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CONCHOLOGICAL SOCIETY
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SOUTHERN AFRICA

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Afrivoluta pringlei Tomlin 1947

THE FAMILY CYMATIIDAE IN SOUTH AFRICA

by R. N. Kilburn.

This is the first in a series of four articles, based on a talk given to the Natal Midlands Group of the Society in February. The subject matter has been divided as follows:-

- Part 1. Introduction.
- Part 2. Annotated checklist (with chief synonyms and references to published figures) and bibliography.
- Part 3. Subfamily Charoniinae.
- Part 4. Subfamily Cymatiinae.

Part 1 Introduction.

Characteristics of the Family.

- (1) Spire usually high and conical.
- (2) Siphonal canal well-developed, often long.
- (3) No anal canal (present in the related family Bursidae).
- (4) Varices normally well-developed; often nodular, but never spinous.
- (5) Lips of aperture with folds or teeth in most cases.
- (6) Sculpture often coarse, dominantly spiral, but often nodular.
- (7) Periostracum often very thick and bristly, serving as camouflage.
- (8) Operculum thick and horny, often markedly too small for the aperture, nucleus variously placed.
- (9) Members of the family range in size from less than an inch to 18 inches in length.

Distribution.

Mainly tropical or warm temperate in distribution, although some live in cold temperate or even sub-antarctic waters. Out of the 32 species and subspecies here accepted as occurring in South Africa, only 5 are strictly endemic, while 3 more extend to Mocambique; moreover several of these are merely subspecies of species occurring in other parts of the world. The remaining 24 are

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all of Indo-Pacific distribution, except for one (Charonia lampas) which is a West-African/Mediterranean form.

Many members of the family are exceedingly widely distributed, due to the long larval stage which enables them to be easily spread by ocean currents. Thus a large number of Indo-Pacific species are also to be found in the Caribbean region, while others are almost cosmopolitan in occurrence. However, distribution is often discontinuous, and the resulting isolation of populations has sometimes resulted in the evolution of distinct subspecies, distinguishable from each other by small details only. In the past such subspecies have usually been regarded as fully fledged species, and it is only now that the group is being examined on a world-wide basis that true relationships have become apparent. Thus the well-known South African Charonia pustulata is no longer regarded as a full species, but as a subspecies of the Mediterranean/West African C. lampas (cf. Beu, 1970). Such name changes are to be expected in many other species as well.

Habitat

Occur from low tide down to 300 fathoms. Details of habitat vary with species, but the following generalisations may be made:

- (a) shelter from wave action is sought, and specimens will not be found in exposed areas, except as a result of an accident;
- (b) situations are chosen which are submerged (or at least moist) at low tide, such as rock pools, gulleys, caverns, etc;
- (c) the open coast or sheltered bays are preferred to river mouths (although a few species may be found at the mouths of large estuaries) - this indicates that they are sensitive to salinity;
- (d) smaller species live chiefly under rocks and in crevices, but larger ones, and those with long siphonal canals, live by preference partly or wholly buried in sand, except in very sheltered areas.

Feeding.

As far as is known most members of the Cymatiidae are active carnivores. Possible exceptions are Argobuccinum and Mayena, which appear to be scavengers, at least on occasion. The true tritons (Charonia) are known to feed on echinoderms (starfish, sea urchins and sea cucumbers). Some members of the genus Cymatium feed on tube worms or ascidians (the "red bait" of South African anglers), and might be regarded as "grazers" (Laxton, 1971), but most seem to prey on other molluscs (including cones and other Cymatium spp.)

Feeding behaviour in various molluscivorous Cymatium spp. has been studied in Hawaii by Houbrick & Fretter (1969). They found that these species made use of their acidic saliva to paralyse their prey. On locating its victim, the Cymatium would protrude its proboscis, which was then introduced into the mantle cavity of the prey-animal. A quantity of venom was then ejected (presumably at the region of the gill, where it would be rapidly taken up by the thin-walled efferent blood vessel.) The prey would then quickly withdraw into its shell, but after a short while relax once more. If rescued at this stage it will recover, showing that the saliva is at normal concentrations non toxic. The Cymatium would grip the shell with its foot, insert the proboscis once more, rasp off pieces of flesh by means of the radula and jaws.

