must be mixed freshly each day, taking as much as required for each feed, and warmed if possible.

A NEW ELAPINE SNAKE FROM QUEENSLAND

BY ERIC WORRELL.

In February 1952 I received from Mr. H. Mellor a small Elapine snake he collected in the Gayndah district. Obvious characteristics indicated that this snake was different from any previously described species. I kept this snake alive for a short period and on its death loaned it to the Australian Museum for examination, but unfortunately the shrivelled condition of the specimen and its small size made it difficult for an adequate morphological examination. Subsequently, Messrs. J. and K. Dwyer obtained for me a larger well preserved snake of the same species collected 250 miles from Gayndah by Mr. William Dunmall at Glenmorgan in January 1954. It is proposed to describe these snakes as a new species which I have pleasure in naming after Mr. Dunmall, collector of the specimen selected as the type and lodged in the private collection of Messrs. J. and K. Dwyer. The allotype is in the author's possession and will be donated to the Australian Museum.

Family ELAPIDAE.

Genus GLYPHODON, Gunther.

Seven grooved teeth following fangs. Two species—*G. tristis*, Gunther; *G. barnardi*, Kinghorn.

Glyphodon dunmalli, sp. nov.

Maxillary barely extends as far forward as the palatine: ectopterygoid about as long as the lower aspect of the maxillary bone, and the suture of the maxillo-ectopterygoid is moderately long and diagonal. A pair of large straight grooved fangs are followed by nine to ten small stout recurved teeth with feeble grooves, beginning on the posterior half of the maxillary arch a little anterior of the beginning of the ectopterygoid. No grooves were detected on the mandibular teeth. The first two, which are small, are followed by two enlarged teeth leaning outwards, an interspace, then about 23 small, stout, slightly recurved teeth. (About 13 teeth follow the large anterior ones in *Glyphodon tristis*.)

The frontal is prevented from entering the orbital periphery by the union in a narrow suture of the prefrontal and postfrontal bones. The type and allotype agree in all these characters, except that in the type nine teeth follow the fangs on both sides, whereas in the allotype ten teeth follow the fangs on the left-hand side and on the right-hand side part of the maxilla has been lost in dissection and only six teeth are left.

In general appearance the head is large, depressed and distinct from the neck. No canthus rostralis. Eye smaller than its distance to mouth, pupil elliptical. Body cylindrical, scales smooth in 21 rows; ventrals rounded.

Scalation: Rostral broader than deep, barely visible dorsally; nasal divided by large nostril; internasals considerably smaller than enlarged prefrontals which extend to labials; single preocular does not contact frontal or nasal; frontal acute posteriorly, about $1\frac{1}{2}$ times as long as broad and as long as its distance to the snout, over twice as broad and twice as long as supraoculars; parietals elongate; two postoculars; 6 supralabials, deep, 3rd and 4th enter eye; 7 infralabials; two pairs of chinshields of similar size, each pair in contact; 1st to 4th infralabials contact anterior chinshields, 4th infralabial also contacts posterior chinshields.

The headshields of both type and allotype agree except that in the type the temporals are irregularly broken and in the allotype temporals are $2 + 2$.

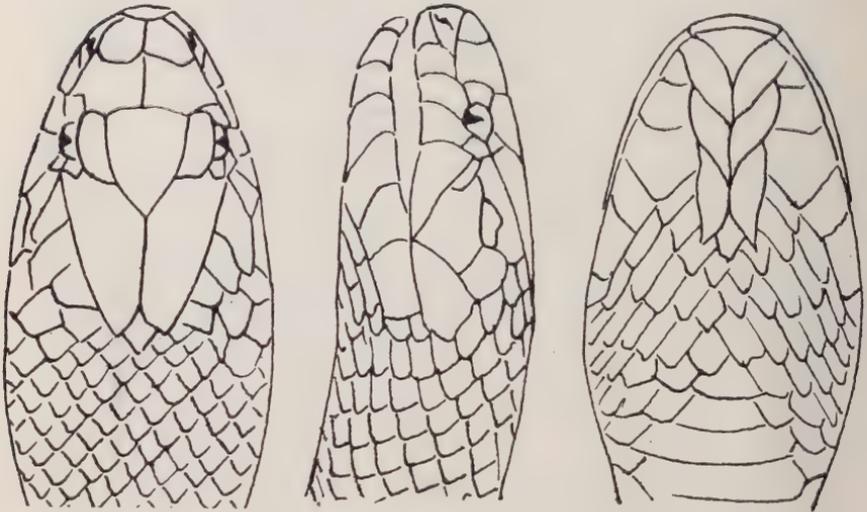
GLENMORGAN Type ♀ : 21 scale rows; Ventrals 186; Anal 2; Subcaudals 39 pairs.

GAYNDAH Allotype ♂ : 21 scale rows; Ventrals 175; Anal 2, Subcaudals 48 pairs.

Colour: The head and body is dark slaty brown with inconspicuous lighter markings on the neck and lips. Tongue pink. Belly white.

Measurements (Type): Length 750mm. or $29\frac{1}{2}$ inches. Tail 88mm. or $3\frac{1}{2}$ inches. Body diameter about 14mm. or $\frac{9}{16}$ inches. Head 31mm. long, 18mm. wide, 13mm. deep. Between eyes 11mm., eye to mouth 4mm., eye to snout 8mm., eye to nostril 5mm., gape to snout 22mm. Eye diameter 2mm. Length of fang almost 3mm., longest mandibular tooth 1.5mm.

The allotype measures 297mm. or $12\frac{3}{4}$ inches. Its shrivelled condition makes critical measurement impossible.



Head of *Glyphodon dunmalli* Worrell (type).

DISCUSSION

During the short period I kept the Gayndah specimen alive it displayed no aggressive tendencies and proved to be entirely nocturnal. *Glyphodon dunmalli* most nearly resembles *Glyphodon tristis* but is immediately separated by the larger number of maxillary and mandibular teeth. The following synopsis separates the three species of *Glyphodon* described to date: *tristis*—17 scale rows, *barnardi*—15 scale rows, *dunmalli*—21 scale rows.

The following abridgment of the description discounts the likelihood of confusion with any hitherto described Australian snake: *Glyphodon dunmalli*—no canthus rostralis; prefrontal contacting labial; scales in 21 rows; ventrals rounded; anal and subcaudals paired.

I am indebted to Mr. C. Brazenor of the National Museum, Melbourne, for his kind assistance with the preparation of this paper.

REFERENCES

- Boulenger, G. A. (1896) Cat. Snakes Brit. Mus. Vol. III, pp. 313-5.
Kinghorn, R. J. (1939) Rec. Aust. Mus Vol. XX, No. 4, pp. 257-9.



Glyphodon dummalli Worrell. Upper: allotype male alive; lower: spirit specimen holotype female.

—Photo E. Worrell.

TAXONOMIC NOTES ON FISHES

BY GILBERT P. WHITLEY, F.R.Z.S.

(Contribution from The Australian Museum, Sydney.)

(Figures 1-8)

Family GALAXIIDAE.

GALAXIAS TRUTTACEUS HESPERIUS Whitley.

(Figure 1)

Galaxias truttaceus hesperius Whitley, Austr. Zool. x, 1944, p. 263 and W.A. Nat. i, 1947, p. 53.

Here figured from the holotype of the subspecies from Nannarup, Albany district, preserved in the W.A. Museum, Perth.



Figure 1.—Native Trout, *Galaxias truttaceus hesperius*, holotype of subspecies from Western Australia.

Family SYNGNATHIDAE.

HIPPOCAMPUS RAJI, sp. nov.

New name for *Hippocampus kuda multiannularis* Raj (Proc. Indian Sci. Congress xxvii, 3, 1945, p. 156), preoccupied by *H. guttulatus multiannularis* Ginsburg, Proc. U.S. Nat. Mus. lxxxiii, 1937, p. 540, from the Bay of Biscay.

Family POLYNEMIDAE.

Genus POLYDACTYLUS Lacepede, 1803.

POLYDACTYLUS SEALEI Jordan & Richardson.

Polydactylus opercularis Seale & Beane, Proc. U.S. Nat. Mus. xxxiii, Nov. 21, 1907, p. 234, fig. 4. Zamboanga, Philippines. Anticipated by *Trichidion opercularis* Gill, Proc. Acad. Nat. Sci. Philad. 1863, p. 168, another species of *Polydactylus*.

Polydactylus sealei Jordan & Richardson, List. Fish. Philip. Is. (Manila), Jan. 20, 1910, p. 16. New name for Seale & Bean's, not of Gill.

D. viii/i, 13-14; A. iii, 12; P. 14 plus 8. L. Lat. 45-48. Tr. 6/1/9 to 11. 26 to 27 gill-rakers on lower part of first gill-arch. Longest pectoral filaments reach origin of anal fin. Two specimens 7 to 8 ins. in total length. Austr. Mus. regd. Nos. IB.1462-3.

Loc.—Torokina, Bougainville Island, Solomons. Collected by Mr. Ellis Troughton in 1945.

New record for Oceania.

Easily recognised by the eight free pectoral rays. About eighty nominal species of Polynemidae have been described and in most cases these filaments number from 4 to 7, but some have 3 to 14. I have not seen descriptions of *Polynemus antillarum* Perugia, 1896, or *astrolabi* and *melanopus* Sauvage, 1881. The only species having eight free rays, besides *sealei*, appear to be *P. octonemus* Girard, 1858, from Texas, the tips of whose filaments extend beyond origin of anal fin, and *P. opercularis* (Gill, 1863) from western Central America, which has much more numerous scales.

Family TERAPONTIDAE.
MESOPRISTES JENKINSI Whitley.

(Figure 2)

Mesopristes jenkinsi Whitley, Austr. Zool. xi, 1945, p. 26 and W.A. Nat. i, 1947, p. 53.

The holotype in the Perth Museum, from the Ord River, Western Australia, is here illustrated.

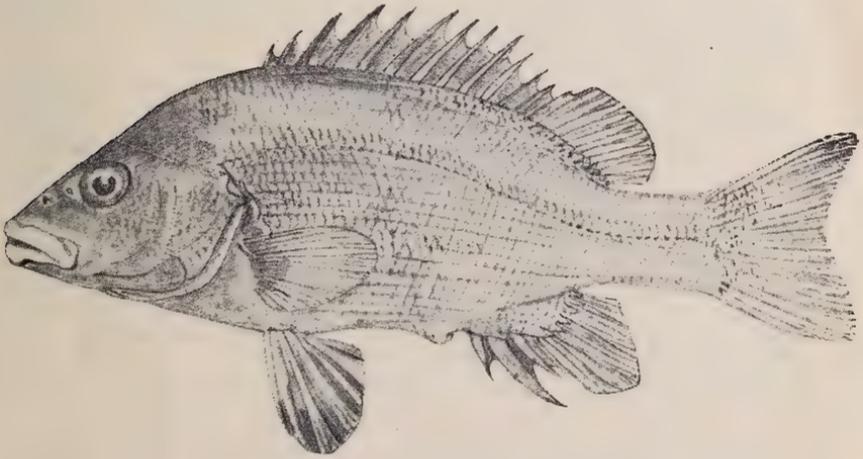


Figure 2.—Grunter, *Mesopristes jenkinsi*. Holotype from Western Australia.

G. P. Whitley, del.

Subfamily HELOTINAE.
PINGALLA, gen. nov.

Orthotype, *Pingalla gilberti*, sp. nov.

Similar to *Helotes* Cuvier & Valenciennes (Hist. Nat. Poiss. iii, April 1829, p. 149) but differing from the genotype, *H. Sexlineatus* (Quoy & Gaimard, 1825), in having much fewer scales in lateral line (about 44 to 55 instead of about 84 to 100), plain coloration (instead of striped) and deeper form.

Includes also *Helotes lorentzi* Weber (Notes Leyden Mus. xxxii, 1911, p. 236) = *Pingalla lorentzi* from southern New Guinea rivers.

PINGALLA GILBERTI, sp. nov.

Br. 6. D. xii, 12; A. iii, 7; P. left 17 (probably due to an old break in top spine), right 15; V. i, 5; C. 15 branched rays. L. Lat. 44. Sc. 41 to hypural plus 4 or 5 to middle of tail. Tr. 6/1/12 to 4/1/4 on caudal peduncle.

Head (19mm.) and depth (20) about 3 in standard length (59). Eye (5), interorbital (5) and maxillary (4) shorter than snout (7) or postorbital (8). Length of pectoral, 13mm.

Head rather rounded, profile obliquely sloping, convex before eyes. Rounded preopercular corner serrated, other opercles and preorbital entire. Lower opercular spine barely reaching opercular lobe. Top, bottom, and front of head before eyes naked, rest scaly. Cheek-scales in 7 or 8 rows below eyes and three rows just behind eye. Posterior nostril well separated from anterior. Some pores on preorbital and mucus canals each side of interorbital. Mouth very small, box-like, not protractile, below level of eyes. Lips normal. Lower jaw included. Premaxillary pedicels more than half eye-diameter. Angle of maxillary barely covered by lip and not nearly reaching eye. A practically single row of compressed, movable, blunt-tipped, cusplike brown incisors on jaws, about 30 in upper and a shorter row of 16 in lower, none notably enlarged. Vomer and palatines toothless. Gill-openings wide, membranes united across narrow isthmus. Gill-rakers short and stubby, 7 plus 11 on first branchial arch.

Body elongate-ovate, compressed, covered with sculptured ctenoid scales which also cover the supracleithrum, which has a few serrae. Lateral line complete, with simple tubes. Dorsals and anal with basal scaly sheaths. Dorsal spines heteracanth, fourth and fifth longest, longer than the rays; penultimate spine shorter than last one. Soft dorsal concave, anal convex. Second anal spine longest. Some of upper pectoral rays longest. Ventrals pointed, not reaching vent. Caudal excavately forked, with blunt lobes.

Colours in life, "Silvery, each scale outlined with dusky green; eye surrounded pale yellow; pectoral yellowish; ventrals pale yellow; dorsals pale olive, covered with minute black dots; anal yellowish anteriorly, hyaline posteriorly, with a blackish blotch on the first three membranes" (T. C. Marshall, field notes).

Described from a specimen 59mm. in standard length or 75mm. (nearly 3 inches) overall. Austr. Mus. regd. No. IB.3148.

Loc.—Forest Home Station, Gilbert River, Queensland; freshwater (Mr. T. C. Marshall, September 1953); Dept. Harbours & Marine, Brisbane, No. 2846.

Holotype and paratypes in Dept. of Harbours and Marine, Brisbane; paratype in Australian Museum, Sydney.

Differs from other terapontids in having brown incisor teeth, fewer than fifty scales in lateral line, and in fin-outlines. Nearest *lorentzi* Weber, 1911 (most recently figured in Weber & Beaufort, Fish. Indo-Austr. Archip. vi, 1931, p. 165, figs. 31 & 32b), but differs as follows:—

A. Posterior dorsal spines subequal. D. xiii-xiv, 13.

L. Lat. 52 *lorentzi*

AA. Last dorsal spine longer than penultimate. D. xii, 12.

L. Lat. 44 *gilberti*

Named after John Gilbert, naturalist on Leichhardt's expedition, who was killed by the aborigines near the river which now bears his name.

Family LUTJANIDAE.

Genus LUTJANUS Bloch, 1790.

LUTJANUS MACLEAYANUS (Ramsay).

Genyoroge macleayana Ramsay, Proc. Linn. Soc. N. S. Wales viii, June 19, 1883, p. 178. North Head, Sydney. *Id.* Waite, Mem. Nat. Club N. S. Wales 1904, p. 29. *Id.* Stead, Edib. Fish. N. S. Wales, 1908, p. 10.

This species was recently illustrated (Whitley, Austr. Mus. Mag. xi, 1954, p. 197 & fig.) for the first time from the unique holotype (No. A.14345) in the Australian Museum, 2½ feet long, from the North Head of Port Jackson, New South Wales. It is rather like *L. coatesi* Whitley (Mem. Qld. Mus. x, 1934, p. 176, pl. xxvi & text-fig. 1) but differs from that and other Australian species in having the following combination of characters.

D. xi, 13; A. iii, 8. L. lat. with about 47 to 50 tubes to hypural. Tr. 9/1/21 to 4½/1/7½ on caudal peduncle. Predorsal sc. 15.

Head (212mm.) 3 in length to hypural joint (634). Eye (34) 6.2, interorbital (49) 4.3 in head.

Preorbital fossa shallow, inconspicuous. End of maxillary emarginate. One enlarged tooth at each side of upper jaw anteriorly; no enlarged canines in lower jaw, which has very few small teeth behind the single row of sharp ones; dentition otherwise as in *coatesi*. Depth slightly more than head. Combined dorsal bases more than half standard length. Dorsal and anal lobes pointed. Longest dorsal ray (112mm.) much longer than longest (fifth) dorsal spine (78). Lower parts of membranes of both dorsals scaly. Pectorals not reaching level of anal origin; ventrals not reaching vent.

LUTJANUS ARGENTIMACULATUS (Bonnaterre).

