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THE DISTRIBUTION OF SOUTH AFRICAN MARINE MOLLUSCS

by Prof. J.H. Day.

Knowledge of the distribution of a particular species adds greatly to its interest, it helps us to find more of the same kind and often it is a guide to its correct identification. A species such as *Murex ramosus* found in Natal but not in the Cape is probably an Indo-Pacific species found through the Indian Ocean to southern Japan and the Great Barrier Reef. If so, we can check the names used in different parts of its range and decide which of these is the correct one to use. Conversely species known from the tropical Indian Ocean should be searched for in Natal but are less likely to be found at Port Elizabeth and very unlikely to be found on the Atlantic coast. Distribution is an interesting and rewarding study but much bedeviled by changes in synonymy, incorrect identifications and records of dead shells obtained from salesmen and assigned to incorrect localities. In the early days collectors depended on sea captains to bring them new and interesting shells but where they came from was very doubtful. Collecting living animals is the only certain way of establishing exact records.

Sven Ekman, in 1935, first put our knowledge of marine distribution on a firm basis. He points out that present day distribution of marine animals depends primarily on evolutionary history for each species evolved only once in one place and from there it has spread out in all directions where there was no barrier for its distribution. In the sea such barriers are of course the land and usually, but not always, the wide oceans. Moreover each species is adapted to a special environment - a particular type of substrate whether rock or coral or sand, a particular type of food and above all by a particular range of sea temperature. Similar sea temperatures occur over wide areas of ocean so that a knowledge of the main ocean currents provides a general pattern of distribution in the sea.

The marine molluss evolve very slowly and fossil deposits in southern Italy show that many of the species which were present in the Miocene period some thirty million years ago are still found at present. But barriers to dispersal of marine animals have often changed markedly during the same period. If we wish to understand the distribution of present day species, genera and families we must be aware of the main geological changes which have affected the distribution of the continents and the sea routes available to

marine molluscs. I refer to what is known as the theory of continental drift. This theory was first put forward by Wegner many years ago but only recently has sufficient evidence been accumulated to make it generally accepted.

In the early Mesozoic era (about two hundred million years ago) in the Permo-Triassic period all the land masses of the globe were united into a giant land mass called Panthalassa with the Tethys Sea biting in between what later became Asia and Africa. By the end of the Jurassic the Tethys sea spread right along the equator dividing the northern land mass from the southern continents. These were breaking up with India drifting north and Australia-Antarctica to the south and west. By the end of the Cretaceous (about seventy million years ago) South America and Africa had been separated by the South Atlantic but Australia-Antarctica and South America were still united. Note that this would exclude the cold water of the west wind drift from affecting Southern Africa. One may speculate that at this time southern Africa was surrounded by fairly warm seas. One could speculate even further that warm water molluscs colonised the whole of Southern Africa. Since cretaceous times the climate differences between the tropics and the poles have become more marked and the Atlantic coasts of the Cape are colder than the South Eastern Cape. It is not suprising that the South African molluscan fauna is largely derived from the Indo-Pacific fauna which is the present day remains of the old Tethys Sea fauna.

Before making a detailed distribution of the South African fauna we must consider the ocean currents around our coasts. As is well known the tropical Mozambique current flows south between Africa and Madagascar bringing with it the tropical Indo-Pacific species as larvae. South of Madagascar it is joined by another branch of the South Indian Equatorial current and the two unite to form the Agulhas current which has a temperature of 25 degrees centigrade. This flows close along the Natal coast but further south it flows off shore along the edge of the continental shelf. The shelf becomes broader and broader so that the current is some forty miles off shore at Port Elizabeth and one hundred and twenty miles off shore at Cape Agulhas. The inshore waters between the Agulhas current and the coast are much cooler, usually 15 to 18 degrees as compared with 25 degrees centigrade in the core of the current. Some tropical Indo-Pacific species tolerate this cooler water but the bulk of the molluscan fauna from the Transkei to False Bay are endemic South African species.

The Agulhas current extends well south of South Africa and tongues of this warm water even join the South Atlantic well out at sea. Occasionally tongues of warm water are driven into False Bay by the south easterly winds and in summer one finds tropical forms like Argonauta and Janthina cast ashore at Muizenberg. Most of the year, however, False Bay is a mixture of cold and warm water and many west coast species are found there. On the Atlantic shores of South Africa from Cape Point to Walvis Bay there is upwelling of cold subantarctic water of between 8 and 12 degrees centigrade. This drifts north as the Benguella current. The molluscan fauna along these coasts consist almost entirely of endemics with a few southern ocean forms such as Aulacomya ater which is known from the Megellan area of South America. The paucity of cold water species may be a reflection of the fact that the molluscan fauna of South Africa is of warm water origin.