Feeding behaviour of several species preying on ascidians and

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others on echinoderms has been reported on by Laxton (1971). A hole is simply cut in the test with the jaws and the proboscis introduced. In those species which feed on echinoderms the anaesthetic effects of the saliva are probably unimportant, while its acidic nature will be of great value in rasping through the hard calcareous test of the prey. This may in fact prove to have been the original function of the saliva, as a similar secretion is produced by members of the related family Cassididae, which seem to feed exclusively on echinoderms.

Reproduction.

As in all advanced prosobranchs the sexes are separate, and in a few cases at least can be separated by shell features. Fertilization is internal, and the eggs are enclosed in protective capsules.

Egg capsules are vase-shaped, with thin transparent walls and flattened, expanded bases. Two types of egg masses occur:

- (1) Capsules attached directly to the substratum in simple sheets or clusters;
- (2) Capsules line the inner surface of a fibrous cup-shaped structure; this is formed by the mollusc laying a cluster of capsules on the substratum in a tight spiral to form the bottom cup, then building up the sides by attaching further rows of capsules at an angle to the anchoring ones so that their flattened bases form the walls of the cup (Laxton 1969).

Each capsule contains numerous eggs, sometimes several hundreds, all of which develop (unless defective). This contrasts with the position in many higher gastropods (including the Bursidae) where a proportion of eggs (nurse eggs) in each capsule are sterile, serving as food for the developing embryos. The female sits on the egg mass until they hatch (1-3 months), during which time she does not eat (Laxton, 1969); similar behaviour is only known in the Cypraeidae, Cephalopoda and in one species of Bullia. The eggs hatch as free-swimming larvae (veligers) and complete their development in the plankton. This planktonic phase may be very long - over 3 months in Cymatium parthenopeum, according to Scheltema (1966). Although it has been claimed that an Australasian species undergoes direct development (eg. the young hatch from the capsules in the crawling stage), this has recently been queried.

Classification.

In a relatively large and complex family such as the Cymatiidae, it is convenient to have some method of grouping genera into workable units. Unfortunately the only available systems produces rather artificial results, indicating that correlation of shell, radular and opercular characters on a broad basis is not practical. I personally prefer the following classification:

Subfamily Cymatiinae : egg capsules formed into a cup-shaped mass; protoconch papilliform.

Subfamily Charoniinae : egg capsules laid in a simple sheet or cluster; protoconch conical or domed.

(Note: References will be given in part 2 of this series).

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ANNUAL GENERAL MEETING:

Notice is hereby given that the Annual General Meeting of the Society will be held on Tuesday, 24th August, 1971 in the Lecture Hall of the S.A. Museum immediately following the Ordinary Meeting which will commence at 8.15 p.m.

Annual General Meeting to be held on Tuesday, 24th August, 1971 in the Lecture Hall of the S.A. Museum at 8.20 p.m.

A G E N D A

1. Minutes of the previous Annual General Meeting as published in Circular No. 122 of September, 1970.
2. Matters arising from those minutes.
3. Consideration of the Reports of the Secretary and Treasurer.
4. The adoption of these reports.
5. Any other business.
6. Vice-Presidents address.
7. Election of the Council.
8. Tea.
9. Shells for display Lambis and Strombus.
10. Film - The Shadow of Progress.

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Secretary's Report for the year ended 30th June, 1971.

I have pleasure in presenting this our thirteenth annual report.

Membership. It was with regret that we recorded the death of three members during the year. Our President, D.H. Kennelly, passed away, after a short illness, in February, 1971. This was a great loss, not only to the Society, but also to South African conchology. The Border Group Council Representative, Mrs. Maimie Rix passed away suddenly in November, 1970, and Transvaal member, Michael Cantor, was tragically killed in a motor accident in August.