Sciaena argentimaculata Bonnaterre, Tabl. Encycl. Meth., Ichth. 1788, p. 123. Ex Forskal, non-binom. Red Sea.

Mesoprion roseigaster Macleay, Proc. Linn. Soc. N. S. Wales v, 1881, p. 331. Rockingham Bay, Queensland (freshwater).

The type of Macleay's species was kindly lent to me by the Curator of the Macleay Museum, University of Sydney, for study. It appears to be *Lutjanus argentimaculatus* and as such was figured in Austr. Mus. Mag. xi, 1954, pp. 194 & 198, fig. It was a gutted specimen, nearly 18 inches long, and had the following features.

D. x, 14; A. iii, 8; P. 16; C. 14. L. lat. c. 46 to hypural. Tr. 6/1/17 to 4/1/6 on caudal peduncle. About 12 predorsal scales, not reaching above eye. Sc. c. 38 from head to hypural joint. Gill-rakers 6/11. Head, 136mm. No fossa at nostrils. Maxillary largely sheathed. Mandible with ascending ramus. Tongue rugose. Boomerang-shaped patch of vomerine teeth; no backward extensions. Minute denticulations on preopercle. Scale-rows subhorizontal or following contour of back; 67 basal radii.

Family CHANDIDAE.

Genus BLANDOWSKIELLA Iredale & Whitley, 1932.

BLANDOWSKIELLA AGASSIZI (Steindachner).

(Figures 3-4)

Ambassis agassizii Steindachner, Sitzb. Akad. Wiss. Wien lv, 1, 1867, p. 9. Fitzroy R., Queensland. *Id.* McCulloch & Whitley, Mem. Qld. Mus. viii, 1925, p. 147. *Id.* Carter, The Aquarium (Philad.) i, 9, 1933, p. 234. *Id.* Whitley, Rec. S. Austr. Mus. v, 1935, pp. 356 & 363. *Id.* Meinken, Blatt. Aquar. Terr. 1938, ii, p. 18, fig.

- ? *Ambassis agrammus* Gunther, Ann. Mag. Nat. Hist. (3) xx, July 1, 1867, p. 57. Cape York, Queensland. And of later authors, also as *Priopis*.
- Pseudoambassis elongatus* Castelnau, Proc. Linn. Soc. N. S. Wales iii, 1878, p. 44. Norman River, Queensland.
- ? *Ambassis mulleri* Klunzinger, Sitzb. Akad. Wiss. Wien lxxx, 1, 1879, p. 346, pl. i, fig. 3. Port Darwin. And of authors, also as *Konopickia*.
- Pseudambassis nigripinnis* De Vis, Proc. Linn. Soc. N. S. Wales ix, 1884, p. 393. Brisbane River, Queensland.
- Priopis olivaceus* Ogilby, Proc. Roy. Soc. Qld. xxiii, 1910, p. 11. Near Brisbane, Queensland.
- Priopis nigripinnis* Ogilby, Proc. Roy. Soc. Qld. xxiii, 1910, p. 12. Inland creeks of Moreton district, Queensland.
- ? *Ambassis interrupta* var. *reticulatus* Weber, Nova Guinea ix, 4, 1913, p. 547. Lorentz River and Merauke, New Guinea. The *Ambassis reticulatus* of later authors, figured by Weber & Beaufort, Fish. Indo-Austr. Archip. v, 1929, p. 414, fig. 98.
- Ambassis dalyensis* Rendahl, Medd. Zool. Mus. Kristiania, No. 5, 1922, p. 187. Daly River, Northern Territory.
- Ambassis reticulatus* Nichols, Amer. Mus. Novit. 1433, 1949, p. 2. Archer River, Queensland.
- Blandowskiella dalyensis* Whitley, Rec. Austr. Mus. xxiii, 1953, p. 124, fig. 1.

The synonymy given above seems justified from an examination of numerous specimens of these little freshwater percoids from various localities from north-western Australia, the Northern Territory, both sides of Cape York and down the eastern Queensland coast to the rivers of northern New South Wales. It is a popular aquarium fish both here and overseas, and seems to vary in the serrae on the head, tubes on lateral line, and profile over eyes.

The specimen figured here (Austr. Mus. regd. No. IB.3158) was caught by Mr. T. C. Marshall in freshwater, Walker's Creek, Norman River, Queensland, and is about 2 inches overall. It has the following characters:—

D. ix, 8; A. iii, 8; P. 13; C. 16 branched rays. Sc. 26. L. lat. obsolescent, one to three tubes along third scale-row represent the upper l. lat. and there are tubes on the 1st and 14th or 15th to 22nd scales along middle of sides. Tr. 5/1/7 = 13. Predorsal sc. 9. Head (14mm.) and depth (15) 2.7 in standard length (37.5). Eye, 4.3; interorbital, 3.6; maxillary, 5; and second dorsal spine, 9mm. Facies as figured. No teeth on tongue. Profile not excavated. Third anal spine longest; soft anal well sheathed, with concave margin. Fourth pectoral ray longest. Scales entire, not bilobed. Fin-tips dusky; pectorals and ventrals plain; dark median line along sides.

I also reproduce Meinken's figure of two Australian specimens domesticated in Germany in 1937, made from living fishes in which the ventrals are situated farther back than mine and the lateral line is complete, with 23 or 24 pierced scales. He found that by shining a light through the fish, the form of the swim-bladder could be seen and that it was rounder in the female and reached farther below than in the male, so his upper figure evidently shows a female and the lower a male.

Figure 3.—Chanda
Perch,
Blandowskiella
agassizi,
Domesticated in
Germany.
After Meinken.

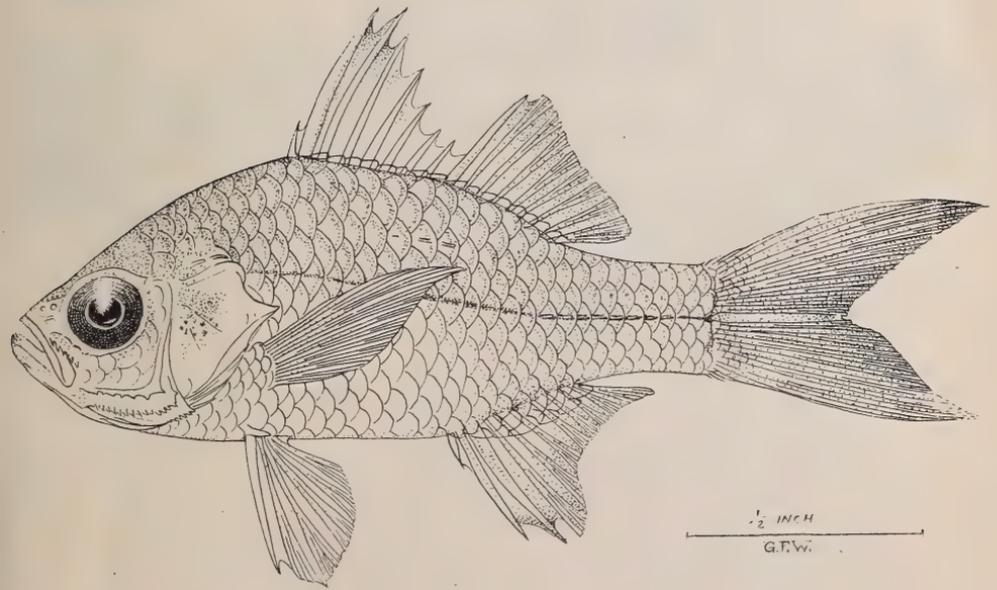


Figure 4.—Chanda Perch, *Blandowskiella agassizi*, from north
Queensland.

Family MULLIDAE.
 PENNON ARMATOIDES, sp. nov.

(Figure 5)

D. viii/i, 8; A. i, 6; P. 14. L. lat. 31 to 34. Tr. 2/1/6.

Head (34mm.) 3.3, depth (30) 3.7 in standard length (113). Eye (8) 4.2, snout (12) 2.9, interorbital (10) 3.4, height of first dorsal fin (27) 1.2, pectoral length (24) 1.4 in head. Barbels not rigid. Narrow band of villiform teeth on jaws only. Eleven gill-rakers on lower part of first gill-arch. General characters as described and figured for *Pennon filifer* (Whitley, Austr. Zool. x, 1941, p. 33, fig. 22) but first dorsal fin shorter, ventral scales not carinate, and depth of caudal peduncle less than 2 in its length. The coloration also differs.

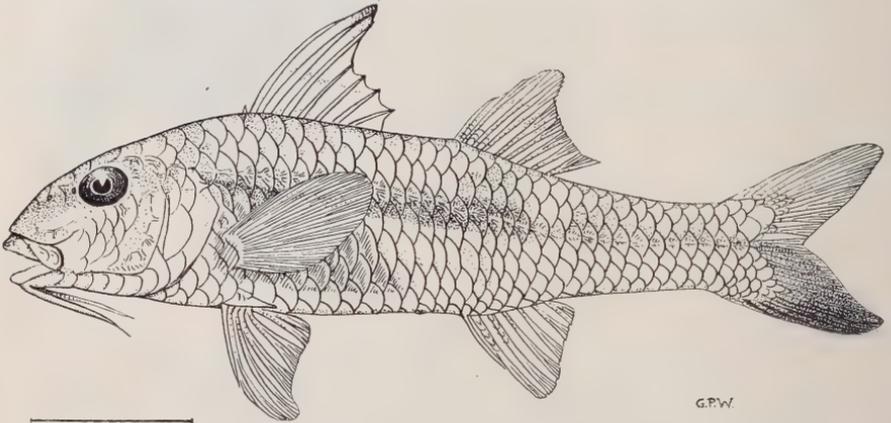


Figure 5.—Goatfish, *Pennon armatoides*. Holotype from Western Australia.

In the new species, specimens preserved in formalin are pale yellowish brown without any conspicuous markings on most of the pale yellow fins. Head yellow with dark brown area on snout. Eye blue. Five or six indistinct dark bars along back. A grey longitudinal band along the scale-row below the lateral line anteriorly and extending back towards root of tail. A dark grey area covers most of lower caudal lobe. On each side of thorax a rosy, beetroot or brick-orange patch.

Described mainly from the holotype (Austr. Mus. regd. No. IB.3006), a specimen $5\frac{1}{2}$ inches in total length. Several paratypes (IB.2980, 2989, and 3025) from the type-locality: Exmouth Gulf, Western Australia; coll. by Mr. K. Godfrey of C.S.I.R.O. Division of Fisheries aboard M.V. "Lancelin" in prawn trawl, August 1952. Another paratype (IB.3195, part) from Townsville, north Queensland.

Apparently nearest *Mulloides armatus* De Vis (Proc. Linn. Soc. N. S. Wales ix, 1884, p. 458) from Queensland but differs from his description as follows:

- A. L. lat. 40. Head $4\frac{1}{2}$, height $5\frac{1}{2}$ in total length. Scapula with a sharp point. Preorbital high, exceeding postorbital. Fins immaculate *armatus*
- AA. L. lat. 34 or less. Head nearly 5, height $4\frac{1}{2}$ in total length. Scapula without a sharp point. Preorbital less than postorbital. Lower caudal lobe dusky *armatoides*

PARUPENEUS LUTEUS (Cuv. & Val.).

Upeneus luteus Cuvier & Valenciennes, Hist. Nat. Poiss. vii, 1831, p. 521. Mauritius. *Id.* Guerin-Meneville, Icon. Regn. Anim. (Cuvier), Poiss. 1844, p. 10, pl. x, fig. 4.

Parupeneus luteus Weber & Beaufort, Fish. Indo-Austr. Archip. vi, 1931, p. 401 (q.v. for refs. and synonymy).

One, 10½ inches long, from Hayman Island, Queensland (Mr. F. A. McNeill, 1934). Austr. Mus. regd. No. IA.6008. Agrees with the original description except that the profile is not concave before eyes and barbels do not reach ventral base; it agrees well with Bleeker's figure in "Atlas Ichth." It is like *P. sufflavus* Whitley (Austr. Zool. x, 1941, p. 31, fig. 21) but has rounder, convex anterior profile, longer barbels and more scales (l. lat. 31, tr. 2½/1/7).

New record for Australia.

Family CHIRONEMIDAE.

Genus CHIRONEMUS Cuv. & Val., 1829.

CHIRONEMUS ABORIGINALIS Whitley.

(Figure 6)

Chironemus aboriginalis Whitley, Austr. Zool. vi, 1931, p. 321. New South Wales.

Here figured from a skin (No. I.3251) exhibited in the Australian Museum, from Dee Why, New South Wales.



Figure 6.—Kelpfish, *Chironemus aboriginalis* from near Sydney.

—Photo H. Hughes.

Family SCOMBRIDAE, subfam. THINNIDAE, nov.

Genus THINNUS S.D.W., 1837.

Thynnus Cuvier, Regne Anim. ed. 1, 1816, p. 313. Tautotype, *Scomber thynnus* Linne. Preocc. by *Thynnus* Fabricius, 1775, in Insecta.

Thinnus S.D.W., Analyst v, 18, Jan. 1837, p. 208. Emendation for *Thynnus* Cuv. Type, by present designation, *Scomber thynnus* Linne, called *Thinnus vulgaris* Cuv. by S.D.W.

Thunnus South, Encycl. Metrop. xxv, 1845, p. 620. Substitute for *Thynnus* Cuv., preocc. Tautotype, *Scomber thynnus* Linne.

Albacora Jordan, Proc. Acad. Nat. Sci. Philad., 1888, p. 180. Orthotype, *Scomber thynnus* Linne.

Thinnus antedates *Thunnus* for the generic name of the tunny, and should be used in its stead. The Southern Bluefin Tuna of Australia was first called *Thynnus australis* by McCoy (Intercolon. Exhibit. Essays No. 7, 1866, p. 317) but his was a *nomen nudum*, moreover preoccupied by Boisduval, 1835, in Insecta. This fish should now be called *Thinnus maccoyii* (Castelnaud, 1872).

In his "Classification of Fishes," 1923, Jordan separated the tunnies and albacores from the Scombridae as a family Thunnidae. I am inclined to regard them as a subfamily, which may be called Thinninae, nov. In insects, Salter (Proc. Linn. Soc. N. S. Wales 78, 1953 (Jan. 1954), p. 276) traced Thynnidae back to Swainson and Shuckard, 1840.

S.D.W., perhaps S. D. Wood of Derbyshire, wrote systematic lists of the fishes, birds and beasts of Britain in the "Analyst," copies of which I have perused in the Mathews collection, National Library, Canberra. He amended many scientific names by changing ph into f, y into i, etc. The paper which concerns ichthyologists is his "The Fishes (Pisces) of Britain, Systematically Arranged" in Analyst v, 18, Jan. 1837, pp. 204 to 215. Notable new names are: *Amfioxus*, A. *vulgaris*, *Ammodites vulgaris*, *Aspidoforus*, *Brama* [= *Abramis*—G.P.W.], *B. vulgaris*, *Carpio* [I select *vulgaris* as genotype—G.P.W.], *Centriscus vulgaris*, *Ciclopterus* & *C. Vulgaris*, *Conger vulgaris*, *Corijaena*, *C. morio*, *Echeneis vulgaris*, *Exocoetus vulgaris*, *Ficis*, *F. vulgaris*, *Gimnetrus*, *Gunnellus maculatus*, *Leptocephalus*, *L. vulgaris*, *Lofius*, *L. vulgaris*, *Mullus vulgaris*, *Ofidium*, *Salmo vulgaris*, *Sciaena vulgaris*, *Scimnus* [for *Scymnus*, replaces *Scymnorhinus*—G.P.W.], *S. borealis*, *Singnathus*, *Thimallus*, *T. vulgaris*, *Thinnus*, *Trigla pinifolia*, *T. rubra*, *T. vulgaris*, *Zifias* and *Zigaena*. Practically all the names are nomina nuda or easily recognised synonyms of well-known British species but *Carpio* is earlier than Heckel's use of that name, *Ficis*. *Scimnus* and *Thinnus* replace preoccupied generic names, and *Scimnus borealis*, attributed to Scoresby, 1820, by Bigelow & Schroeder, is credited to Muller & Henle in Sherborn's Index Animalium.

Family ISTIOPHORIDAE.

Genus TETRAPTURUS Rafinesque, 1810.

TETRAPTURUS BREVIROSTRIS (Playfair).

Histiophorus brevirostris Playfair, Fish. Zanzibar, 1866, pp. 53 & 145, 2 figs. Zanzibar. Not that of Day, fish. India, 1876, p. 199, pl. xlvii, fig. 3, from Madras, which is *Tetrapturus tenuirostratus* Deraniyagala, Spolia Zeyl. xxxvi, 2, 1951, pp. 137 to 139, pl. i, fig. b and pl. ii, fig. b (synonym: *T. acutirostratus* Deraniyagala, Atlas Vertebr. Ceylon i, 1952, on coloured plate xxvii, not in text).