On the basis of the temperature differences between the ocean currents the late Professor T.A. Stephenson defined four faunistic provinces on the shores of Southern Africa. These are:-

- 1) The tropical fauna of northern Mocambique. Many of these species extend over the whole Indo-Pacific region while others are confined to the Indian Ocean or the tropical coasts of East Africa from the Red Sea to Mocambique and Madagascar. Within this region there are of course habitat groups on rocky shores, on sandy shores of lagoons and the special group which lives in mangrove swamps. Examples of marine molluscs on rocks and coral are Monodonta australis, Nerita albicilla, Littorina obesa, Cypraea arabica, Cypraea annulus, Cypraea moneta and predators such as Thais bufo. On sandy shores are Nassa arcularis, Polynices didyma and Volema paradisaica. In mangrove areas the fauna is limited but Cerithidea decollata and Littorina scabra are abundant. There are of course thousands of other tropical species. The fauna is very rich.
- 2) The subtropical fauna of Southern Mocambique, Natal and the Northern Transkei. This fauna includes many tropical species, many subtropical endemics and some warm water endemics whose centre of distribution is further south. Examples on rocky shores are Littorina africana, Nodolittorina natalensis, Cellana capensis, Cypraea caputserpentis, Drupa granulata and Conus ebraeus. On sheltered sandy shores such as Durban Bay the fauna includes Solen corneus, Lamya capensis and Nassa kraussiana.
- 3) The warm temperature fauna of the south coast extending from the Transkei to False Bay. This fauna includes only a few tropical and subtropical species but many endemic South African species. Some of these are restricted to the warm south coast but others occur all round South Africa from Natal to the cold waters of the Atlantic coast. Examples of species which are restricted to warm waters are Patella longicosta, Patella miniata, Oxysteles sinensis, Thais capensis and Cheronia pustulata on rocky shores and Solen capensis and Phalium zeylanica on sandy shores. Species which extend onto the cold west coast are Littorina knysnaensis, Patella cochlear and Turbo sarmaticus on rocky shores and Donax serra and Natica genuana on sandy shores.
- 4) The cold temperature fauna of the west coast extends from Cape Agulhas to Cape Cross north of Walvis Bay where it mixes with the tropical fauna of Angola and West Africa. It will be noted that there is also an overlap on the shores between Cape Agulhas and Cape Point. In warmer bays such as the Glencairn - Strandfontein stretch there is a majority of warm water species such as Patella longicosta and Oxysteles sinensis while on colder projecting headlands such as Cape Hangklip there are many typical west coast species such as Patella compressa, Burnupena delalandii on rocks and Bullia digitalis on the sand.

These faunistic differences on the shore are determined by differences in the surface temperature. The same temperatures prevail down to about 30 metres or the limits of the surf zone mixing. But of course molluscs live at much greater depths too; in fact down to the ocean abyss and different temperature conditions prevail at lower levels. In general temperatures are very uniform over larger areas. Shells brought up by fishing trawlers working in depths of 100 to 300 metres are different species from those on the shore. Trawlers working on Natal coasts bring up subtropical species such as the rare but beautiful Pleurotomaria africana which has not been recorded from the Cape. Cape trawlers working out of Port Elizabeth on the Agulhas bank and those from Cape Town working off Saldanha Bay bring up very similar species for the bottom temperatures are very uniform from about 11 to 14 degrees centigrade. There is in fact no sharp change in the molluscan fauna at such depths on the two sides of the Cape Peninsula. Species such as Neptuneopsis gilchristi, Fusitriton murrayi, Volucorbis abyssicola and Cypraea fuscorubra have a wide range.

EPITONIUM SCALARE LINNE - EXTENSION OF RANGE

by A.B. Jenner

Much has been written about Epitonium scalare Linné (Synonym E. pretiosa Lamarck) commonly known as the "Precious Wentletrap". There is little doubt that it is one of the most exquisite species in existence, and at one time, because of its beauty and rarity, was the most desirable and sought after of all shells.

According to available literature it is said to have been collected around Amboina and other Indonesian Islands. However, it is no longer rare since it is known also to occur in Japanese, Chinese, and Ceylonese waters as well as, in some abundance off the Eastern Australian coast. Its habitat thus appears to have been confined to the East, between about 75 and 160 degrees longitude.

Consequently it is considered to be of interest and importance that the finding of a living Epitonium scalare Linné off the East coast of Southern Africa be recorded.