The total membership of the Society continues to increase. During the year under review 59 new members were elected, this being three more than last year is a very encouraging figure. However, against this figure must be offset the members lost during the year. A total of 28 members were lost, thereby leaving a net increase of 31. The position of our membership at 30th June was:

	<u>At 30/6/70</u>	<u>Additions</u>	<u>Losses</u>	<u>At 30/6/71</u>
Honorary	2	-	1	1
Life	6	1	-	7
Ordinary	209	48	25	232
Student	18	11	2	27
Institutions	9	-	-	9
	<u>244</u>	<u>60</u>	<u>28</u>	<u>275</u>

During the year one Student Member transferred to Ordinary Membership, and one Ordinary Member transferred to Life Membership.

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The Council. The year has seen some changes to your Council. With the acceptance of the new constitution in February, the old system of having Country Council Members fell into disuse. In place of this the Groups are now represented by Regional Council Members. To inaugurate the new system, Mr. Jenner and Mrs. Gilmer were co-opted to the Council as soon as the new constitution was adopted to represent the Transvaal and Border Groups respectively. On the resignation of Mr. Jenner, his successor as Chairman of the Transvaal Group, Mr. E. Ralph, automatically became Regional Member in his stead. The Council have recently co-opted Mr. J. Scheepers, Chairman of the Durban and Natal Coast Group, to represent members of that Group.

Mrs. Connolly decided that, after an unbroken period of nearly ten years on the Council, she was entitled to a break and resigned in January, 1971. Professor J. Mallory was co-opted to fill the vacancy caused by this resignation.

I am happy to report that although Mrs. Connolly no longer serves on the Council she is as keen and as active as ever and is only too willing to assist whenever possible. On behalf of the Society I would like to thank Mrs. Connolly for her services over the years.

Activities. Apart from the very encouraging increase in membership, the formation during the year of two new groups indicates the continued growth of the Society, and a round up of the various areas is:

Cape Town Headquarters. Once again eleven meetings were held during the year, two of which were addressed by outside speakers, four addressed by members, four were discussion meetings and a film was shown at the eleventh. The attendance at the meetings was very disappointing, but has maintained an average figure.

Eastern Cape. This group was formed in Port Elizabeth, with an inaugural meeting in November, 1970 and regular monthly meetings since and reports from that area indicate that the members there are "getting cracking" with their studies and discussions. The membership in the Eastern Cape is steadily increasing and I would like to wish our "baby" the best of good shelling.

Border. Although this group suffered through the deaths of both Mrs. Rix and Mr. Kennelly they have not lost any of their enthusiasm, a factor for which this group are noted. At the present the Group are trying to build up a reference collection to help members with the identification of their finds.

Durban and Natal Coast. After a shaky period early in the year under review this group rallied and is again at full operational strength. Talks are being arranged for the monthly meetings and field outings are being undertaken.

Pietermaritzburg and Natal Midlands. As hinted in the President's review last year, this group was in fact formed in August, 1970. Regular monthly meetings have been held with talks on a variety of subjects allied to conchology.

Transvaal. As usual this group have been very active and at the moment are formulating plans to hold an exhibition later in the current year. There have been some changes in the local committee during the year and we wish the group every success.

Circulars. In addition to the publication of eleven circulars during the year, members were issued with an index covering circulars 100 to 120. Circular 121 saw the first issue of the "new look"

format, and, judging by comments received from members, the new form was well received. Two of the circulars each had a page of photographs and two issues had line drawings. We would like to have published more photographs but found that the cost was rather prohibitive. However, during the coming year we are hoping to be able to overcome the cost factor. Once again we would like to thank all those who continue to send in articles for publication. Without their help there would be no circular. The advertisement page appeared four times during the year. This is still struggling for survival and we are hoping that if we persist it will eventually come into its own.

Publications. Although no special publication was issued during the year there has been a steady demand for back copies of the circulars, as well as for the previous special publications. We can contribute this demand directly to the advertisement page where the availability of these publications has been brought to the notice of members. The Society has also made contact with a few Shell Dealers and is able to purchase various shell books on behalf of members from these dealers. A bulk order gives the Society a small discount.