Tetrapturus brevirostris Goode, Rept. U.S. Fish. Comm. 1880 (1883), p. 308, pl. vii. *Id.* Jordan & Evermann, Occas. Pap. Calif. Acad. Sci. xii, 1926, pp. 30 & 33. *Id.* Deraniyagala, Ceylon Journ. Sci. (B) xviii, 1933, pp. 53 & 55, pl. iii, fig. 2. *Id.* La Monte & Marcy, Ichth. Contrib. Intern. Game Fish Assn. i, 2, 1941 & table (regarded as a marlin). *Id.* Smith, Sea Fish. S. Afr., ed. 2, 1950, p. 315, fig. 876. *Id.* Weber & Beaufort, Fish. Indo-Austr. Archip. ix, 1951, p. 237 (not all synonymy). *Id.* Whitley, Austr. Mus. Mag. (in press).

?*Tetrapturus indicus* (Cuv. & Val. ?) Deraniyagala, Spolia Zeyl. xxvi, 2, 1951, p. 139, pl. ii, fig. a. Mombasa—very short snout.

Br. 7. D. iv, 35/7? A. iii, 10/7; P. i, 19; V. 2 and C. 15 main rays. Sc. c. 130.

General facies as usual in marlins. Sword 4.9 in length to caudal fork and nearly 10 times diameter of eye. Depth 7.9 in total length.

Dimensions in inches:

Total length—65½.	Level of second dorsal and anal origins to end of middle caudal rays—11½.
Length to caudal fork—60½.	Upper caudal lobe—13.
Girth—20.	Lower caudal lobe—12½.
Snout to tail-base—58.	Caudal keels—1½.
Breadth of sword above lower jaw—0.7.	Minim. depth of caudal peduncle—1.8.
Tip of snout to ant. border of eye—12½.	Length of caudal peduncle—5½.
Tip of snout to tip of mandible—6½.	Height of 1st dorsal—7.
Tip of snout to maxillary border—14½.	Height of 2nd dorsal—1¾?
Body depth, below first dorsal—8½.	Last ray of 2nd dorsal—3.1.
Body depth, above first anal fin—6½.	Median dorsal spines—3.05.
Head—18½.	Height of 1st anal—4.8.
Eye—1½.	Origin of pectoral to that of anal—19½.
Interorbital—2.85.	Pectoral, length—8.
Postorbital—5.	Pectoral, base—1½.
Lower jaw—6½.	Width between origins of pectorals—3.7.
Maxillary fold—2.4.	The base of the second dorsal fin and the ventral fins are incomplete and cannot be measured.
Eye to preopercular margin—2.7.	
Spread of tail—21.6.	

Distance from tip of rostrum to tip of mandible nearly equal to that of tip of mandible from eye. Sword straight, slightly flattened above, rounded and granular below. Profile evenly elevated, not steep nor hunched at the shoulders. Very small teeth on jaws and finer ones on tongue; vomer and palatines not available for inspection. Free end of tongue convex. Maxillary reaching less than an eye-diameter behind eye. Scales on top of head, temples, cheeks, and sides of lower jaw. Nostrils simple, posterior the larger.

Form elongate, gentle tapering, compressed. No rugose area behind operculum. Interdorsal space about two eye-diameters, without upstanding spines. Anterior dorsal spines not enveloped in thick skin. A groove from ventral fins to about anus but no interdorsal or interanal grooves. Scales elongate lanceolate, slender, close-set or imbricate. Lateral line indistinct, simple, arched above pectoral fin thence straight along middle of flanks. Many pores on upper parts of body, near scale-tips. Caudal peduncle almost elliptical in cross-section, with two fleshy keels on each side.

First dorsal fin lower than body, its margin concave anteriorly and convex posteriorly, median spines fairly long, more than half the dorsal lobe, and not concealable in a sheath. Fifth to 14th dorsal spines branched and at least fourth to eighth anal. First anal lobe acute. Insertion and end of second dorsal fin in advance of levels of those of second anal. Pectorals falciform, adpressible, not reaching half way to level of anus but ending below 20th dorsal spine, its insertion low, level with lower jaw. Ventrals narrow, broken in this specimen, but each appears to have had two main rays and a couple of inner rudimentary rays.

Colour of the preserved skin dark brown for more than half of the upper part of the head, body and adjacent fins, also both caudal lobes. The lower parts of head and body and its fins are now yellowish, the junction of light and dark areas well defined, running from the lower caudal keel to the angle of the mouth and top of lower jaw. Apparently no bars on body or spots on fins; spinous dorsal uniform brown.

Described from a mounted specimen (Austr. Mus. regd. No. B.3521) from India. The internal characters, palate, gills, etc., accordingly cannot be described.

The Australian Museum recently received a second specimen of this species from the Arafura Sea, Northern Territory (new record); Capt. F. E. Wells, through the Commonwealth Fisheries Office (Regd. No. IB.3264). It is smaller than the Indian one described above, 5ft. 2in. overall. Sword (12 inches) 4.6 in L.C.F. (56) and 9 times eye. Distance from tip of snout to tip of mandible is greater than that from tip of mandible to eye. Free end of tongue notched. L. lat. distinct. Pectoral fin reaching below 22nd dorsal spine and halfway to level of anus.

Family Gobiidae.

ACENTROGOBIUS SCRUTARIUS, sp. nov.

D. vi/i, 8; A. i, 6; P. 5 plus 14. Sc. 34. Tr. 13. Pred. c. 14.

Head (9mm.) 3.1, depth (5) 5.6 in standard length (28). Eye (3) 3 in head, greater than snout and less than postorbital. Profile acute. Vertex scaly to above preoperculum, rest of head naked. Mucous papillae minute. Two mucous pores along narrow interorbital, others around eye and preoperculum and over opercles. Mouth reaching below anterior third of eye. Lips thick, not covered; upper jaw slightly the longer. Teeth in several rows, outer ones spaced and slightly enlarged. Tongue convex, not notched. Gill-openings little wider than depth of pectoral base. Isthmus broad. Anterior nostril separate from upper lip and with small flap.

Form anteriorly cylindrical, posteriorly compressed. Second or third dorsal spine longest. Pectoral fin (7mm.) shorter than head but equal to ventrals and caudal; five upper pectoral rays free, seventh branched ray from below (i.e. 12th ray) longest. Ventrals united, with frenum, fifth ray reaching base of anal papilla. Caudal rounded. Dorsal fin lower than body, pointed posteriorly. Scales papery, weakly ctenoid, deciduous or lacking on anterior part of breast and upper part of pectoral base.

Brown with darker marblings. Eyes bluish. Fins mostly light in tone, first dorsal with blackish blotch posteriorly, second dorsal and caudal brown-spotted. Anal with submarginal infuscated band. Total length 1.4in.

Described from the holotype (Austr. Mus. regd. No. IA.6092) from Gladstone, Queensland.

Distinguished from other Australian gobies mainly by the few anal rays, the free upper pectoral rays, and scale-counts.

Latin *scrutarius*, trashy.

NESOGOBIUS PULCHELLUS (Castelnau).

One from Rockingham; D. L. Serventy, 1937.

New record for Western Australia.

Family Gobiomoridae.

Genus PHILYPNODON Bleeker, 1874.

PHILYPNODON GRANDICEPS (Krefft).

(Figure 7)

Eleotris grandiceps Krefft, Proc. Zool. Soc. Lond. 1864, p. 183. Upper Hawkesbury River, N. S. Wales.

Eleotris (Eleotroides) melbournensis Sauvage, Bull. Soc. Philomat. Paris (7) iv, 1880, p. 57. Melbourne, Victoria.

Through the courtesy of Professor L. Bertin and the skill of Mademoiselle Mauger of the Museum Nationale d'Histoire Naturelle Paris, I am able to reproduce the latter's drawing of the type of *Eleotris melbournensis* in the Paris Museum. Professor Bertin states (*in lit.*, 6 May, 1954) that it is numbered A.1887 and that it conforms with Sauvage's description except for a misprint: L. lat. 55 should have read 35. In McCulloch & Ogilby's key (Rec. Austr. Mus. xii, 1919, pp. 257-258) the species enters the genus *Philypnodon*.

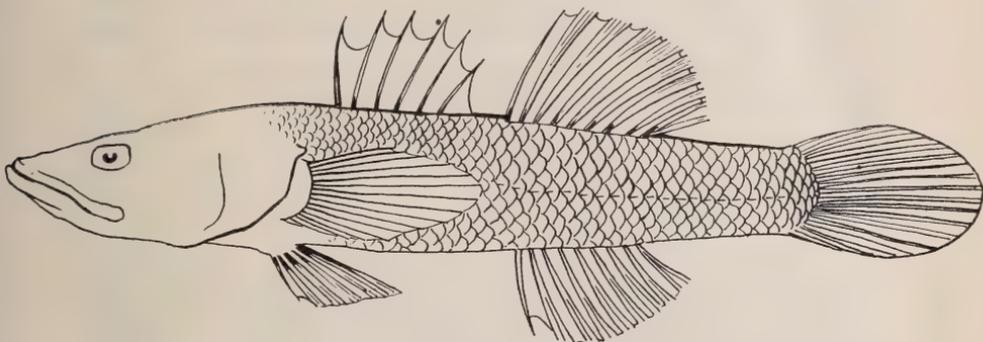


Figure 7.—Gudgeon, *Philypnodon grandiceps*: from the type of *Eleotris melbournensis* in the Paris Museum.

Mdlle. Mauger del.

From Mdlle. Mauger's drawing of this old specimen, and now that we are no longer misled by the typographical error in Sauvage's description, it is now plain that *Eleotris melbournensis* must be added to the synonymy of the Big-headed Gudgeon, *Philypnodon grandiceps*, the Melbourne form of which had earlier been named *nudiceps* by Castelnau, 1872. Other synonyms are: *Eleotris gymnocephalus* Steindachner, 1866 and *Ophiorrhinus angustifrons* Ogilby, 1898. The Big-headed Gudgeon is now known from rivers of southern Queensland, New South Wales, Victoria, and South Australia.

Genus *CULIUS* Bleeker, 1856.

CULIUS MELANOSOMA (Bleeker).

Eleotris melanosoma Bleeker, Nat. Tijdschr. Ned. Ind. iii, 1852, p. 705. Wahai, Sumatra. *Id.* Montilla, Philip. Journ. Sci. xiv, 1931, p. 62, pl. iii, fig. 1 (ipon fishery). *Id.* Koumans, Fish Indo-Austr. Archip. x, 1953, p. 297 (refs. & synon.).

Culius melanosoma Whitley, Austr. Mus. Mag. xi, 5, 1954, p. 151, fig.

In 1937, the Rev. Father J. B. Poncelet collected 24 specimens of this species, 65 to 190mm. in total length, inland from Buin, Bougainville Island, Solomons (Austr. Mus. regd. Nos. IA.6329, 6330, 6333, 6338, 6342, 6344, 6350 to 6352, 7309 to 7311, 7313, 7317, 7319, 7320 and IB.382 to 388). In 1954, I figured a female, 148mm. long (No. IA.7309). The natives called these fishes Tugu and Bibau, Pogubu, Lubau, or Tuntunika. The series shows little variation:

D. vi/i, 8; A. i, 8; P. 18 to 20; Sc. 50 to 58; Tr. 15 to 17; Tr. on caudal peduncle 13 to 16; Predorsal sc. 36 to 41. Tongue truncate or broadly rounded, no preopercular spine; rows of small papillae around chin and preoperculum and passing from over eyes to over nostrils.

Dark brownish in spirits, often with rows of dark scale-centres, orange on belly, fins chequered, sometimes infuscated; caudal variegated cream and brown, thereby distinguished from the plain dull or dark caudal of the related *Culius fuscus* (Bloch & Schneider) which has smaller scales and longer pectoral fins.

Family SOLEIDAE.

PARDACHIRUS PAVONINUS (Lacepede).

Achirus pavoninus Lacepede, Hist. Nat. Poiss. iv, 1802, pp. 658 and 660.

No locality = East Indies, *vide* Ogilby, Mem. Qld. Mus. v, 1916, p. 142.

One specimen from Point Cloates in the Western Australian Museum, Perth. New record for Western Australia.

Family SYNANCEJIDAE.

SYNANCEICHTHYS VERRUCOSUS (Bloch & Schneider).

Synanceja verrucosa Bloch & Schneider, Syst. Ichth. 1801, p. 195, pl. xlv. Habitat in India.

Aboriginal children caught a small stonefish of this species at Port Hedland when I was there on 24th September 1945, and last year another specimen was fished from Lancelin Island (Austr. Mus. regd. No. IB.3202). New record for Western Australia. Professor J. L. B. Smith (Trans. Roy. Soc. S. Africa xxviii, 1941, p. 451) suggests that this species and *Synanceja horrida* may be sexual dimorphs, a topic worth investigating, and he has given a personal account of the effects of the venom in Copeia, 1951, 3, p. 207.

Family SPHAEROIDIDAE.

Genus TORQUIGENER Whitley, 1930.

TORQUIGENER PIOSAE, sp. nov.

(Figure 8)

D. 7. A. 7. P. 14. C.8 branched rays.

Head (25mm.) 2.6, depth of body at vent (14) 4.6 in standard length (65). Eye (6) 4.1, snout (10) 2.5, interorbital (7) 3.5, height of dorsal fin subequal to length of pectoral (11) 2.2, and length of caudal (16) 1.5 in that of head.

General characters as described for *Spheroides squamicauda* by Ogilby (Proc. Roy. Soc. Qld. xxiii, 1910, p. 17, from southern Queens-

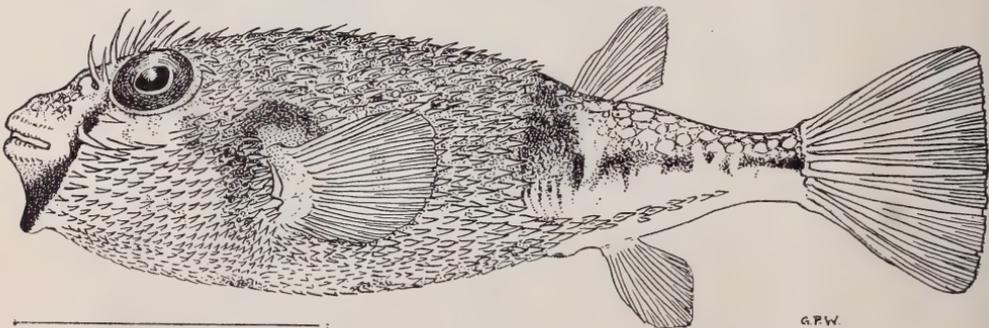


Figure 8.—Toado, *Torquigener piosae* Whitley. Holotype from Western Australia.

land), but differing in the head-proportions given above, in having the eye quite adnate and shorter than snout, body very prickly, without lateral naked embayment, and in coloration as described below. Each nostril a hood-like papilla, with anterior and posterior opening. Long erectile spines on interorbital. Operculum with cartilaginous spur. Anterior profile slightly excavated. Movable spines occur densely on most of the head and body, from level of nostrils to level of dorsal origin and from behind chin to near vent, concealing the lateral line system, which appears to be as figured for *Torquigener* by Fraser-Brunner (Ann. Mag. Nat. Hist. (11) x, 1943, p. 10, fig. D). A band of flattened spines extends backwards along ridge below each side of caudal peduncle for some distance. Caudal fin longer than its peduncle.

Life-colours.—Ground colour cream above, white below; back and sides with dense network of light brown, also two diffuse dark cross-bars, one before dorsal origin, the other at middle of back. A broken brown band or series of lateral blotches along each side and an oblique bar extending forward from below one eye to join its fellow across chin. This and the other median lateral blotches are broken up by orange or yolk-yellow patches. The yellow also forms a few irregular blotches on the white belly. Mouth dirty-white, fins pale yellowish. Eye blue with opalescence below pupil.

Described from the holotype in the Australian Museum (regd. No. IB.3217), where there is also a smaller paratype (IB.3218); other paratypes are in the Western Australian Museum, Perth. The holotype is 84mm. or 3.3 inches overall. A dissected paratype has five short gill-rakers on lower part of first branchial arch, airbladder globular, vertebrae 8 plus 12 = 20. The frontal bones separate the lateral ethmoids and the latter from the sphenotics and the skull-characters, etc. bring it down to *Torquigener* in Fraser-Brunner's key.

Loc.—Three to four miles west of Fremantle, Western Australia; otter-trawl from 4 fathoms, among brown algae and kelp; 25 August 1954. Collected by the author, who had been attending the Pan Indian Ocean Science Association's congress in Perth at that time, and from whose initial letters the new trivial name is derived. I am grateful to Mr. A. J. Fraser, Superintendent of Fisheries at Perth, and his Inspectors, J. Bramley, A. Melsom and J. Munro, and their associates, for several enjoyable trawling operations off Fremantle last August.

OBSERVATIONS ON AN EEL-GOBY

Leme purpurascens De Vis

BY ERIC A. NICHOLSON.

(Clarence Valley Field Naturalists' Club, Grafton, N.S.W.)

Probably as a result of the floods early in 1954, a curious member of the goby family was washed out of its usual habitat in the Grafton district and was kept in an oblong tank 18in. by 13in. by 12in. deep, planted with ribbon weed, in fresh water from about 1st March to about 1st June.