Whilst holidaying on Magarugue Island, situated some 8 miles off Vilanculos on the Mocambique mainland in July 1973, Mr Bompani of Johannesburg, one morning decided to go in search of fish in the deep channel on the landward side of the island. During a dive to a depth of approx. 75 feet he noticed a beautiful white mollusc moving on the sandy bottom immediately ahead. The shell was brought to the surface and admired by several people. The animal was later removed and the specimen cleaned.

It measures 51,3 x 31,8 mm. The Natal Museum, Pietermaritzburg, confirms that it is a magnificent specimen of Epitonium scalare Linné.

The writer is informed that a broken example of the species has also been found in dredgings from Durban Bay.

It would be interesting to know if any other specimens of E. scalare have been taken in waters bounding Southern Africa.

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Symposium on the family Littorinidae.

A one-day Symposium on Taxonomic Trends in the Littorinidae was held at the Royal Scottish Museum, Edinburgh, on Tuesday, March 19th. The Symposium, the first restricted to this family of the prosobranch Gastropoda, was chaired by Sir Maurice Yonge and attended by 37 people with interests in the Littorinidae. Talks were presented on a range of littorinid topics; probably the most noteworthy contribution was unpublished evidence given by Dr. J. Heller that the polymorphic species Littorina saxatilis (Olivi) should be regarded as containing at least four separate species.

The meeting unanimously endorsed the suggestion that an informal Littorinid group should be formed, with an international membership, as far as possible comprising all workers actively interested in these gastropods. This idea had previously received postal support from over 20 others, mostly from abroad, who were unable to attend the meeting. Anyone wishing to learn more about the group should write to the appointed co-ordinator, Charles Pettitt, Manchester Museum, The University, Manchester M13 9PL, England.

At the meeting Mr Pettitt displayed a proof copy of the Indexed Bibliography of the Family Littorinidae (Gastropoda: Molluscs) 1758-1973, compiled by him and now published by the Manchester Museum (M.M. Publication N.S. 4. 74). This bibliography, printed in A4 size with "plasticised" covers, contains about 730 references to

world-wide Littorinidae; there is a subject and a general systematic index, with a special index of new generic and specific descriptions. The price is £0.75p. but the author has arranged that individual workers and members of recognised conchological societies may order a personal copy at cost price, 50p; to both prices should be added 8p. postage in U.K., and 15p. overseas. Requests should be sent to Charles Pettitt, at the above address; cheques etc. should be made payable to Manchester Museum.

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Changes of Address.

Mr & Mrs F.H. Vosloo, P.O. Box 134, Scottburgh, 4180.

Mr P.A. van der Westhuizen, 18 Laubscher Street, Kuruman, 8460.

Master D. Briscoe, 7 Pagen Rd., Mill Part, Fort Elizabeth, 6001.

Mr B. Lafferty, c/o 255 Paling Ave. North, Hamilton, Ontario, Canada.

Mr & Mrs G. Hyatt, P.O. Box 11, Plaston, 1244.

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New Members.

Capt. W.E. Owen, Master, m/s Loi Kim, c/o Hongkong Borneo Shipping Co. Ltd., 815, International Building, 141 Des Voeux Rd., C. Hong Kong.

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Exchanges Wanted:

Mr V. Scerri, 6 Dingli St., Sliema, Malta. Wants to exchange Mediterranean shells for local South African shells.

Mrs R. Krause, 7830 S.W. Pitic Lane, Portland, Oregon 97223, United States of America. Is interested in obtaining some South African Cypraea.

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Minutes of a meeting of the Society held on 27th August, 1974.

Mrs Carlsson opened the meeting in the absence of our Chairman, with a word of welcome to all present. Apologies were received from four members.

The minutes of the previous meeting, as published in The Strandloper No. 165, were taken as read and approved. There were no matters arising from those minutes.

There being no further business the meeting was duly closed.

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Minutes of the Sixteenth Annual General Meeting of the Society held at Cape Town on 27th August, 1974.

In the absence of the Chairman and Vice-President, Mr Carlsson opened the meeting with a word of welcome to all present. Apologies were recorded as having been received from Mr Freeman, Mr & Mrs Giles and Mrs Hart.

The notice convening the meeting, as published in The Strandloper No. 165 was read by the Secretary. The Secretary also read a message from Mr Freeman as follows:- "Please accept my most profound apologies for not attending this important meeting of the Conchological Society.

"It is particularly unfortunate that I am obliged to be elsewhere on this occasion when I ought personally to hand over the Chairmanship to my successor.