Constitution. An Extraordinary General Meeting in February, 1971, saw the acceptance of the new constitution. This was the result of nearly two years work on the part of your Council, and was originally initiated to ease the day to day running of the Society's affairs. This has already proved its worth in the method of election of new members. There is no longer a delay of nearly two months as there was under the old constitution.

Finance. This delicate question will be dealt with more fully in the Treasurer's report. He is more qualified to speak on this matter than I and his report follows this.

Library. Departing from normal procedure the Librarian's report is incorporated here. During the year the following were acquired for the library.

- No. 213 The Living Cowries by C.M. Burgess
- 214 National Geographic Magazine - March 1969
- 215 A guide to the Sea Shore by Ray Ingle
- 216 Description of a New Cowry from Taiwan by Phillip Clover
- 217 The status of Gregariella simlicifilllis Barnard with records of Mytilidae from Southern Angola by B. Kensley and M.L. Penrith
- 218 The Veliger - from volume 12
- 219 Journal of the Malacological Society of Australia
- 220 A guide to Field Identification of Sea Shells of North America by R. Tucker Abbot.

Members once again made full use of this facility in that 82 books were loaned at the monthly meetings and 19 books were sent through the post to members outside Cape Town. I would remind members that the library is for the use of ALL, and that those outside Cape Town need only write in listing the books they require.

It was necessary to fine certain members again this year for the late return of borrowed books. This is something we do not like doing, but it must be remembered that some of the reference books are in demand and we often have waiting lists for them. Please, therefore, return your books when they are due, if no one else has requested them you can always taken them out again.

Generally the year under review has, all things considered, been a very successful year in the history of the Society, and I would like

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to take this opportunity of expressing the Society's gratitude to the Directors and staffs of the various museums throughout the country, for the use of their Lecture Halls, for our Group meetings, as well as the other organisations who so kindly allow our members to make use of their facilities.

Finally, I wish to thank the Vice-President and all members of the Council for their support and assistance during the year.

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Treasurer's Report for the year ended 30th June, 1971.

I present the following account for your consideration:

Income and Expenditure Account for the year ended 30th June, 1971

<u>1970</u>		<u>1971</u>
	<u>INCOME</u>	
45	Entrance Fees	43-00
322	Subscriptions	353-20
-	Life Membership Fee	25-00
55	Profit on sale of Publications	29-21
4	Library Fines	4-30
21	Interest	29-18
50	Donation	- -
2	Advertising Fees	7-00
24	Sale of Shells	- -
<u>523</u>	<u>TOTAL INCOME</u>	<u>490-89</u>
	<u>EXPENDITURE</u>	
238	Cost of Circulars (including postage and envelopes)	411-29
41	Secretarial Postages	67-69
42	Printing and Stationery	32-88
43	Library Expenditure	20-46
9	Bank Charges and Exchange	15-82
115	Library Cupboards	- -
5	Addressograph Plates	4-73
3	Sundry Expenditure	4-72
<u>496</u>	<u>TOTAL EXPENDITURE</u>	<u>557-59</u>
27	Leaving a DEFICIT to be carried to Accumulated Funds of: (1970 - Surplus)	66-70
	<u>Statement of Accumulated Funds as at 30th June 1971</u>	
664	Balance as at 1st July 1970	691-46
27	Less Deficit for the year (1970- Add Surplus)	66-70
<u>691</u>		<u>624-76</u>
<u>127</u>	Subscriptions paid in advance	<u>278-75</u>
<u>818</u>		<u>903-51</u>
	<u>Represented by:-</u>	
	<u>Cash</u>	
1	On hand	- -
88	Standard Bank of S.A. Ltd. (Current Account)	103-51
729	Natal Building Society (Savings Account)	800-00
<u>818</u>		<u>903-51</u>

Note:/

Note: The Library Books, Library and Reference Collection cupboards and saleable publications on hand were all written off at the time of purchase.