The head of the fish nearly always rested up against a sand slope, the tail and fins generally relaxed. The colour between eyes and mouth and leading around gill-edge was silver grey. All top portion blue-grey. Lower sides and belly pink. Dorsal fin light grey. Every few minutes the goby turned completely upside-down, grabbing a mouthful of sand, sometimes blowing it out of mouth again in a sudden surge, at other times it seemed as if the sand was ejected out of the gills. It was more active at night, swimming in open water, though it was noted swimming in daylight (at sunrise). The fish made a number of tunnels just under the roots of the ribbon weed, causing the weed to lift off the sandy bottom. The tunnels would be about the length of the fish (about 8 inches); the fish would drive its head into the end of the tunnel with a burst of speed and would wriggle its body in a side-waving motion; this was increased at a terrific speed causing a very rapid flow of water to carry sand and matter out of the tunnel and causing the sand to build up into a pyramid with amazing rapidity. When the fish was disturbed with a stick, it swam at a very great speed and if one of the sand heaps were in the way, it just swam right through it as if it were not there, without actually stopping. It just slowed up for a moment. The fish also would swim backwards a least its own length with ease, and would sometimes attach itself to the side of the glass tank by means of the sucker formed by the ventral fins.

Another person had seen about six of these fish stranded in road-side pools after the receding flood waters within a distance of a quarter of a mile.

After death, the fish was presented to the Australian Museum, where it was registered No. IB.3182 and identified as *Leme purpurascens de Vis*. A good figure of that species appeared in Records of the Australian Museum xii, 10, 1919, p. 206, pl. xxxi, fig. 3. It grows to 9 inches in length and is known as the Blind Goby or Eel Goby. It usually burrows in mud, sand or ooze in salt or brackish water, about 18 inches below low water level and the eyes are reduced to tiny organs beneath the skin of the head, which has little pimple-like sense organs. The teeth are quite large. Another observer stated it can live a long time out of water and even move overland by a series of "end to end" turns. *Leme purpurascens* has been found from Queensland to New South Wales, south to the Shoalhaven River.

TRAGEDY ON THE WALLS

BY TARLTON RAYMENT, F.R.Z.S.

(Hon. Associate in Entomology, National Museum, Victoria)

No opal yet mined by man has surpassed the Chrysid wasps for brilliant colour; the vivid prismatic greens; iridescent peacock-blue overlaid by translucent purple; gold lacquered with ruby, amethystine, and pearl. Yes, they have such scintillating beauty that words are inadequate to paint the portrait.

I have seen an Indian woman wearing "beauty spots" cut from a chrysid's thorax, and no precious gem could excel the loveliness of that simple disc of glowing colour; a jewel of opal set on a copper petal.

Oh, yes, the wasps range over a wide domain. Europeans have dubbed them "Ruby Wasps," but the name is not especially appropriate for our Australian species, which are invariably metallic and opalescent peacock-green. "Jewel" wasps will pass, but "opal" wasps would be far more acceptable, though "gold" wasps is perhaps more literal.

The scientist, well aware of the foibles of his fellows, demands something more reliable than the vernacular tongue, and falls back on the ancient universal ones of Latin and Greek. After all, it is no mean achievement to be able to communicate in a manner that is understood by all nations, therefore, Chrysid, from Gr. *chrysos*—gold.

The entomologist, a patient worker, knows the gold wasps' family as CHRYSIDIDAE, and with the logic of his science, has divided it into a number of genera by the very simple process of counting the spines on the end of the abdomen, hence we have *Tetrachrysis*, with four spines; *Pentachrysis* with five; *Hexachrysis* with six; all very descriptive and understandable by even that admirable fellow, the "man in the street," so let's hear no more complaints about the obscure jargon of scientific nomenclature. Of course there are many other genera such as *Heptachrysis* and even *Monochrysis*, but a visitor does not meet the whole of one's relations at the first introduction.

The northern regions of Australia are the home of the largest of the Chrysid, *Stilbum splendidum* Fabr., 18 or more millimetres in length, with wings suffused with smoky purple. She appears to be closely related to the European wasp, *S. cyanurus* Forst. I have several really beautiful *Tetrachrysid*s from Katherine in the Northern Territory, but I have no knowledge of their habits, except that they frequent flowers for a sip of honey.

Pentachrysis imperiosa Sm., about 8 millimetres in length, is common enough along the eastern portions of Australia, but the species that interests me most is perhaps one of the smallest, and it may be limited to the southern districts. Strangely, although the "jewel" wasps have penetrated to Tasmania, yet they failed utterly to reach New Zealand. I have another very small wasp from the south-western corner of the continent.

However, you will have no difficulty in recognising the Chrysid, for only three segments of the abdomen are visible, and the tip of most is ornamented with short spines; the wings are usually shaded with a smoky purple lustre; the antennae are short.

That is enough of their anatomy for the moment.

"And where can one study the glorious chrysid?"

I do not have to travel very far to surprise her at her nefarious trade. Oh, yes, I said nefarious trade, for it is an abominable one, as we shall see presently. Before me is a whole boxful of the bejewelled killers gathered at the Research Station in the Kimberleys, in the far

north-west of Australia, but I do not have to go that far to glean the details of her life, for I have pieced together convincing evidence of her crimes right at my very door, so to speak, for she lurks about the walls of my house looking for the mud cells of the black and red Alastorids, of whose habits I have already told you.

When the summer sun heats the bricks to an uncomfortable degree, there is almost sure to be a green jewel wasp busy on her search, for she is most active when the heat is greatest. She is in no great hurry, and carries on her search with careful deliberation. Every Chink is explored, for she appears to be aware that the Alastorid favours only the northern aspect; the sunless walls of the south are entirely neglected. Back and forth she ranges over the wall, with her head almost touching the bricks, until at last she works along the shadow cast by the window-sill.

Of course she finds her goal, for the nest of the Alastorid must have shelter from any rain which would soon reduce it to a shapeless dab of mud, and the projecting sill affords just such a protection, without cutting off the warmth of the sun's rays.

The jewel wasp alights at a safe distance, and reconnoitres the site; her antennae extended, and quivering, as though "tasting" the sweet odour of her objective—she approaches—closer . . .

Suddenly the Alastorid arrives with her sac of water, and the chrysid "freezes". The builder departs without having observed her green enemy. The chrysid now walks boldly up to the door, for the "householder" is not there to deter her—she has her head just in the doorway, when the owner unexpectedly returns.

The jewel wasp gets a sharp jolt, and the Alastorid threatens her with gnashing mandibles. Hastily the chrysid retires—but not too far, for the householder no sooner takes off for another journey, than the green parasite is back again. This time fortune is with her. She steals inside, and I cannot follow her movements inside, but I can easily reconstruct the crime, for there is plenty of circumstantial evidence.

There is a microscopic penetration of the earthen cell-cap, and inside is a tiny white egg attached to the side of the sleeping baby of the Alastorid. Well, in a day or two the parasite's eggs will hatch; the young larvae will begin to feast on the pale victim. Is the meal just gulped down? No, not by any means; it is eaten with fastidious appetite. I think it was my esteemed friend, the late Prof. W. M. Wheeler, who said that "inherited memory" directed just which parts should be consumed first.

I am doubtful of the famous scholar's dictum. If a man be given a whole roast chicken for a meal he will inevitably eat first the parts he enjoys most, leaving till last the parts he likes least; if he be ravenous, he will at length consume even the viscera. I suggest that a wasp larva is no more homogeneous in flavour than the roast chicken of our tables.

In eight or so days, the prey will have all been consumed while the "meat" is still fresh, so to speak. The preservation of the food; the saving of the vital parts until the last spark of life is extinguished, is one of the miracles of nature.

But I must hurry on. The parasite's larva, now fully grown, spins a tough brown cocoon, and is safely housed in the thick mud cells of the Alastorid. The larva will undergo a marvellous transformation; the pupa will exhibit the elements of the feelers, the legs; wings; eyes, everything that goes to make the Chrysid some of the most beautiful of wasps.

With exceeding care I cut down the cluster of mud cells, and remove it to the laboratory for further study in the spring. But I underestimated the persistence of the green Chrysid—out of the eight mud cells came five green Chrysid. Not one of the original Alastorids had survived.

"But you forgot to tell us the number of spines on the tail of the tiny chrysid?"

Sorry, none at all, if you please, but I must leave such minutiae for record in another place.

Explanation of Plate

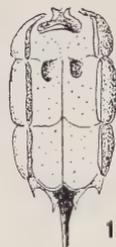
1. Adult chrysid wasp, *Holochrysis* sp., parasitic in cells of the mud-dauber *Paralastor*.
2. Lateral oblique view of the head.
3. Frontal view of head-capsule showing transverse torus and excavated face.
4. One of the stout angulated scapes.
5. Three segments of the posterior tarsus.
6. The strigilis, or antennal cleaner, of anterior leg is of primitive character.
7. Hind calcar is finely serrated.
8. The claws of the tarsi are simple; pulvillus small.
9. The hamuli of the posterior wings are strong.
10. The minute hairs of the dark wings.
11. Head and thorax are sculptured with a coarse network of rugae.
12. Apical segment of a *Tetrachrysis* from the Kimberley Range, W. Australia.
13. The ventral segments of chrysid wasps are deeply depressed, or concave, and polished; the terga developed to sharp lateral ridges.
14. Front of head-capsule of a New Guinea chrysid, *Stilbum splendidum* Fabr.
15. Apex of abdomen of *Hexachrysis* from Kimberley Range.
16. Scutella process of *Stilbum splendidum*.
17. Apical segments of flagellum.
18. Apical ventral segments of undetermined *Holochrysis* parasitic on *Paralastor*.
19. Lateral view of apical segments of abdomen of *Stilbum splendidum*.
20. Lateral view of apical segments of abdomen of *Hexachrysis* sp.
21. Sculpture of first abdominal tergum of parasitic wasp, *Holochrysis*.
22. Sculpture of second abdominal tergum.



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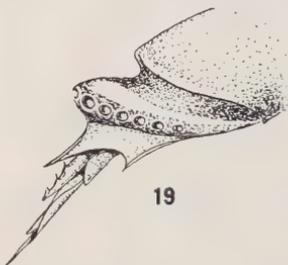
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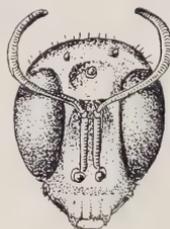
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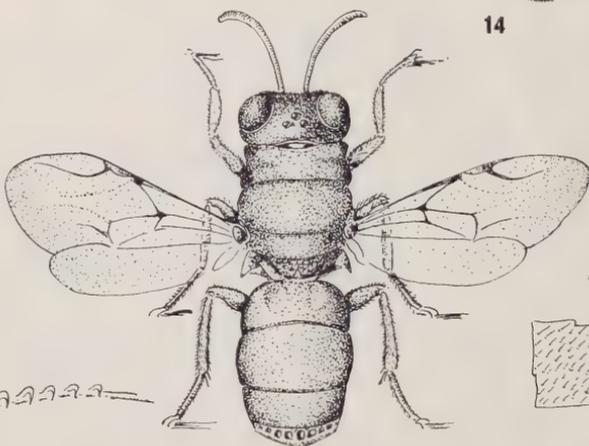
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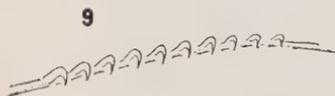
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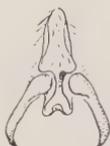
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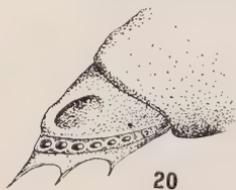
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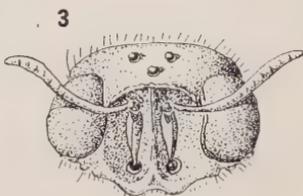
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TARLTON RAYMENT

HISTORIC POLE 346

BY TARLTON RAYMENT, F.R.Z.S.

(Honorary Associate in Research, National Museum, Melbourne)

Do you know the evanid wasp? Well, I did not, but I caught up with her in a peculiar way. You may remember that Jean Henri Fabre, the inimitable French Naturalist, exhorted us to keep looking in the right place, and we will surely be rewarded.

Well, for many years I had been seeking the nesting place of a tiny black bee, *Pachyprosopis*, for none had hitherto observed the home of these remarkable atoms of life, "animated specks of coal", as my revered Mentor once graphically described them.

It seemed that Fortune was about to smile on me at last, and soon I shall discover her impalpable silvery skin cradles; the egg; larva; pupae; male; pudding; everything. I am elated!

Oh yes, I know it is a petty truth to unravel the home life of a modest bee less than a quarter of an inch in length—

"Did I hear someone say—"What does it matter anyway?"

Yet I am so constituted that I place a higher value on the discovery of one eternal Truth in Nature than I do in accumulating the evanescent records of the turf. Let us admit it must be a matter of taste, but somehow I am driven by an inherent urge to build my brick, however small it may be, into the majestic edifice of man's knowledge.

And now—after years of seeking, success is close at hand. I find her in a telegraph pole, if you please. I cannot well chop down a great public utility for such a petty truth as the home life of a bee, but I can appeal to the master of telegraphs. "Could I, in the name of science, have a slab, even a tiny one, from pole 346?" The answer from the master is—"The foreman will meet you on the morning of the 10th inst. to co-operate." So I say—"Thank you, Sir!" Of course I am elated. A petty truth can move a great Department.

So the scene of my studies henceforth will be a mere pole in the street. But it is no ordinary piece of timber, for it is a historic pole, marked in the annals of the Postal Department for preservation at the request of a modest naturalist. When its life of service has ended, he is to be on hand to take delivery of the veteran to dissect it in the cause of scientific endeavour. Inside the timber, I say, are innumerable secrets that I should like to uncover to learn the truth.

The pole was fashioned by some timber-feller from the stout trunk of an ironbark tree: a red ironbark, or "mugga", as the aborigines knew it, but the white man's science has distinguished it as "iron wood," *Eucalyptus sideroxylon*. It is an excessively durable timber, but wood-boring beetles have drilled the softer sap-wood with a million pin-hole galleries, and in due course, after the beetles have abandoned them, behold, a tiny black bee, 4 millimetres or less in length, arrived to purify the site and establish a comfortable home.

I have devoted a long life to the study of the Hymenoptera, from the highly endowed domesticated honey-bee of the apiaries, to its simpler relatives content to dig a cave in the ground, or maybe occupy a gallery in some decaying tree. Well, I am intrigued by the minute size of the honey-gatherer in the pole. She is so industrious, gathering her tiny load of honey and pollen, and carrying them home mixed together in her sac, for she has hardly any harvesting hairs on her jet-black body.

Of course, I have to capture a sister or two, for I must establish her identity. Well, she is new to science, and a suitable name must be found for the midget. I cannot do better than remember the lady who has watched the pole for me over the years. It is a small tribute to pay for years of unselfish observation. When the linesmen arrive with an axe to test the solidity of the pole, she runs out to warn them—"Carefully, men, if you please! That's a historic pole, you should know, for it's full of the secret works of a bee. It's not to be destroyed—*ever!*"

The men cease their clouting—They peer curiously into the entrances to the minute galleries. "We've heard something about that from the boss," they admit respectfully enough, but marvelling inwardly how on earth such infinitesimal creatures could possibly influence a great governmental department which they themselves could never hope to move.

In all justice, I have to dedicate my bee to the faithful guardian of its home, and christen it *Pachyprosopis lynettae*. You see, I have something akin to affection for "Pole 346" and its colony of microscopic bees. Why, next year there will be a veritable horde of them for study! I am thrilled with pleasurable anticipation.

But I have run ahead of my story.

On a clear hot sunny noon I wander over to my "historic" pole to record the traffic inwards, and the departures for the field; a simple occupation.

Hullo! What's happened? Instead of the busy flight of cobby black bees, there are very different creatures cruising along the "air-ways" of the bees. They appear to be almost ethereal; they are so excessively slender; the wings vibrating so rapidly that a veritable mist seems to be wafting about the doorways of the bees.

I am astonished at the transformation. One of these insect "phantoms" hovers before a tiny gallery—Then the dastardly motive of the criminal suddenly flashes through my mind.

The "phantom," I say, is a mere wraith of an insect, she is so finely lined; three long tenuous filaments float out behind her, and at the other end, the exceedingly long head is peculiarly grotesque.

I record the momentary pause before the tiny entrance to the bee's nest; the "phantom" facing the pole; the filaments more delicate than the finest thread ever spun by the looms of man—are curved forward under the body. The peculiar formation of the abdomen actually assists her in attaining this remarkable posture.

Oh, yes, the attachment of her abdomen! It is so very remarkable that it has become the most conspicuous feature of the Family, for instead of its being joined to the *base* of the metathorax, as in all other insects, it issues from the *top*, giving the grotesque impression that the wasp has been mutilated in some extraordinary way. Nevertheless, despite its quaint effect, the character is so distinctive that it has become the unmistakable "hall mark" of the evanids.

Astonishingly, the filaments seem literally to "pour" into the tiny gallery. With a lens I am just able to perceive the merest undulation, "a wave," passing along the slender—why not let us know this impalpable weapon of death by its proper name—her ovipositor. It is the passage of the parasite's egg onto the soft white body of the baby bee. The horde of honey-gatherers become a figment of my imagination; next summer, instead of bees, there issued from the pole a host of tiny evanid wasps.

