



THE STRANDLOPER

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Afrivoluta pringlei Tomlin 1947

THE FEEDING OF GASTROPODS (continued)

by J.H. Day.

Gastropods with an anterior canal to protect the siphon are often called whelks. They are carnivorous and include both scavengers and active predators. Species of Burnupena such as B.lagenaria, in Natal, B.delalandii, on the west coast and, B.cincta, all round South Africa, are typical scavengers. If you crush a limpet or a winkle and drop it into a rock pool, you will see all the Burnupena start waving their siphons to locate the food and then start crawling towards it. Experiments have shown that there is a sense organ, called an osphradium, at the inner end of the siphon where it opens into the gill cavity and this is what detects the blood from the crushed limpet. Once Burnupena reaches the food it extends its proboscis with the radula at its tip and rasps away the flesh. If a dead fish is left in a rock pool overnight the skeleton will be beautifully clean the next morning. I have not tried cleaning shells in this way, but I think that if you boiled them, then enclosed them in wire netting and left them in a rock pool, it should work. Your family certainly won't miss the smell around the house! Burnupena will attack any weakened shellfish, and when limpets are damaged by oil washed ashore, Burnupena inserts its proboscis under the limpet shell and rasps at the foot until the limpet loosens its hold.

On sandy shores the main gastropod scavengers are members of the family Nassidae. The many species of Nassa live on sheltered sand banks in bays and estuaries, or deep below the surf in the open sea. Nassa speciosa is common on the sandy bed of False Bay, N.coronata is equally common in Delagoa Bay and N.kraussiana is abundant in all estuaries. There is some mystery here for N.kraussiana is really too common in weed beds. One suspects that it is omnivorous and takes plant as well as animal foods. The species Bullia live on surf beaches and have an extremely large foot to maintain their position on the sand when the waves cover them. Professor Alex Brown of the University of Cape Town has made an intensive study of Bullia. He finds that Bullia normally lies buried in the sand near low tide, with only its siphon projecting to sense the odour of dead fish in the waves. Dead fish, "blue bottles" (Physalia), jelly fish or old red bait are all attractive. The smell of carrion in the water will attract Bullia from quite a long distance along the beach. Bullia immediately emerges from the sand and spreads out its foot in the

backwash of the waves. The next wave rolls it up the shore and Bullia makes use of every side wash to approach the food and digs its foot into the sand to resist being swept further away. Soon many Bullia congregate and lurch up the beach to the stranded jelly fish or whatever, always guided by the odour in the water. Professor Brown tested many chemicals as attractants. He impregnated cotton wool with each test chemical and noted if Bullia moved toward it. If it did he decreased the concentration and in this way he showed that skatol, which gives the evil smell to many types of carrion, was effective in incredibly low dilutions. But cotton wool impregnated with skatol alone won't deceive Bullia. It won't extend its proboscis and attempt to feed on the cotton wool. To make it do this you must add one of the amino acids released by the decay of proteins. Then Bullia will happily attempt to eat the cotton wool.

Among the active predators are the Muricidae (Murex, Thais, Drupa, Urosalpinx etc.), the Cassidae (Xenogalea), the Naticidae (Natica and Polynices), the Cymatiidae (Argobuccinum, Charonia, Mayena and Cymatium), some of the Nudibranchs, Janthina which feeds on living "blue bottles" on the sea surface and many others. Many species specialise on one type of prey.

Thais, Drupa and Urosalpinx are typical drillers on rocky shores. Urosalpinx of course is the famous oyster drill which does a great deal of damage in American oyster farms and small numbers also occur in South Africa. Thais dubia drills holes in the shell of small barnacles, young Patella granularis and Littorina knysnaensis. In spring Littorinas congregate in crevices presumably to mate and on such occasions I have seen Thais dubia converging from all directions to join the crowd. Patella granularis eventually grows too thick a shell for T. dubia and younger ones often resist an attack. They either clamp down hard on the foot of the Thais or if Thais is on top they rock from side to side to dislodge it and then lifting up their own shells as a lady picks up her skirts they make off at high speed. We know a fair amount about T. dubia but we are woefully ignorant about the other species. Possibly T. cingulata feeds on mussels such as Aulacomya or Choromytilus for it occurs among them but it would be nice to be certain. And then what about T. squamosa, T. rudolphi, T. bufo and all the others? What do they prey on?

Dr. Carriker in the States has found that it takes a Thais several hours to drill a hole through a shell and many of the drills find it easier to drill through the horny operculum of a winkle. This makes one realise the value of the thick calcareous operculum which has been developed by species of Turbo.