As you will have noticed from the above account the year under review ended with a deficit of R66-70. This was prophesied as early as February and is the reason why your Council has increased the subscriptions for the ensuing year. The main increase in expenditure has been the circulars and postages brought about by the increased postage rates. During the forthcoming year it is expected that certain expenses will again show an increase. These are:- a) Postages, because the present rates were not in operation for the full year and overseas rates have only just been increased, and b) Circular costs, because we have been fortunate during the past year in obtaining our paper and envelopes at a very much reduced rate through a member in the trade, but as this member has now moved away from Cape Town we will once again have to pay full prices for these commodities.

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MEETINGS:

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| Cape Town | Tuesday, 24th August 1971. Lecture Hall S.A. Museum. A.G. Meeting and film. |
| Port Elizabeth | Saturday, 4th September 1971. 4 Molsonder, 10th Avenue, Summerstrand at 2.30 p.m. |
| East London | Sunday, 29th August 1971. Lecture Hall East London Museum at 3 p.m. |
| Durban | Please contact Mr. Scheepers for details. |
| Pietermaritzburg | Saturday, 4th September 1971. Natal Museum 2.30 p.m. Bursidae and Colubrariidae. |
| Johannesburg | Friday, 27th August 1971. Theatre Hall, Shell House at 8 p.m. |

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Minutes of the meeting held at the S.A. Museum - 29th June 1971:

Mr. Freeman welcomed those present. Apologies were received from Mrs. Connolly, Mr. & Mrs. Carlsson, Bruce Campbell, Mrs. Mallory, Mr. & Mrs. Giles and Mr. Graham Ivy.

The minutes of the previous meeting, published in Circular No. 130 were taken as read.

It was announced that the July meeting would take place at U.C.T., where Professor Day would talk on "Biology of Marine Mollusca around the Cape"

Those members who brought shells for display each talked shortly on their respective exhibits.

After tea and biscuits there was a general discussion on the shells displayed and Mrs. Kerr also brought a number of photographs of shells that caused a good deal of comment and advice for future attempts.

The Annual General Meeting is to be held with our normal August meeting. The shells for display are to be Lambis and Strombus.

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Minutes of the meeting held at U.C.T. - 27th July, 1971.

Mr. Freeman welcomed those present and thanked Professor Day for offering to talk to the Society. Without further delay the meeting was handed over to Professor Day who kept us all entertained with a very informative talk which ended all too soon after an hour and a half. The talk was illustrated with slides. At the end of the talk Professor Day showed the members the methods used by him to photograph specimens.

ABOUT MEMBERS:

The following changes of address have been recorded.

- Mrs. A. Ritter, 62 Porter Street, Worcester, Cape.
- Mr. J. Walker, "Olympus", Boyes Drive, St. James, Cape.
- Mr. J.S. Dench, 1009 Kensington, North Ridge Road, Durban, Natal.
- Mrs. E. Lewis, Miss V. Lewis, Master G. Lewis and Master V. Lewis
71 Burt Drive, Cotswold, Port Elizabeth, Cape.

The following have been elected to membership:

- Mr. H. Narramore, 11 Jutland Crescent, Park Drive, Port Elizabeth.
- Mr. & Mrs. H.A. White, 31 Northumberland Avenue, Kabega Park,
Port Elizabeth, Cape.
- Mrs. E.F. Fraser, P.O. Schroeders, Natal.
- Mr. C.P. Fernandes, P.O. Box 1430, Lourenco Marques, Mocambique.
- Mrs. E. Coucum, 65 Whitman Street, Yeppoon, Queensland 4703,
Australia.
- Mr. J. Wuyts, Wetstraat 58, B-2000 Antwerpen, Belgium.

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EXCHANGE WANTED:

Mr. W.J. Dyer, "Pebbleways", 8th Street, Voelklip, Hermanus would like to obtain shells from Florida, U.S.A. and Sanibel Island.

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SECRETARY/LIBRARIAN.

Mrs. R.O. Carlsson
18, Tecoma Way
Pinelands, Cape
South Africa
Phone: Cape Town 53-1536

TREASURER/EDITOR

Mr. R.O. Carlsson
18, Tecoma Way
Pinelands, Cape
South Africa