Family HYLAEIDAE

Pachyprosopis lynettae, sp. nov.

Type, male: Length, 3mm. approx. Black and yellow; almost nude. Head quadrate from the front, a delicate, almost obsolete tessellation, shining; face-marks yellow, extending up to the orbital margins as a fine line thicker at the base; frons very long and convex; clypeus convex and butter-yellow; supraclypeal area with a transverse yellow band almost as large as the clypeus; vertex long, facial foveae a mere line reaching the yellow lateral lines; compound eyes reniform; genae large and tessellate, amber spot at base; labrum amber, minute; mandibulae yellowish-amber, short; antennae yellowish-amber beneath, darker above, short and stout, articles wider than long.

Prothorax small, black; tubercles yellow, the colour running round as a line onto the collar; mesothorax shining, an obscure purple lustre, microscopically lineate, many microscopic shallow punctures, each with a minute white hair; scutellum and postscutellum similar; metathorax only a trifle rougher, with area ill-defined; abdominal dorsal segments black, with an obscure purple lustre; microscopically transversely striate; ventral segments yellowish-amber.

Legs, even the coxae, pale-yellow, posterior tibiae flushed with amber; tarsi more or less flushed similarly, a few white hairs; claws reddish; hind calcar yellowish, serrate; tegulae and sclerites pellucid, with yellowish marks; wings iridescent, very long for so small a bee; nervures pale-sepia, basal strongly arched and far short of nervulus; cubitus practically straight, first recurrent entering long first cubital; cells peculiar, the radial deep and pointed on the costa; the small second cubital practically a triangle; pterostigma large, sepia; hamuli minute, four, weak.

Allotype: The female is very similar in form, but the head lacks the bright-yellow markings; the flagellum is much darker beneath, obscurely amber; the ventral segments of the abdomen are dark, with obscure amber, and the legs, too, are darker-amber, only the anterior pair showing yellow on tibiae and tarsi; tegulae are brown.

Locality: Toorak, in telegraph-pole No. 346, 15th March, 1944, Victoria.

Type and allotype in the collection of the author. Species dedicated to Lynette Young, Toorak, Victoria, in appreciation of her co-operation over the years.

Allies: *P. holoxanthopus* Ckll., which has base of abdomen red; the female is near *P. nitidiceps* Ckll., with area of metathorax reticulate, neururation of wings different; *P. angophorae* Ckll. male has the abdomen entirely black beneath; *P. hackeri* Ckll., from Brisbane, is close to female.

Biological Notes: Six to eight cells, each 3mm. in length, and 1.5 mm. in diameter, are formed of an imalpable silvery skin, licked on by the glossa. They are built in the abandoned galleries of the powder-post beetle, *Lyctus brunneus* Stph.

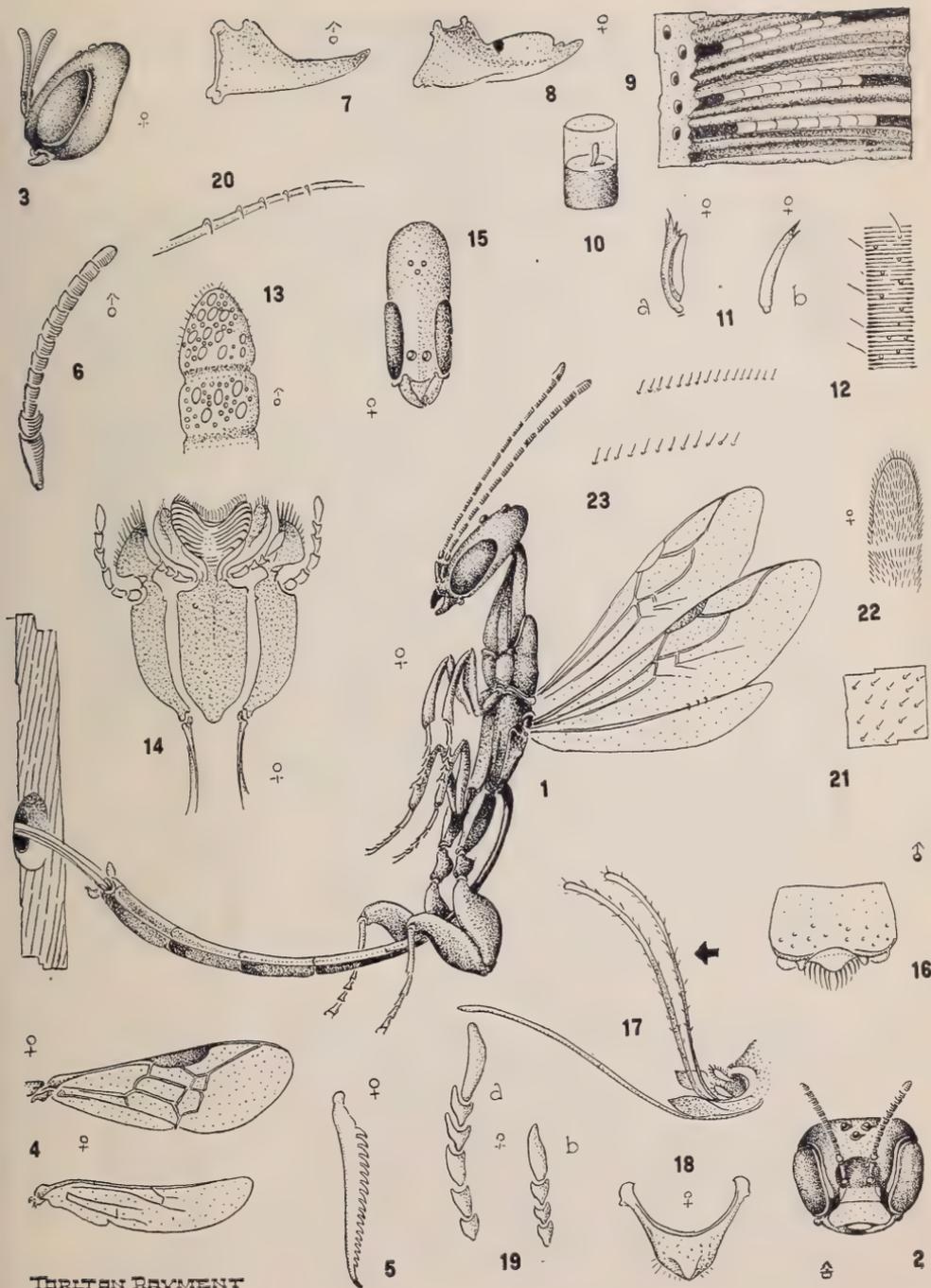
The cells are provisioned with an olive-green batter of nectar and pollen gathered from many botanical sources, and the egg is deposited on the "pudding." There is only one brood for the season.

Observed mating on flowers of *Eucalyptus ficifolia*, 5th Feb. 1950.

(See magazine "Walkabout," June, 1944, for comprehensive account and illustrations of cells of bee.)

Explanation of Plate

1. Remarkable undetermined evanid wasp parasitic on bee, *Pachyprosopis lynettae*, sp. nov. Note how the long ovipositor is extended into the bee's gallery.
2. Front of head-capsule of male *P. lynettae*.
3. Lateral view of head-capsule of female.
4. Posterior and anterior wings of bee.
5. Posterior calcar of female *P. lynettae*.
6. Antenna of male is short and stout.
7. Mandible of male is acute;
8. That of the female briefly bidentate.
9. Slab off pole showing 3 series of cells built by the bee in galleries bored by the powder-post beetle.
10. One of the thin silvery skin cells of the bee, with an egg on the "pudding" of pollen and honey.
11. a. Strigilis, or antennal-cleaner, of female bee.
b. Strigilis of the evanid wasp.
12. Portion of sting-palp of wasp highly magnified (the place is marked with an arrow in No. 17).
13. Apical segments of male bee's antenna: note the abnormally large pore-organs.
14. The mouth-parts of the bee are of primitive character: note the short broad glossa.
15. View of front of remarkable long head of the wasp: this character permits it to emerge from the narrow confines of a gallery after it hatches.
16. Yellow clypeus and labrum of male bee.
17. Apical segment of abdomen of wasp, with the long ovipositor and two sting-palps.
18. Apical sternum of male bee.
19. a: Maxillary palpus of bee; b: labial palpus.
20. Hamulae of bee's wing.
21. Hairs on wing of bee: that of the wasp is similar.
22. Apical segments of flagellum of wasp.
23. The posterior margin of the small wing is alike in both bee and wasp; the hairs are fine and few in number.



THURTON PAPMENT

A Note on the Distribution and Host of *Hyptiogaster inaequalis* Turner, An Australian Gasteruptionid (Evaniioidea)

BY ARTHUR W. PARROTT.

(Wakapuaka Road, Nelson, New Zealand.)

Through the courtesy of Mr. Tarlton Rayment of Melbourne, Victoria, I received six specimens of a Gasteruptionid, *Hyptiogaster inaequalis* Turner, which were observed parasitising the larvae of a native bee (*Cladocerapis persooniae* Rayment). The observations are of particular interest as there is practically nothing known on the host relations of the Australian species of this genus. For this reason the publication of the following notes seems to be justified. It is hoped that further observations will be made by local entomologists on the biology and host relations of these interesting and important insects.

The identification of species of the genus *Hyptiogaster* has been considerably facilitated recently by the publication of an excellent revision of the genus by R. W. Crosskey (1953). The classification adopted in the present note is that brought forward by Crosskey (1951) in his important revision of the Evaniidae. He recommended that the Evaniidae be removed from the superfamily Ichneumonoidea and raised to a superfamily rank, and the three previously recognised subfamilies be given family rank (i.e. Aulacinae, Evaniinae and Gasteruptioninae). Further evidence supporting this opinion has been recently presented by Short (1952) who studied the larval head of the Ichneumonoidea. This author states that there are two general types of larval heads, one type is that of the Ichneumonids and Braconids, which have prominent sclerotic bands and small mandibles, the other is that of the Evaniidae, in which there are no prominent sclerotic bands and the mandibles are large. He states, however, (p. 53) that there are many intergrades between these two types of larval heads.

HYPTIOGASTER INAEQUALIS Turner.

Hyptiogaster inaequalis Turner, 1918, p. 410, Female.

Hyptiogaster inaequalis Turner, Hedicke, 1939, p. 49. Listed.

Hyptiogaster inaequalis Turner, Crosskey, 1953, p. 371, redescribed, fig.

This species was originally described by Turner (1918) from one male and six females taken in November 1913, at Yallingup, south-western Australia. Apparently it has not been recorded since, but Crosskey gives an excellent re-description of this species based on Turner's original material.

DISTRIBUTION.

Originally described from Yallingup, south-western Australia, *H. inaequalis* is now recorded from Jamberoo, Illawarra Range, N.S.W., on the eastern side of the continent. Although these two localities are separated by a distance of over 1,000 miles, this pattern of distribution occurs also in another species of this genus, *H. patellata* (Westwood, 1851), which was originally described from South Australia, near Adelaide, but has since been recorded from the Swan River, Western Australia. It has also been recorded from Ararat in Victoria (see Crosskey, 1953, p. 370). A similar distribution occurs in several species of Ichneumonidae, as for instance in the genus *Labium*. With the exception of those species that do occur both in the western and eastern sides of the continent, as instanced above, the western Australian Ichneumonid and Braconid faunas appear to have a strong

indigenous element which characterises the fauna as a whole. The same statement applies equally to the south-eastern states, and most definitely to the north-eastern portion of the continent, embracing principally the coastal districts of Queensland. The latter has a strong New Guinea element which probably extends into northern New South Wales. The above record from New South Wales is based on six males collected by Mr. Tarlton Rayment, in November 1950.

HOST RELATION.

As no records of the hosts of Australian *Hyptiogaster* appear to have been published the following notes by Mr. Rayment are of particular interest. In a letter to the author Mr. Rayment states "These wasps are positively parasitic on the larvae of the wild bee (*Cladocerapis persooniae* Rayment) and were taken at the "nests" at Jamberoo, Illawarra Range, N.S.W. during January 1950. There were many hundreds of these parasites flying to and fro over the numerous shafts of the bees, for they had established a very populous colony in the ground."

The writer wishes to express his very sincere thanks to Mr. Tarlton Rayment for the opportunity of examining these interesting specimens, and allowing him the privilege to publish these interesting observations.

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"THE MARINE ZOOLOGIST"

VOL. 1. No. 3.

(Incorporated with the Proceedings of the Royal Zoological Society of New South Wales, 1953-54, published March 4, 1955)

The Genus *Tolema* and Its Allies

(Class Mollusca)

BY CHARLES F. LASERON, F.R.Z.S.

(Plate I, figures 1-12.)

This research has been assisted by a grant from the Science and Industry Endowment Fund.

Family PURPURIDAE.

Genus TOLEMA Iredale, 1929.

Tolema Iredale, Rec. Austr. Mus, XVII, 1929, p. 186.

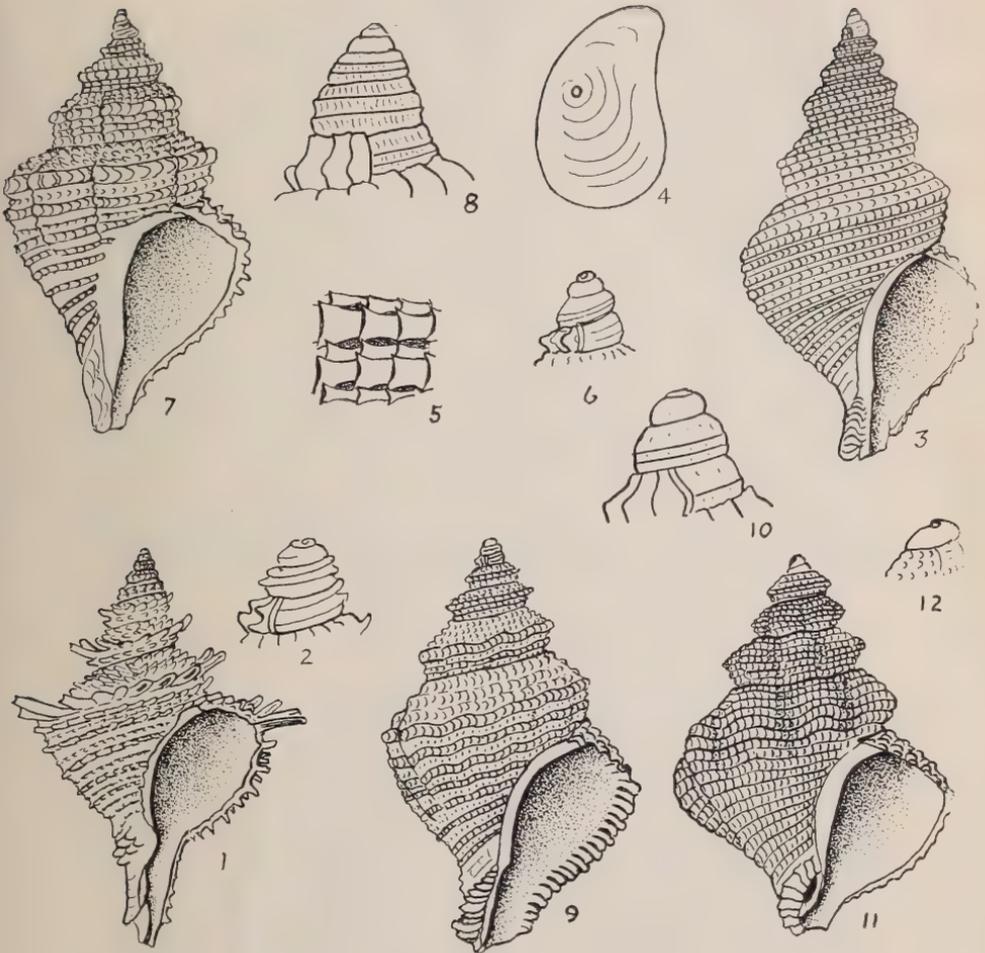
Genotype *Tolema australis* Laseron, not *Purpura sertata* Hedley as used by Iredale.

Owing to the confusion caused by the mixing of two species from the continental shelf, a curious problem in nomenclature has arisen. In 1903 Charles Hedley described a shell collected by the Thetis Expedition as *Purpura sertata*. The type was very immature, but Hedley considered its characters sufficiently distinctive for identification when the adult shell should be found. Large specimens were later found which seemed to be the adult of *Purpura sertata*, and which so resembled the Japanese species *Coralliophila lischkeana* Dunker that Hedley concluded they were the same, and in his Check List of 1917 he synonymized *sertata* in favour of Dunker's name. In 1936 Iredale accepted the identification of the large shell as the adult of *sertata*, but considered it distinct from the Japanese species. He restored the specific name of *sertata*, having in 1929 proposed the new genus *Tolema* with the so-called "*sertata*" as genotype. In 1947 Powell discovered a New Zealand species very close to this "*sertata*" which he named *Tolema peregrina*.