The Cassidae and Naticidae prey on sand-dwelling animals. Xenogalea zeylanica ploughs its way through the sand with its siphon sticking up like a chimney. It feeds on "pansy shells", the flattened sea urchin Echinodiscus which lives just below the sand at low tide. Pansy shells which have been neatly drilled are common on the shores of Mossel Bay and Plettenberg Bay, for pansy shells live in thousands just beyond the breakers. Natica and Polynices also plough through the sand with their polished shells covered by the mantle. Both of them feed on burrowing bivalves such as Loripes, Tivela, Dosinia and Psammotellina. Small bivalves are just crushed by the jaw, but larger prey are held between the two sides of the foot while the radula bores a hole through the shell. According to Dr. Carriker not only the radula but also secretions of a special boring gland are used. The shell of a mollusc is composed of tiny crystals of calcium carbonate held together by an organic matrix. The secretions of the boring

gland dissolve the matrix and the radula scrapes away the loose crystals. So the two are used alternately and when Dr. Carriker fixed a microphone to the aquarium in which Natica was at work you could hear, very clearly: scrape, scrape, scrape ... scrape, scrape, scrape scrape, etc. He recorded the sounds on tape, and when he played it back next morning it became apparent that Natica had worked industriously all through the night, for it takes several hours to bore through a shell.

Cymatium, Argobuccinum, Charonia and Mayena are among the largest of the whelks and they tackle many types of prey. The giant Australian conch Charonia is famous for feeding on the crown-of-thorns starfish, which is doing so much damage to the Barrier Reef. Unfortunately we know very little of the habits of South African Cymatium. Jenny Day, my wife, has an interesting story to tell about Argobuccinum argus. It feeds on Gunnarea capensis, a worm which makes large sandy reefs on the rocky shores of the Cape. Each worm is protected in a hard sandy tube about the size of a pencil with a funnel shaped opening at one end through which the worm protrudes its head to feed. When attacked it draws back its head, which is covered with a crown of chitinous spines. It is thus safe from any ordinary predator. But Argobuccinum is not an ordinary predator. Like all whelks it has a long proboscis, tipped with a radula, and it can secrete both sulphuric acid and an enzyme which will dissolve protein. It inserts the proboscis into the worm's tube and pours in its secretions. These loosen the protective spines and partly digest the head so that the radula can then rasp away the rest of the body.

There must be equally interesting stories to tell about Charonia pustulata, Mayena gemmifera and the several species of Cymatium. Probably most of them feed at night but anyone who keeps them in aquaria until they are good and hungry and then tempts them with different types of foods, should be able to learn a lot.

The cones are the most famous of all the predatory gastropods. The radula teeth are elongated to form barbed darts and are stored in a packet next to a poison gland. When an unwary prey comes within reach, the poison darts are shot out and the prey dies within a few seconds. The infamous Conus geographus can poison a man. Conus striatus kills small fishes and then swallows them whole. Most cones prey on marine worms, but, unfortunately, no observations have been made on South African species. It is probable, however, that Conus mozambicus feeds on the mussel-worm Pseudonereis which is used by anglers as bait.

The most surprising of all the predatory gastropods is the pretty little pink nudibranch Melibe rosea. It has lumpy projections on its back and a queer hood, like an old-fashioned candle snuffer, over its mouth. Melibe is common in rock pools around the Cape and we kept one in an aquarium at the University, along with several other little animals, including some armadillo-like isopods which roll up into a ball with disturbed. These kept disappearing so we watched to see what was happening. We saw one creeping past the innocent Melibe when suddenly the "candle-snuffer" plopped down on top of him. Its edges were then drawn together and with one good crunch the poor isopod was gone and Melibe looked as innocent as before.

The plankton drifting in the sea provides food for a wide variety of marine animals from worms to whales. Among the molluscs, the bivalves have specialised as plankton feeders. Some are filter feeders, living on diatoms drifting in the water, and others are deposit feeders, using one of their siphons to suck up the diatoms

and microscopic fragments of sea weeds which have settled on the sandy bottom. A few gastropods have become filter feeders or deposit feeders. One of the best known is Crepidula, the slipper limpet, which incidentally changes its sex as it grows older. The common South African species is Crepidula porcellana which attaches itself to the shells of larger molluscs. Calyptraea chinensis (the Chinese hat-shell) is another filter feeder which lives on dead shells. Both of them use their gills for feeding as well as respiration. The gill hangs in the mantle cavity and water is drawn in from the left side and exhaled through the right. Inevitably sand grains are drawn in with the respiratory current but, as these are heavy, they fall onto the floor of the mantle cavity and are carried out by a ciliated gutter. In the filter feeding gastropods this system is slightly modified. The light food particles are drawn in with the respiratory current and caught on the gills and then drop down into the ciliated gutter. They are sorted from the heavier sand grains by weight, get mixed with a trail of mucus and this food-laden mucus string is led forward to the mouth. Obviously this lazy method of feeding does not require the animal to move at all and many filter feeders are sedentary like Crepidula and Calyptraea. Turritella carinifera lives so still in rock crevices that it is often overgrown by sponges. Turritella capensis lies half buried on sandy mud in quiet lagoons. It just makes a small depression with its foot so that the entrance to the mantle cavity is kept clear. Food particles drifting over the bottom are drawn in, sorted from the silt, and that is all that is needed. Vermetus actually attaches itself to a rock like a worm tube and has an even lazier method of catching food particles drifting in the waves. There is a mucus gland which opens just below its mouth and a thread of slime is formed and drifts out in the current. Food particles adhere to this sticky fishing line and at intervals the food-laden thread is drawn in the swallowed. Vermetus corallinaceus is gregarious and numbers of intertwining tubes form coral-like masses on low tide rocks around the Cape Peninsula. The many mucus threads which the animals produce hang down in the water, touch and join to form a net like a sticky spider web. The only problem is how they share the catch!