"I should like you all to know how much I have valued the honour you have done me by having me as your Chairman and Vice-President for so long.

"My contribution to the Society's progress has lately been negligible, due to other demands on my time and energies. This has obliged the other Council members to take over that much more responsibility and I am only too pleased publicly to pay tribute to the hard work and self-sacrifice of our Secretary and Treasurer who give so much of their spare time.

"I wish you well and I hope to see you again soon."

The minutes of the Fifteenth Annual General Meeting, as published in the Strandloper No. 165 were taken as read and adopted. It was noted that there were not matters arising from those minutes.

The report of the Secretary in respect of the year ending 30th June, 1974, as published in the Strandloper No. 165, was considered and formally adopted by the meeting.

The report of the Treasurer in respect of the year ended 30th June, 1974, as published in the Strandloper No. 165, was considered. Mr Carlsson, from the Chair, stated that the books had, in terms of the constitution, been scrutinised by two members of the Society. Miss F. Leers and Miss K. Leers were thanked for performing this task. The Chairman also informed the meeting that the books were available at the meeting to any member who wished to inspect them. The report was formally adopted by the meeting.

The Chairman announced that the following nominations had been received to fill the vacancies on the Council:-

President	Professor J.H. Day
Vice-President	Mrs M.C. Giles
Members	Miss K. Leers
	Mrs J. Watt
	Mr M.C. Giles
	Mr G. Verhoef
	Mr J. Watt

As the number of nominations received equalled the number of vacancies on the Council there was no necessity to hold a ballot. The other members of the Council are:-

Secretary	Mrs R.O. Carlsson
Treasurer	Mr R.O. Carlsson
Regional Members	Mr A.H. Adam (Transvaal)
	Mrs M. Latigan (Border)
	Mr A. McLachlan (Eastern Cape)
	Mr J. Scheepers (Natal)

The Secretary informed the meeting that a proposal had been received that Mrs H. Jefferies, of Kei Mouth, be elected as Honorary Member of the Society. She explained the procedure to be adopted to elect an honorary member. It was noted that the proposal had been unanimously approved by the Council. A vote was then taken and all members present voted in favour of the election of Mrs Jefferies as an Honorary Member.

There being no further business Mr Carlsson handed the meeting over to Professor J.H. Day, President of the Society, who addressed the members on "The Distribution of South African Marine Molluscs".

This talk, which was illustrated with slides, is published on page 1. Mr Kapp, on behalf of the members, thanked Professor Day for taking the time to prepare this talk and address the meeting.

After tea Mr Verhoef showed a film on a recent trip to the Seychelles, Hawaii and California. This film included shots of Dr Burgess, Mr P. Clover and Mr Summers. Mr Carlsson, in closing the meeting, thanked Mr Verhoef for once again entertaining us.

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Around the Groups.

Border Group, East London. Apologies were received from two members at our meeting of 4th August. A note of thanks from the Clifton School Mothers Group was passed around. This group had been addressed by Mrs Latigan during July. A sketch, by Mr. Brickhill, of Phenacovolva labroguttata Schilder, done on typing paper was shown to the meeting. It was felt that a definite badge should be used by the Group to identify themselves when dealing with outsiders.

As the idea was to bring guest speakers to the Group for talks in the future, ways and means of footing their transport bills was discussed. The Library was discussed, and new books belonging to the museum and Mrs Latigan were looked at and admired. Miss Eva promised to look into one of the publications for the Group. Members were encouraged to make use of our small library which is housed by Mrs Palmer. Any member who has an "old" discarded book on shells is most welcome to make a donation! The banning of Beach buggies in East London area, and the new sewerage farm at Shelly Beach were then discussed. No final decisions were reached.

Mrs Latigan then displayed blank check list forms. She explained that this project of ours would go a long way to help conchology. All shells, "live" or "dead" collected between Jeffery's Bay and the Natal coast were to be recorded. On Miss Evas' suggestion the Eastern Cape Group were to be approached to see if they were willing to help.

After tea members visited the Museum to see some of the shells kept in the reference collection.

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Natal Midlands Group, Pietermaritzburg. Our meeting of 3rd August was well attended. The shells for discussion were the Janthina - their biology and characteristics. It was interesting to note that there are five species of this world wide shell. Of these Janthina palleda was rare to our coastline as it is really an Atlantic species. Janthina reclusia is considered the rarest species of all. An interesting feature of this mollusc is that it produces fully developed young and does not lay eggs like other molluscs. And of course the Janthina secrete a purple dye which can be most effective when eluding its enemies.