This seems quite straightforward, but further information shows that the original *Purpura sertata* grows into quite a different shell from that adopted by Iredale as the genotype of *Tolema*. From a series collected from 30-35 fathoms off Crookhaven it is very clear that the adult of *sertata* is an enlarged replica of the immature shell, with more whorls of course, but with the same peculiar protoconch, the same absence of spines and the same cone-in-cone scale-like sculpture. At the same time juvenile specimens of *Tolema* have been found which are miniatures of the adult genotype, very different from the true *sertata*, with prominent spines on even the earliest adult whorls. The protoconch, though also a true sinusigera, also differs from that of *sertata*. When shown the full series Mr. Iredale quite agrees with me that the two species are distinct.

There can be no doubt of the identity of Iredale's genotype, as it is figured and is a very distinctive species, but as it is not Hedley's *sertata* it is left without a name. The Japanese species *lischkeana* differs chiefly in the sculpture, the spines are in two series, alternately long and short, but the New Zealand *peregrina* is much closer to our own, and there is little difference between this and the Australian species. Powell has, however, studied and figured the three

Plate I.



Explanation of Plate I

1. *Tolema australis* Laseron; 2. protoconch.
3. *Liniaxis elongata* Laseron; 4. operculum; 5. details of sculpture magnified; 6. protoconch.
7. *Liniaxis sertata* Hedley; 8. protoconch.
9. *Liniaxis nodosa* Adams; 10. protoconch.
11. *Rhombothais arbutum* Woolacott; 12. protoconch.

forms and is satisfied that they are distinct. It is now proposed to name the New South Wales shell *Tolema australis* sp. nov., and this will replace *Purpura "sertata"* as the genotype of *Tolema*.

Tolema australis sp. nov. Figs. 1, 2.

Shell large, growing to two inches or more, biconical, white. Protoconch sinusigeral, of four whorls, the first minute, the next bearing incipient spiral keels, the last two each with two prominent spiral keels, the surface roughened with what under the microscope appear to be projecting scales. The protoconch terminates in a strong varix, but the sinusigeral spur is hidden by the overlap of the first mature whorl. Mature whorls five or six (in the type, which is not quite mature, there are four), flattened into a shelf above the periphery and rounded below. The sculpture is predominantly spiral, a prominent, spine-bearing keel on the periphery, with three narrow keels on the shelf above and six moderately prominent keels on the body whorl below, with one or sometimes two small keels between each of these. All the keels are packed with elongated scales, each curved into a semi-tubular form, open below, pointing forward and rising from within the one preceding it. The scales on the periphery are similar in structure, but fewer in number, about 14 on the body whorl, and they are extended into spines nearly equal in length. The aperture is pyriform, the inner margin smooth and curved, the outer margin rounded, restricted anteriorly, merging into a long, straight anterior canal. The columella is imperforate, bearing several overlapping scales or processes similar in structure to the spines but much flattened.

The type, Fig. 1, is a specimen from 110 fathoms off Sydney, lacking full maturity by about one whorl, and 31mm. in length. The protoconch, Fig. 2, is from a young specimen 12mm. in length collected by Mr. Garrard from 40 fathoms off Twofold Bay.

Genus LINIAXIS gen. nov.

Genotype *Liniaxis elongata* Laseron.

Related to *Rapana* Schumacher and *Rhombothais* Woolacott, but differing by having the columella solid and narrow, and not broadly umbilicate as in *Rapana* and perforate as in *Rhombothais*.

This genus is proposed to include a small, natural group of three New South Wales species, living well below low water or on the continental shelf. All have marked sinusigeral protoconchs of from three to five whorls, with two spiral ridges on the last two whorls with transverse striae between. They are biconical in shape, the anterior canal slightly prolonged, the axis adjoining the canal solid and covered with narrow overlapping plates. The sculpture is predominantly spiral, though broad rounded axial ribs may also be present. The spiral keels are numerous and closely packed, and may be of two alternating orders, and are invariably covered with fine closely spaced imbrications or scales which may assume a perfect cone-in-cone structure, recalling some of the deep water Trophonidae. The operculum is horny, multi-spiral, and with the nucleus close to but within the margin.

Iredale, 1929, has previously noted that one of the three species, previously known as *Rapana nodosa* differed radically from the typical *Rapana*, and tentatively referred it to *Coralliophila* H & A Adams. *Coralliophila* is, however, a tropical genus, of different facies, an inhabitant of coral reefs, crawling on the coral and frequently developing a stem clasping habit.

There is a fourth species closely related to *Liniaxis*, which has generally been confused with the true *nodosa* by local conchologists. This has recently, 1954, been named by Mrs. Lee Woolacott as a new

genus and species, *Rhombothais arbutum*. *Liniaxis* is very close to *Rhombothais* but differs chiefly in the absence of an umbilical slit. Mrs. Woolacott also shows the operculum of *Rhombothais* with a marginal nucleus, whereas in *Liniaxis* the nucleus is well within the margin. The protoconch of *Rhombothais*, though sinusigeral, is smaller, shorter, and lacks the spiral keels. (Figs. 11, 12.)

Liniaxis elongata sp. nov. Figs. 3-6.

Shell biconical, with moderately long spire, grey-white when alive. Protoconch sinusigeral, of four whorls, the last two with sharp keels, but no transverse striae visible, a prominent varix present, but the sinusigeral claw hidden by the overlap of the first adult whorl. Adult whorls six, angled at the periphery, sutures deep. The sculpture consists of about 16 subequal keels on the body whorl, that on the periphery slightly larger than the others, four above the periphery, the remainder below. Between the main keels is an alternating series of much finer keels, the whole packed tightly together. The surfaces of the keels themselves are closely covered with small curved scales opening forwards, each originating within the one preceding it, producing a cone-in-cone structure (see Fig. 5). The sculpture continues right to the base of the shell. A few broad undulating ribs cross the whorls transversely, but they are not apparent. Aperture pyriform, inner margin curved and smooth, outer margin rounded, restricted anteriorly. Anterior canal short and straight, columella imperforate, bent outwards, its anterior end covered with broad overlapping scales of similar structure to those on the keels. Length of type, 23mm.

Locality: 30-35 fathoms off Crookhaven, a series of four specimens, half grown to mature.

Remarks: This is the most elongated of the three species here discussed, and it can be readily distinguished from the others by this character as well as details of the aperture and sculpture.

Liniaxis sertata Hedley. Figs. 7, 8.

Purpura sertata Hedley, Mem. Aust. Mus., iv, 1902, p. 382, figs. 95, 96.

The confusion surrounding the identification of this species has already been discussed under *Tolema*. There remain some details of the adult shell which can be added to the original description. Nothing more can be said of the protoconch, of which Hedley has given a full description and a beautiful drawing showing the sinusigeral claw, hidden in all my specimens by the overlap of the adult whorls. The fully adult shell has four whorls, the periphery is sharply angled, and flatter above than in *L. elongata*, the spiral keels are coarser and fewer in number, about 12 on the body whorl. The imbricate scales are, however, similar in character, and there is also a secondary series of small keels alternating with the main ones. The aperture is pyriform, but broader than *elongata*, with the outer margin more angled. The anterior canal is narrow, rather longer, the columella is straight and narrow at its extremity, not bent backwards, and only slightly imbricate. It is quite imperforate. The smooth band on the inner margin is comparatively broad. The specimen figured is from 30-35 fathoms off Crookhaven and is 18mm. long.

Liniaxis nodosa Adams. Figs. 9, 10.

Rapana nodosa Adams, Proc. Zool. Soc. 1853, p. 98.

There is still some doubt of the identity of this species. In 1912 Hedley examined the types of many Australian shells in Europe, amongst them *Rapana nodosa* in the British Museum. In his paper published in 1913 he remarked that the two shells marked types were reputed to be from the Philippines and with them was mounted another specimen from Port Jackson. In his opinion the Philippine locality

was erroneous and all three specimens were Sydney shells. Accepting this as correct, particularly as the figure of the type published by Hedley corresponds with those since collected from Sydney, *nodosa* may well remain as the name of the local species.

For the benefit of local conchologists the following shell characters may be noted. The colour varies from pure white to pink. The form approaches that of *L. sertata* but is rather slenderer, though not as slender as *L. elongata*. The number of spiral keels, with alternating secondary keels is about the same as in *L. sertata*, but the imbricate scales are smaller and more closely packed. The protoconch also is different, with only four whorls instead of five, and the transverse striae are less marked. The anterior canal is short but broader, and the anterior end of the columella is wider and covered with large overlapping scales. The transverse ribs or folds are also much more prominent than in *L. elongata*, they are about ten on the body whorl, rising almost into nodules on the periphery. As in the other two species the columella is imperforate. *Rhombothais arbutum* with which this has frequently been confused is a shorter, more rhomboidal shell, and the umbilicate slit and protoconch also enable its ready separation. The specimen figured came from 6-9 fathoms off Sow and Pigs Reef, Port Jackson, and its length is 20mm., width 14mm., measurements almost identical with the type.

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Note: All the types as well as the specimens figured have been presented to the Australian Museum, Sydney.

Descriptions of the Animals of Three New South Wales Cowries

BY K. RUTLAND and J. KERSLAKE.

Erronca caurica longior—Iredale (Aust. Zoologist, viii, 2, June, 1935, p. 130).

While collecting at Long Reef, a few miles north of Sydney, in May, 1954, with members of the Marine Section, Mrs. Swann found a live, immature specimen. The foot was creamy-white with sides flecked with black; mantle grey and black mottled with white, star-shaped spots; tentacles orange. The shell measured $1\frac{3}{8}$ in. long and both lips were unformed. The speckling of the dorsal area was present, though not intense as in mature specimens.

K. RUTLAND.

Gratiadusta xanthodon—Sowerby (Conch. Illus., pt. 3, 1832, fig. 18).

Iredale (Aust. Zoologist, viii, 2, 1935) pointed out that the shell from eastern Australia known as *xanthodon* differs in some respects from that figured by Sowerby. However, no new name has, as yet, been proposed for our shell.

It is a fairly common cowry of the central Queensland mainland, notably Hervey Bay and Keppel Bay. Iredale *loc. cit.*, publishes a description of the animal of a specimen from Keppel Bay. This description does not agree with that of specimens collected by myself at Woody Head, Clarence River, N.S.W., in October, 1953. The Woody Head animal may be described as follows:

Foot creamy-yellow with dark grey reticulations on the top only. Mantle also creamy-yellow, but heavily streaked and mottled with black giving a general appearance of dark grey. Papillae creamy-yellow, spaced irregularly about $\frac{1}{8}$ in. apart over the mantle. Tops of the papillae terminate in 4, 5 or 6 branches. These branches are set at an acute angle from the stem, presenting an almost upright, stiff appearance. Siphon, which extends about $\frac{1}{8}$ in. beyond the shell, is cream and the orifice fringe is also cream. Tentacles orange.

Although the above description disagrees in every respect with that of the Keppel Bay animal, it is impossible to separate shells from these two areas.

Evenaria ursellus marcia—Iredale (Aust. Zoologist, ix, 3, 1939, pp. 313-4).

This rare visitor to the Sydney district was found at Long Reef in May, 1954.

Under its earlier name, *E. kieneri* Hidalgo, Iredale (Aust. Zoologist, viii, 2, 1935, p. 124) published a description of the animal collected at Lindeman Island, north Queensland. The following description of the Long Reef shell agrees with this.

Foot pale cream, minutely speckled with black. Mantle white and so transparent as to allow the pattern of the shell to show through quite clearly. Papillae white and branched with soft, frilly processes which undulate delicately as the creature moves. Siphon short, pale cream with fringed orifice. Tentacles yellow.

It may be noted that this animal did not retract its mantle for some minutes after being exposed to the sunlight.

J. KERSLAKE.

Adelaide, Gales and Shells

BY KAY RUTLAND.

Last year I was fortunate enough to spend a few months in Adelaide during which time there were no less than four gales. Reading in the paper that shells were piling up in great quantities, I wasted no time in getting down to the beach and chose Semaphore as my hunting ground. The shells were certainly there in great numbers. But there were also tons and tons of seaweed and what were left of dozens of shacks that had been built along the beach.

There were hundreds of people beachcombing so I joined in and had my collecting bag full in a very short time. It was quite exciting to get *Hypocassis bicarinata* Jonas, with its white animal, a *Pterynotus trifurmis* Reeve, which also has a white animal, and *Colus australis* Quoy & Gaimard, whose animal is a bright red. Hundreds of the small translucent *Mantellum orientalis* Adams & Reeve had been washed up and were in a dying condition, with their bright pink tentacles making them easy to see on the green weed. I found a few *Callanaitis disjecta* Perry, and some small *Notovola alba* Tate, *Mimachlamys asperimus* Lamarck and *Equichlamys bifrons* Lamarck. Some of the latter had *Sabia conica* Schumacher, living on them, also *Zeacrypta immersa* Angas.

Lyrta mitraformis Lamarck was there also, but I didn't find it alive. *Solemya australis* Lamarck, with its highly polished periostracum also turned up, and others collected that day were *Exhalotis cyclobates* Peron, *Tawera gallinula* Lamarck, *Lutraria rhynchaena* Jonas, *Venerupis galactites* Lamarck, *Cardium cygnorum* Deshayes, *Cardium racketti* Donovan, *Codakia lacteola* Tate, and *Glycymeris radians* Lamarck.

Seeing a young boy carrying a number of shells, I asked him what he had found and amongst his treasures saw a beautiful specimen of *Zoila thersites* Gaskoin, which he wouldn't part with! I'm sure I turned over two tons of seaweed after that, hoping I'd find another, but I didn't, and was told later, by a member of the Malacological Society of Adelaide, that it is only on very rare occasions that that particular shell is found on the Adelaide beaches, as its habitat is Eyre peninsula. These shells apparently were not uncommon there about twenty years ago, but now are very difficult to get. They live on an orange coloured sponge at a depth of 12 to 15 feet. Fortunately for me, I met someone who had lived on the peninsula twenty years ago, and who had one of these cowries, which was given to me.

During my stay in Adelaide I collected approximately 150 species, including the lovely little southern *Oliva australis* Bruguiere, which lives near Outer Harbour. The smaller species of the Trochidae were very attractive and showed interesting differences from our New South Wales species.

I attended quite a number of the meetings of the Malacological Society of South Australia, which were very interesting and instructive. The Society is fortunate in having the help of Mr. Cotton of the South Australian Museum, who brings along the Museum's specimens of the family to be studied at the meeting. This, of course, is of great assistance to the members.

Note on *Haurakia trajectus* Watson

BY JOHN LASERON.

When comparing the molluscan faunas of the tropical waters of Queensland with those of the temperate waters of the New South Wales (Peronian) coast it is necessary to distinguish between species which may be considered indigenous and those tropical forms which have invaded northern New South Wales through the medium of the warm southern-flowing Notonectian Current. In this comparison small and minute shells are just as important as the larger forms.

In 1867 Frauenfeld described *Alvania novarensis* from Port Jackson, and this species, now *Haurakia novarensis*, is well known from Moreton Bay, Queensland to the south coast. It can be considered a typical representative of the Peronian fauna. In 1886 in the Zoology of the Challenger Expedition, xv, pl. xlv, fig. 6, Watson described *Rissoa (Alvania) trajectus* from Queensland, the type locality being the Gulf of Carpentaria. In 1907, Hedley, "Mollusca of the Mast Head Reef" (Proc. Linn. Soc. N.S.W., xxxii, p. 494), recorded *trajectus* as a synonym of *novarensis*. Further material shows, however, that this synonymy is not justified and that *trajectus* should be restored as quite a good species. I have collected long series from Darwin in the Northern Territory and from Bowen in Queensland, and have also seen it from Caloundra. Over this wide area it shows no variation, but is quite distinct from the Peronian *novarensis*. The two species have similar colouring and superficially a similar appearance, but *trajectus* is smaller, has a whorl less, fewer ribs and the sculpture is stronger and more prominent.

The Identity of *Phasianella virgo*

BY CHARLES LASERON, F.R.Z.S.

(Figures 1-2.)

Living on the seaweed *Phyllospora* in the deeper pools or just below low tide on the foreshores near Sydney is a small *Phasianella*. At Long Reef this occurs in enormous numbers, and at Reef Beach within Port Jackson it is just as abundant. Local conchologists have always accepted this as *Phasianella virgo* Angas (Proc. Zool. Soc., 1867, p. 115, pl. 13, fig. 25). Examination of a long series from Long Reef, however, showed that there were two species mixed together, one comparatively rare, for only four specimens were picked out. Under the impression that the rarer species was undescribed, the original description of *P. virgo* was checked, and it was with surprise that comparison showed that it was the rare form which matched *virgo* in all characters. The drawing and description of *virgo* are excellent, and there can be little doubt of the identification. Thus the common species is left without a name, and it is here described as new. For the purpose of comparison both species are here figured. The type of the new species and specimens of the true *virgo* have been presented to the Australian Museum.

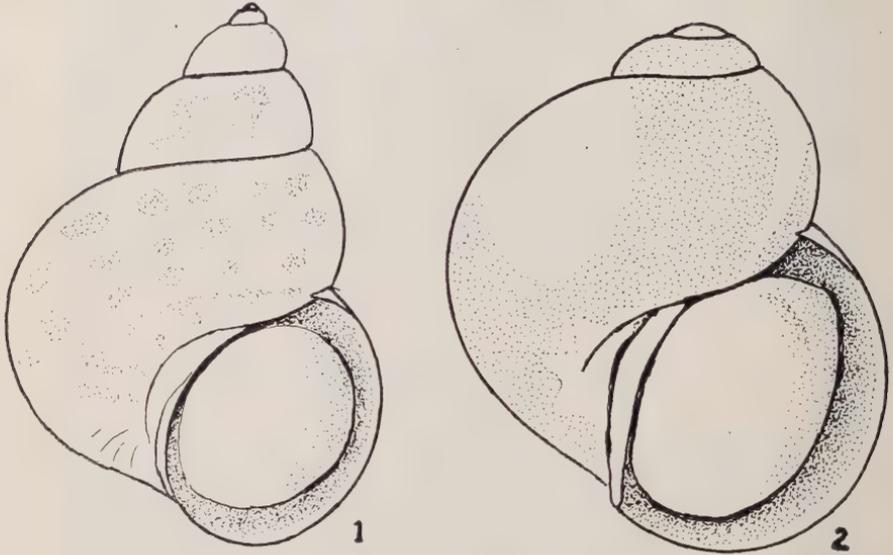
Phasianella gregaria, sp. nov. Fig. 1.

Shell small, conical, with an elevated spire. Shell substance thin, with a thin, transparent epidermis not always apparent. Colour variable, generally pale or even white with several rows of irregular brown spots, occasionally brown with white flames. No distinguishable protoconch, growth beginning from a minute apex and thence proceeding regularly. Whorls four, smoothly rounded, sutures indented, body whorl inflated, sculpture confined to microscopic growth lines. Aperture rounded, produced anteriorly, nearly circular, outer margin

thin, inner margin slightly reffected, peristome not entire, columella with a narrow band of callus and the mere trace of an umbilical slit. Overculum ovoid, narrowed anteriorly, very thick, white and smooth, dome-shaped externally, internally slightly concave, pauci-spiral, nucleus about one third in from margin. Length 3mm., body whorl 2.2mm., extreme width 2mm.

Habitat: Very abundant living on the seaweed *Phyllospora* at Long Reef, north of Sydney (type); also at Reef Beach, North Harbour, Port Jackson, and in similar locations along the coast.

Remarks: Comparison with figure 2 of *P. virgo* will at once show the difference between the two species. *P. gregaria* is not only more elongated but has an extra whorl, the aperture is relatively smaller, the columella is of different form, the shell substance is thinner and the surface less porcellanous and polished.



Explanation of Text Figure

1. *Phasianella gregaria* Laseron. 2. *P. virgo* Angas.

C. F. Laseron del.

On *Sepia cultrata* Hoyle

BY TOM IREDALE.

In the "Challenger" Reports, Hoyle described a Cuttle-fish under the name *Sepia cultrata* from southern New South Wales. There was some mishap in connection with the depth from which it came; this was first given as 2,200 fathoms, later amended to 150 fathoms. The figure given of the bone was not easily recognisable, but a variety was figured which was that of a common New South Wales bone. The name was consequently left in suspense until accurate determination of the type could be made. Miss E. C. Pope, of the Australian Museum, recently visiting England, has compared local specimens with the type and variety, and has cleared the matter up. It appears that the type bone was broken, and that the artist restored it in his drawing, but that Hoyle did not carefully check the drawing, hence the con-

fusion. The type bone did not essentially disagree with the variety, and both are undoubtedly the local shell which I named *macilenta*, so that *cultrata* can be reinstated, and *macilenta* dropped as a synonym of *Glyptosepia cultrata*.

This still leaves unresolved the status of *gemellus*, which agrees closely but is a broader shell, even as the southern and western *hedleyi*. Recent collecting on the beaches north of Sydney found *gemellus* much the commoner, while on the southern beaches *cultrata* (syn. *macilenta*) is more numerous, though both are more uncommon than the other local species, such as *plangon*, *mestus*, *rex* and *rozella*.

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Coral Dwellers

BY LEE WOOLACOTT.

(Plate II.)

During a stay at Heron Island in the Capricorn Group, Queensland, in 1946, a Mr. Cunningham, who was a keen fisherman, brought in several pieces of coral which had caught in his line. He was generous enough to give them to me, and so I am able to illustrate two very interesting bivalves which make homes in the branches of living coral. The coral itself is of a pale, yellowish-fawn and the little "cups" are a light orange. The small *Chlamys*, *Coralichlamys acroporicola* Iredale, is nestled down between the junction of two branches and has made a perfect pocket there, retaining on the walls of the pocket a complete impression of the shell with the ribs in reverse. In the illustration, the coral has been broken back to show the shell.

The shell is pale cream in colour and nine-tenths of an inch long by seven-tenths wide. It is delicately constructed and somewhat frail. There are about 15 compound ribs bearing obsolete scales. A very surprising feature of this shell is that the ribs are strongly grooved internally, but appear weak and rather poor externally. Valves slightly convex, ears very uneven, and the shell is often distorted.

On the same coral, attached by a byssus, were two or three small butterfly pearl shells, *Electroma tragulata* Iredale. Very delicate, thin, translucent, of a pale horn colour tinged with green and spotted and barred with dark jade green. Convex in the umbonal region, with the right valve becoming concave towards the ventral margin. The hinge line is short and without teeth. Both colour and shape vary considerably. Most specimens are comparatively smooth except for small growth-striae, but one specimen is smooth from the hinge to about two-thirds of its length when it becomes sculptured by numerous delicate but closely-packed concentric striae. The shell is iridescent within.

Another coral dweller, which should prove of interest to New South Wales collectors, is *Lithophaga calcifer* Iredale, a small boring bivalve usually found in Queensland. It was, therefore, quite thrilling to find a living pair in a small patch of coral growing in a deep pool at Woolgoolga on the north coast of New South Wales. These very odd shells are often referred to as Date Mussels because of their resemblance to a date stone. *Lithophaga calcifer*, however, is less like that than many other species. The New South Wales specimen is smaller than most Queensland shells of the same species, measuring nine-tenths of an inch long by three tenths wide with a depth of three-tenths of an inch.

In some strange manner the living animal is able to deposit a chalky substance on the tips of both valves, a thick crust which extends

Plate II.



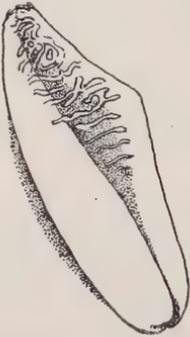
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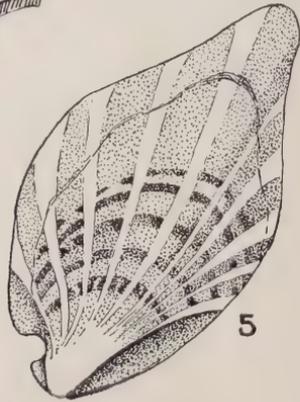
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3



4



5

Dilin Lee Woodcut.

partly beyond the true shell but still has the appearance of being part of it. This chalky material, probably powdered coral combined with mucus from the mantle, is cemented on the outside in strong wrinkles and folds at the tips, decreasing in size and thickness until it becomes a thin film towards the anterior end. The shell itself is a light chestnut colour, rounded at the anterior end and projecting very slightly beyond the umbones, with very little dorsal elevation, and the ventral margin with very little dorsal elevation, and the ventral margin slightly curved.

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Explanation of Plate II

- 1-3. *Coralichlamys acroporicola* Iredale.
1. Exterior view of shell x 2.
2. Hinge x 2.
3. *Coralichlamys acroporicola* in situ.
4. *Lithophaga calcifer* Iredale x 2.
5. *Electroma tragulata* Iredale x 2.

Rissoïd Sectional Names

BY TOM IREDALE.

The preparation of a revised list of the marine mollusca of New South Wales has necessitated the proposal of some new generic names for molluscs of the so-called Rissoïd series. The names here introduced have been in manuscript for many years and the groups here defined have escaped separation up to the present. They can be recognised by reference to Laseron's Review (Rec. Austr. Mus. xxii, pp. 257-287, figs. 1-94, 1950), where the species are fully described.

Phintorene, gen. nov. Type, *Rissoina allanae* Laseron, loc. cit., p. 261, fig. 5. Differs from *Rissoina* in its slender form, cancellate sculpture and mouth-features.

Caporista, gen. nov. Type, *R. iredalei* Laseron, l.c., p. 262, fig. 6. Differs from *Rissoina* in form, coloration, engraved sculpture and thin outer lip.

Feldestea, gen. nov. Type, *R. salebrosa* Frauenfeld, Laseron, l.c., p. 269, fig. 33. Differs from *Estea* in triangulate form, mouth-features and lirate sculpture.

Nodulestea, gen. nov. Type, *Estea castella* Laseron, l.c., p. 268, fig. 32. Differs from *Estea* in form, mouth-features, and nodulose sculpture.

Obescrobs, gen. nov. Type, *Rissoa jacksoni* Brazier, Laseron, l.c., p. 274, fig. 52. Differs from *Scrobs* in triangular form and mouth-features.

Ultiscrobs, gen. nov. Type, *Scrobs pluteus* Laseron, l.c., p. 275, fig. 55. Distinct from *Scrobs* in obese form and mouth with shelf-like columella.

Emblanda, gen. nov. Type, *Rissoa emblematica* Hedley, Laseron, l.c., p. 276, fig. 59. Differs from *Anabathron* in size, coloration and mouth-features.

Badepigrus, gen. nov. Type, *Rissoa badia* Petterd, Laseron, l.c., p. 277 fig. 64. Differs from *Epigrus* in size, coloration and mouth-features.

Herewardia, gen. nov. Type, *Rissoina kesteveni* Hedley, Proc. Linn. Soc. N. S. Wales xxxii, p. 497, pl. xvii, fig. 25, 1907. Differs from *Rissoina* in form, sculpture and unvariced mouth.

Dialessa, gen. nov. Type, *Diala translucida* Hedley, Laseron, l.c., p. 285, fig. 89. Differs from *Diala* in its rounded whorls, different mouth-features and less solid form.

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Thomas, John, Estate of Late, Shell Harbour, N.S.W.
Walter & Eliza Hall Trust, Box 130CC, G.P.O., Sydney.
Weingott, Mr. L., 76 Clarence Street, Sydney.

FELLOWS:

Allan, Miss Joyce K., Australian Museum, Sydney.
Barrett, Charles, C.M.Z.S., "Maralena," Maysbury St., Elsternwick, Vic.
Chisholm, A. H., c/o Angus & Robertson, Castlereagh St., Sydney.
Cotton, Bernard Charles, South Australian Museum, North Terrace,
Adelaide, S.A.
Glauert, L., Western Australian Museum, Perth, W.A.
Halloran, Dr. Garnet, 143 Macquarie St., Sydney.
Hallstrom, Sir E. J. L., 462 Willoughby Rd., Willoughby.
Hindwood, Keith A., Wingello House, Angel Place, Sydney.
Iredale, Tom, "Solander," Queenscliff Rd., Manly.
Kinghorn, J. R., Australian Museum, Sydney.
Laseron, C. F., 15 Hill St., Balgowlah.
McGill, Arnold R., 119 Wollongong Rd., Arncliffe.
Musgrave, Anthony, Australian Museum, Sydney.
Pope, Miss Elizabeth, 36 Kameruka Rd., Northbridge.
Rayment, Tarlton, Bath St., Sandringham, Vic.
Roughley, Theodore Cleveland, Coolong Rd., Vaucluse.
Troughton, Ellis Le Geyt, Australian Museum, Sydney.
Ward, Melbourne, Gallery of Natural History and Native Art, Medlow
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Zeck, E. H., Entomological Branch, Dept. of Agriculture, Box 36, G.P.O.,
Sydney.

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Allan, Miss Joyce K., F.R.Z.S., Australian Museum, Sydney.
Davies, M. S., 26 O'Connell St., Sydney.
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Evatt, The Hon. Clive, 121 Macquarie St., Sydney.
Fairfax, Vincent, 850 New South Head Rd., Double Bay.
Iredale, Tom, F.R.Z.S., "Solander," Queenscliff Rd., Manly.
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Stiffe, R. J., 350 George St., Sydney.

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 Dew, Miss Barbara, 16 Wallaroy Rd., Double Bay.
 Dixon, Robert Craig, 33 Hunter St., Sydney.
 Duff, Miss Elizabeth Eleanor, 460 Burwood Rd., Belmore.
 Friend, Alfred Harry, B.Sc.(Agr.), c/o Entomology Branch, Dept. of
 Agriculture, P.O. Box 36, Sydney.
 Goddard, William Strickland, 4 Lennox St., Mosman.
 Golding, Miss M., 2 Broderick St., Balmain.
 Halloran, Aubrey, O.B.E., B.A., LL.B., 28 Martin Place, Sydney.
 Hallstrom, John E., 462 Willoughby Rd., Willoughby.
 Harford, Mrs. Leone Z., 33 Henson St., Marrickville.
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 Johnston, Peter Robert, 15 Fairfax Rd., Mosman.
 Keast, James Allen, 313 West Botany St., Rockdale.
 McCamley, F., Flat No. 6, 25 Clarendon Rd., Stanmore.
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 Manwaring, H. A., 2 Altona St., Abbotsford.
 Minell, Mrs. Dorothy Ebsworth, 85 Birtley Towers, Elizabeth Bay.
 Monticone, Dr. Charles Albert, G.P.O. Box 2058, Sydney.
 Morgan, H. E., 74 Pitt St., Sydney.
 Murray, C. Stuart, G.P.O. Box 2427, Sydney.
 Musgrave, Anthony, F.R.Z.S., Australian Museum, Sydney.
 Oldham, Roland V., c/o Mrs. T. Suess, 70 Kent Rd., Wooloowin, Q'land.
 Ormsby, Anthony Irwin, 3 Castlereagh St., Sydney.
 Packer, H. E., Belgenny Flats, Taylor Square, Darlinghurst.
 Pope, Miss Elizabeth, F.R.Z.S., 36 Kameruka Rd., Northbridge.
 Rogers, William James, 12 Bradleys Head Rd., Mosman.
 Scott, N. A. H., 22 Terminus St., Petersham.
 Slater, K. R., c/o Australian Petroleum Co., Port Moresby, Papua.
 Smith, Warren Frederick, 14 Myrna Rd., Strathfield.
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 Street, The Hon. K. W., Chief Justice of N.S.W., 2 Greenoaks Ave.,
 Edgecliff.
 Todman, R. G., "Meridin," 328 Edgecliff Rd., Edgecliff.
 Troughton, Ellis Le Geyt, F.R.Z.S., Australian Museum, Sydney.
 Turner, W. H., 15 Sutherland Rd, Chatswood.
 Vickery, Ottomar George, 63 Pitt St., Sydney.
 Ward, Melbourne, F.R.Z.S., Gallery of Natural History and Native Art,
 Medlow Bath, N.S.W.
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 Woolacott, Mrs. L. H., 11a Everview Ave., Mosman.
 Worrell, E. F. A., Ocean Beach Aquarium, Umina, Woy Woy.
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 G.P.O. Box 36, Sydney.

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 Berckelman, Miss Edith M., 29 Bradley's Head Rd., Mosman.
 Berne, Norman, 3 Duntroon Ave., Wollstonecraft.
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 Beswick, G. H., LL.B., 282 George St., Sydney.
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 Campbell, Miss J., 39 Derwent St., Glebe Point.
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 Campe, Mrs. I., 64 Tindale Rd, Artarmon.
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 Chapman, Miss Julia Ann, c/o Francis Chapman Sons & Deekes Ltd.,
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 Clark, Roland C., 33 Kardinia Rd., Mosman.
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 Clayton, Charles, c/o Printers Pty. Ltd., P.O. Box 36, Waterloo.
 Clayton, Mrs. C., 42 Rickard Ave., Mosman.
 Clemens, Miss A. M., c/o Sister May, 2 Bradleys Head Rd., Mosman.
 Clyne, The Hon. Daniel, 29 Farleigh St., Ashfield.
 Collett, Sister M., Donald St., Greenwich.
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Coppleson, Dr. V. M., 225 Macquarie St., Sydney.
 Cornell, V., 10 Lennox St., Mosman.
 Crowley, V., Palmgrove Rd., Avalon Beach.
 d'Alpuget, Miss B., Apartment 8, 40 Blue's Point Rd., McMahon's Point.
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 Denham, H. H., 463 Willoughby Rd., Willoughby.
 Desmarchelier, Theo, 3 Flat, 11 Bradleys Head Rd., Mosman.
 Dewhurst, Norman, 2 St. Elmo St., Mosman.
 Dobson, Roderick, 44 Junction Rd., Wahroonga.
 Done, Herbert Stanley, Rockley St., Castlecrag.
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 Drake, J. M., 40 Burrawong Ave., Clifton Gardens.
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 Dwyer, John Edward, 6 Simpson St., Mosman.
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 Evans, Raymond, "Garth Craig," 6 Flood St., Clovelly.
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 Farleigh, Miss K. M., 32 Kardinia Rd., Mosman.
 Fell, John W., 15 Silex Rd., Clifton Gardens.
 Ferguson, George A., c/o Angus & Robertson Pty. Ltd., 89 Castlereagh
 St., Sydney.
 Firth-Smith, W. A., 145 Darling Point Rd., Darling Point.
 Finckh, Dr. E. S., No. 1 Valley Rd., Lindfield.
 Finckh, E. V., 1 Valley Rd., Lindfield.
 Fisk, William James, 18 Moore St., Campsie.
 Fitzhardinge, Miss Julie G., 19 Beecroft Rd., Pennant Hills.
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 Francis, James John, 3 Castlereagh St., Sydney.
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 Galvin, P. F., 15 Thompson St., Mosman.
 Garrard, Thomas A., c/o Australian New Zealand Bank, Ltd., Banks-
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 Gates, Edward Roy, 98 High St., Willoughby.
 Gatliff, Henry Ernest, 82 Raglan St., Mosman.
 Glauert, L., F.R.Z.S., Western Australian Museum, Perth.
 Gollin, Mrs. B., Flat 65, 4 Macleay St., Potts Point.
 Goodman, C. W., c/o Quarrymans Hotel, Harris St., Sydney.
 Graham, F. A., 115 St. George's Cres., Drummoyne.
 Green, R. Rae, 5 Whiting Beach Rd., Mosman.
 Gregory, Mrs. Hilda, 2 Musgrave St., Mosman.