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Eastern Cape Group, Port Elizabeth. With apologies from five members there were only five members and thirteen visitors at our meeting of 3rd August. Mr McLachlan extended a welcome to all visitors and commented on the fact that there were more visitors than members, and felt that our members were letting us down.

Mr McLachlan drew attention to the article in the Strandloper by Mr F. Greave on Marginella, and said he hoped more members would

endeavour to write articles for publication. Mr McLachlan advised that there had been a change in the scheduled talk and slide show in that Mr Allen and Mr van Niekerk, both members of the Diving Club, would be giving the talk. The talk in September would be by Mr A de Villiers of the P.E. Museum, on his trip to Gough and Marion Islands.

Mr McLachlan then gave a short talk on the family Trochidae or Top Shells which was the family for display and discussion.

A letter of thanks was read from the Secretary of the Y.M.C.A. thanking members of our Society for participating in the Hobbies Fair. This exhibition proved of great interest to the public and brought forth twenty-nine enquiries from interested people regarding membership of the Society.

Mr Allen then proceeded with a most interesting talk on his trips to Mauritius, Reunion and Mocambique which was combined with some excellent slides, the underwater series being of particular interest to members. After this Mr Allen also showed slides of our coast and several pieces of different corals which are to be found on reefs along our shores.

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Transvaal Group, Johannesburg. Our meeting of 23rd August was attended by 15 members and visitors. Apologies were received from five members.

No reports on recent shelling trips were forthcoming, but Mr Ruben took the opportunity to recommend a visit to the recently established Marine Aquarium at Pretoria.

The Chairman, Mr Adam, gave details of the methods to be adopted in drawing up locality checklists. As agreed at our previous meeting the family Mitridae was to be the first family considered. A comprehensive list of this family had been prepared by Mr Ralph to be used as a starting point for the entry of additional locality and species data, and Mr Ralph was asked to talk on his system of card indexing which had been used in the preparation of the list.

Mr Ruben gave a half-hour talk on the techniques of shell photography, illustrated by a number of his own slides. These he had chosen more to illustrate the faults that could be committed than as examples of the best that could be done. The talk was most stimulating and a considerable number of questions were asked from the floor.

At the conclusion of the talk a preliminary checklist panel was formed consisting of Dr van Hoepen, Mr Aiken and Mr Ralph, and the identification of Mitridae species brought by members and recording of locality data began. It seems that the project has got off to a good start although it became clear that it would be no light task and several meetings would be required before an initial list could be completed.

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Pretoria Group, Pretoria. With apologies from four, there were nine members and visitors present at our meeting of 21st August.

The Chairman open the meeting with a special word of welcome to three prospective new members. We were very pleased to see Miss du Freez again after her extensive tour of the United States. The minutes of the previous meeting were confirmed.

Mr Smith gave a talk on the new Aquarium at the National Zoological Gardens and told the meeting that the Charonia lampas pustulata

were mating and that several egg sacks were seen in the tank. The Tridacna was, at last, eating. It also appears that plans were afoot to acquire more live shells for the Aquarium.

Mr Smith and Mrs Wilson reported on the meeting of the Transvaal Group, held on 19th July, which they were able to attend. Mrs Adam had shown a number of close-up colour slides of molluscs. These proved to be most interesting and Mrs Adam is to be congratulated. The meeting decided unanimously to invite Mr and Mrs Adam to our next meeting.

After general discussion it was decided that each person present make a 10c contribution towards tea monies. Mr Jooste offered to donate twelve cups and saucers and Mr Smith twelve teaspoons. It was also agreed that, in order to swell the kitty, we all bring a few shells to the next meeting for a bring-and-buy. Another suggestion was that each member exhibits his or her favourite family at the last meeting of the year and that Mrs Boswell be asked to judge the exhibits.

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SUBSCRIPTIONS!!!

At the time of writing there are still 45 unpaid subscriptions. Will these forty-five members please note that unless their subscriptions have been received by the 30th September their membership of the Society will be suspended. This is, therefore, the last copy of the Strandloper that will be sent to you.

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MEETING:

The next meeting of the Society will be held on Tuesday, 24th September in the Lecture Hall of the South African Museum, Queen Victoria Street, Cape Town at 8.15 p.m. The shells for display and discussion will be the Muricidae as illustrated on pages 136 to 143 of Sea Shells of Southern Africa by E. Kensley. A film on "Diving amongst the wrecks of the Japanese Imperial Fleet which was sunk at Truk Island in the Caroline Group" will be screened.

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