Hall, Nancy Myra, "Lynwood," 1 Major St., Mosman.
 Halloran, Dr. Garnet, F.R.Z.S., 143 Macquarie St., Sydney.
 Harris, Dr. Clive, 235 Macquarie St., Sydney.
 Harrison, Dr. J. L., 4 Thompson St., Clifton Gardens.
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 Heath, Gladstone Hodsoll, 3 Thompson St., Clifton Gardens.
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 Heyde, Charles William, 216 Nicholson Pde., Cronulla.
 Higgs, A. B., 4 Milton Ave., Mosman.
 Hill, A. C. W., 115 Pitt St., Sydney.
 Hill, Miss Jean B., 115 Pitt St., Sydney.
 Hill, Mr. F. T., 21 Coolawin Rd., Northbridge.
 Hindwood, Keith Alfred, F.R.Z.S., Wingello House, Angel Pl., Sydney.
 Hirst, Brian, Pine Ridge, Castle Hill.
 Hirst, Edward, "Burraburoo," Wellington Rd., Gulgong.
 Hockings, Arthur Thornton, G.P.O. Box 1761, Sydney.
 Holland, E. F., 76a Ninth Ave., Campsie.
 Hooke, R. W., 34 Thompson St., Mosman.
 Hooke, R. Waldron, 34 Thompson St., Mosman.
 Hordern, Anthony, 7 Holt St., Double Bay.
 Hudson, William Arthur, 40 Bradleys Head Rd., Mosman.
 Hughes, John, 58 Rosebery Rd., Killara.
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 Hunt, W. L., 27 Hunter St., Sydney.
 Huntington, G., 69 Bay St. Mosman.
 Inglis, Eric, 57 Nixon St., Surry Hills.
 Ivey, Miss Lily, 15 Gladswood Gardens, Double Bay.
 Jenkinson, Mrs. M., 326 Victoria Rd., Marrickville.
 Jervis, Mr. T. H., 74 Roseville Ave., Roseville.
 Johnson, Mr. A. C., 693 Anzac Pde., Maroubra.
 Johnson, Geoffrey Alan, 546 George St., Sydney.
 Johnson, Mrs. M. B., Flat 3, Coonanbarra Rd., Wahroonga.
 Johnstone, G., 12 Larool Ave., Lindfield.
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 Jones, J. C., P.O. Box 9, Biggerden, Q'land.
 Jones, Miss Valmai, 14 Middle Head Rd., Mosman.
 Judd, Everard, 24 Bradley's Head Rd., Mosman.
 Kater, Dr. Norman M., 146 Wolseley Rd., Point Piper.
 Kay, Mrs. F., 358 Victoria Rd., Marrickville.
 Keighley, Frank M., Golden Valley, Sutton Forest.
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 Kelly, Barry, 80 Mintaro Ave., Strathfield.
 Kennedy, Miss Grace, 80 Warrane Rd., East Willoughby.
 Kerslake, Mrs. Joy, 29 Nundah St., Lane Cove.
 Kerslake, Richmond, 29 Nundah St., Lane Cove.
 King, Ambrose, 116 Croydon Rd., Croydon.
 Kinghorn, James Roy, F.R.Z.S., Australian Museum, Sydney.
 Kleckham, F. H., Lorengau, Manus Island, T.P.N.G.
 Kleckham, Mrs. F. H., Lorengau, Manus Island, T.P.N.G.
 Krug, G., 22 Bradley's Head Rd., Mosman.
 Lanceley, Edward J., 22 Lucknow St., Willoughby.
 Langmuir, Ronald John, 26 Strickland St., Rose Bay.
 Laseron, C. F., 15 Hill St., Balgowlah.
 Laseron, John, 15 Hill St., Balgowlah.
 Lavett, J. K., Box 4256, G.P.O., Sydney.
 Lawson, Albert Augustus, Harden Rd., Artarmon.
 Lawson, Miss E., 30 Thompson St., Mosman.

Leeds, Richard Alan, Warana, Wyandra, W. Line, Q'land.
 Levitt, Miss D. C., 94 Rossmore Ave., Punchbowl.
 Levitt, Miss V. C., 94 Rossmore Ave., Punchbowl.
 Lewis, George Owen, c/o Tooth & Co., Kent Brewery, Sydney.
 Lions, Mrs. F., 160 Alt St., Haberfield.
 Lippmann, Herbert Maximilian, 14 Buena Vista Ave., Mosman.
 Llewelyn, Arthur Stuart, 131 Pitt St., Sydney.
 Lloyd, Miss Edith Florence, c/o Sister May, 2 Bradleys Head Rd.,
 Mosman.
 Lough, E. R., 12 Burrawong Ave., Mosman.
 Loveday, G. C., 28 Kardinia Rd., Clifton Gardens.
 McAllister, V. L., 15 Prince Albert St., Mosman.
 McAlpine, D. K., 12 St. Thomas St., Bronte.
 McColl, S., G.P.O. Box 5003, Sydney.
 MacCulloch, Dr. H. T. C., 76 Boulevard, Lewisham.
 Macdonald, A., 11 Bradleys Head Rd., Mosman.
 McDonald, Mr. A., 33 Massey St., Gladesville.
 McDonald, Robert William, 20 Saville St., Gore Hill.
 McGill, Arnold Robert, 119 Wollongong Rd., Arncliffe.
 MacIntosh, Dr. Neil W. G., 35 Benelong Cresc., Bellevue Hill.
 MacNamara, John, 46 Alt St., Ashfield.
 Mackillop, F. C., "Cumbrae," Ellamatta Ave., Mosman.
 Mackillop, J. A., F.R.G.S., No. 6 Clytha House, Thrupp St., Neutral Bay.
 MacKenzie, Mrs. V. J., 17 St. Neot's Ave., Potts Point.
 McMaster, Sir Frederick Duncan, "Dalkeith," Cassilis, N.S.W.
 McNeill, Frank A., Australian Museum, College St., Sydney.
 McRae, Colin, 1 Bradleys Head Rd., Mosman.
 McRae, David Beattie, 1 Bradleys Head Rd., Mosman.
 Maher, S., 48 Sir Joseph Banks Rd., Bankstown.
 Marks, L. W., 58 Parriwi Rd., Mosman.
 Marr, Sir Charles, Telegraph Rd., Pymble.
 Mathews, R., 730 Princes Highway, Sylvania.
 Matthews, Bert, "Petgar," West Street, Brookvale.
 Mayer, Matron E., 25 Homebush Rd., Strathfield.
 Meale, Kenneth Harold, 27 Norma Ave., Eastwood.
 Mell, Miss E. E., c/o Sister May, 2 Bradleys Head Rd., Mosman.
 Mellor, Walter L., 437 Forest Rd., Penshurst.
 Micholson, Julius Charles, 9 Whiting Beach Rd., Mosman.
 Miller, Don, Old Northern Rd., Glenorie.
 Milne, Allan Eden Furley, 641 Pacific Highway, Mount Colah.
 Milne, Mrs. J., 21 Joubert St., Hunters Hill.
 Monaghan, R., 3 Rockwell Cresc., Potts Point.
 Moore, Harold Hamilton, 6 Mudies Rd., St. Ives.
 Moore, William Robert, 12 Kywong Ave., Pymble.
 Morgan, Frederick E., 324 Pitt St., Sydney.
 Morley, W. A., 50 Kingslangley Rd., Greenwich.
 Murnin, R. B., 12 Macleay St., Potts Point.
 Murray, Prof. P. D. F., Challis Professor of Zoology, Dept. of Zoology,
 University of Sydney.
 Murray, R. J., 198 Princes Highway, Carlton.
 Nash, Robert L., 2 Lennox St., Mosman.
 Neill, Miss Frances F., 13 Bradleys Head Rd., Mosman.
 Nettheim, R. F., 21 Thompson St., Mosman.
 Nevill, J. J., 26 Prince Albert St., Mosman.
 Noble, Rupert F. S., 5 Prince Albert St., Mosman.
 Oatley, Percy Allan, 4 Prince Albert St., Mosman.
 Oberg, Olaf D. A., C.M.G., Gardeners Rd., Mascot.
 Ongley, W. S., 47 Wollongong Rd., Arncliffe, N.S.W.
 Orsben, Henry Joseph, 43 Bradleys Head Rd., Mosman.
 Palmer, Lynton Edward, 96 Pitt St., Sydney.
 Parle, P. O., 11 Lennox St., Mosman.

Parrott, Arthur W., "Lochiel," Wakapuaka Rd., Kira R.D., Nelson,
 New Zealand.
 Paterson, J. G., 21 Kardina Rd., Mosman.
 Paton, F. A., 46 Birriga Rd., Bellevue Hill.
 Patten, Miss Mary Kathleen, 27 Rickard Ave., Mosman.
 Patten, Robert A., P.O. Box 1, Mosman.
 Patterson, William, 14 David St., Clifton Gardens.
 Pearson, Richard Browning, "Nelgowrie," Coonamble.
 Percy, Dr. C. E., Flat 2, 4 Thompson St., Mosman.
 Perry, Leonard John, 9 Thompson St., Mosman.
 Pescott, Miss Beverley May, 32 Kardinia Rd., Mosman.
 Pescott, Miss Joscelyn Farleigh, 32 Kardinia Rd., Mosman.
 Pescott, J. M., 32 Kardinia Rd., Mosman.
 Peters, Robert E., 2 Simpson St., Mosman.
 Phillips, Edward Arthur, 68 Prince Albert St., Mosman.
 Pilcher, James E. H., St. Ann's Morella Rd., Clifton Gardens.
 Playoust, Maurice, 22 Prince Albert St., Mosman.
 Pockley, Dr. Eric, Avalon Pde., Avalon Beach, N.S.W.
 Poolman, Noel K., 6 St. Elmo St., Clifton Gardens.
 Powell, F. D., 9 David St., Clifton Gardens.
 Ramsay, J. S. P., "Kalia," Gale St., Woolwich.
 Raper, Leonard Francis, P.O. Box 284, Lismore.
 Raves, Victor Sydney, Craig Athol, 18 Burrawong Ave., Clifton Gardens.
 Raves, J. V., 18 Burrawong Ave., Clifton Gardens.
 Rayment, Mrs. R. E., 17 Muston St., Mosman.
 Read, B., 17 Pine St., North Sydney.
 Richardson, Harold R., 181 Clarence St., Sydney.
 Rigby, Alfred Leslie, 17 Castlereagh St., Sydney.
 Robbins, D., 50 Dennis St., Lakemba.
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 Robertson, Stanley Gladstone, 42 Prince Albert St., Mosman.
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 Ruthven, G. H., 4 Thompson St., Clifton Gardens.
 Sachisthal, N. A., Charlton Boys' Home, Avona Ave., Glebe Point.
 Sampson, Mrs. R., 102 Birrell St., Waverley.
 Sargeant, L. J., 35 Gladstone St., Parramatta.
 Sargeant, L. T., 42 Brickfield St., Parramatta.
 Saunderson, M., Terranora Bldgs., 29 Reiby Pl., Sydney.
 Sayers, E. C., 87 Eddy Rd., Chatswood.
 Scammell, George, 7 David St., Clifton Gardens.
 Scammell, R. B., 10 Buena Vista Ave., Clifton Gardens.
 Scott, Alban Edward, 72 Middle Head Rd., Mosman.
 Scott, George, 19 Kardinia Rd., Clifton Gardens.
 Selby, Mrs. Barbara, 7 Fisher Ave., Vacluse.
 Shaffran, John, 9 St. Elmo St., Mosman.
 Shaw, C. Vernon, 61 Concord Rd., Concord.
 Shaw, Douglas John, 28 Prince Albert St., Mosman.
 Shellshear, Professor Joseph L., "Struan," Gladstone Rd., Leura.
 Shirley, William Lancelot, 41 Clifford Ave., Fairlight.
 Simpson, W. H., 2 Effingham St., Mosman.
 Slater, Ederic Sutherland, 16 Prince Albert St., Mosman.
 Smith, Colin Campbell, 46 St. Thomas St., Waverley.
 Soady, Miss Mary E., c/o Union Trustees, 2 O'Connell St., Sydney.
 Spain, Ian Alfred Hamilton, "Ulundri," Old Castle Hill Rd., Castle Hill.
 Spencer, Jack L., 21 David St., Mosman.
 Stark, Mrs. M. L., 14 Pacific Pde., Dee Why.
 Stedman, Frank Milton, 19 David St., Clifton Gardens.

Stephen, Alfred Ernest, G.P.O. Box 1158, Sydney.
 Stephens, Henry John, 41 Lords Ave., Asquith.
 Stewart, Prof. James Douglas, Gladswood House, Gladswood Gardens,
 Double Bay.
 Stinson, E. R. D., 48 Raglan St., Mosman.
 Stott, S. G., 2 David St., Clifton Gardens.
 Strempel, E. A., c/o Adelaide S.S. Co. Ltd., G.P.O. Box 1535, Sydney.
 Swords, Miss Freda, 12 Carr St., Waverton.
 Tait, George Edward, 35 Moruben Rd., Mosman.
 Tansley, H. E., 50 Bradleys Head Rd., Mosman.
 Taylor, Dr. Arthur Thornton, 175 Macquarie St., Sydney.
 Thellefsen, E. S., c/o Royal Danish Consulate, 56 Hunter St., Sydney.
 Thomas, Mrs. Dorothy, R.M.B., 128 Nelson Rd., Nelson, via Riverstone.
 Thomas, Mrs. Madge Isobel, "Antheor," Rickard Ave., Mosman.
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Department of Harbours & Marine, Edward St., Brisbane, Queensland.
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 Turnidge, Frederick, 17 Tycannah St., Northbridge.
 Waite Agricultural Institute, University of Adelaide, Adelaide.
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CONTENTS

	Page
Seventy-fourth Annual Report	1
Presidential Address	2
Officers for the Year 1954-55	3
Revenue Account	4
Balance Sheet	5
Obituary	7
Reports of Sections	8
Syllabus of Sectional Meetings	13
Junior Members' Study Group	14
Papers:	
A Revision of the Genus <i>Pseudechis</i> , by R. D. Mackay ..	15
The Australian Netting Spider, <i>Deinopis subrufus</i> , by N. L. Roberts	24
Bellingshausen in Australia, by T. Iredale	34
Bill Moults in Prions, by T. Iredale	37
Notes on the Breeding of the Scarlet Chested Parrakeet, by F. J. Blaxland	37
A New Elapine Snake from Queensland, by E. Worrell ..	41
Taxonomic Notes on Fishes, by G. P. Whitley	44
Observations on an Eel-Goby, by E. A. Nicholson	58
Tragedy on the Walls, by T. Rayment	59
Historic Pole 346, by T. Rayment	63
Note on the Distribution and Host of <i>Hyptiogaster inaequalis</i> Turner, An Australian Gasteruptionid (Evanoioidea), by A. W. Parrott	68
The Marine Zoologist [Special Supplement], Vol. 1, No. 3 ..	70
The Genus <i>Tolema</i> and Its Allies, by C. F. Laseron	70
Descriptions of the Animals of Three New South Wales Cowries, by K. Rutland and J. Kerslake	75
Adelaide, Gales and Shells, by K. Rutland	76
Note on <i>Haurakia trajectus</i> , by J. Laseron	77
The Identity of <i>Phasianella virgo</i> , by C. F. Laseron	77
On <i>Sepia cultrata</i> Hoyle, by T. Iredale	78
Coral Dwellers, by L. Woolacott	79
Rissoid Sectional Names, by T. Iredale	81
List of Members	82