There are quite a number of deposit feeding gastropods in mangrove swamps including Cassidula labrella, Cerithidea decollata and Pyrazus palustris. Cerithidea of course climbs up the mangrove trunks, but actually feeds on the mud surface. Possibly the most abundant and widespread of all the particle feeders is the little pulmonate Assiminea. There are several species and millions of them, all about the size of match heads, can be found in estuarine salt marshes all round South Africa. They seem to have similar habits to Hydrobia ulvae which has been intensively studied in England. Hydrobia can be rafted over quite large distances by the tide. It clings to the surface film as the tide seeps over the mud and feeds on particles in the film while it is carried about, but it can drop off as the tide recedes below its preferred level. It also feeds on organic particles on the mud surface and, as most of these are derived from decaying plants, they are rich in carbohydrates but poor in protein. Hydrobia extracts the protein and voids the carbohydrate as faecal pellets. These, of course, accumulate and are attacked by bacteria some of which can fix atmospheric nitrogen and build it up into new protein with the energy derived from the breakdown of the carbohydrate. In time, back come the Hydrobia and extract the protein. Over a long period of time the carbohydrate built up by the reeds, rice grasses, Zostera and other salt marsh plants and much of the

carbohydrate in the detritus is converted into protein. This is converted into animal flesh, not only by Hydrobia (or Assimineae), but also by many other detritus feeders such as worms, shrimps and burrowing prawns. These in turn provide food for large fish and wading birds and man himself. An acre of salt marsh provides as much food as the same area of good agricultural land.

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ABOUT MEMBERS:

It is with deep regret that we have to record the passing on 21st. October of Cape Town member Mr. Graham Ivy. Mr. Ivy joined the Society shortly after its formation in 1958 and he was a keen member right up to the date of his death. We would like to take this opportunity of extending our sincere sympathy to his family.

Changes of Address:-

Mr & Mrs C.P.S. Allen, P.O. Box 97, Simonstown 7995.

Mrs I. Davies, 63 Park Hill Road, London, N.2.

New Members:-

Mr B.P. Rijkmans, 6 Carisbrook Rd., Stirling, East London, 5201.

Mrs E.B. Roberts, 301 Bulwer St., Pietermaritzburg, 3201.

Mr B.E. Brickhill, Fort Cox Agricultural College, P.O. Middledrift 5685.

Mrs B.E. Brickhill, Fort Cox Agricultural College, P.O. Middledrift 5685

Mr C.T. Tosio, 7 Helmsley Court, 141 Musgrave Rd., Durban 4001.

Mrs C.T. Tosio, 7 Helmsley Court, 141 Musgrave Rd., Durban 4001.

Mrs D. Smith, P.O. Margate, 4275.

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EXCHANGES WANTED:=

Mr O. Raus, 2 Daniel Street, Attadale, West Australia 6156. A member of the W.A. Shell Club he would like to contact South African collectors with the view to exchange. He has only a few specimens from S.A. ✓

Mrs F.E. Good, 3142 Larga Ct., San Diego, CA 92110. U.S.A. Particular favourites are Murex, Cypraea, Volutes and Mitras, but all good shells from other families are most welcome in exchange for shells from Mexico, west coast of U.S.A. and Florida. ✓

Mr M.L. Chapel, 2002 Margaret Drive, Wichita Falls, Texas 76306. U.S.A. Has a fairly large collection and trades all over the world.

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AROUND THE GROUPS:

Transvaal Group, Johannesburg. At our meeting of 19th October, Dr. van Hoepen gave an account of his recent trip to Porto Amelie and Mr. L.J. Smith also gave a talk. The theme of his talk was nature conservation and what man can do to prevent pollution and destruction of our natural resources. A brief outline was given of the factors contributing to the threat of wildlife and the importance of the food-chain in nature for the preservation of species. To illustrate the importance of the conservation of the natural habitat for preservation of all forms of wildlife, a

number of colour slides were shown of wild animals which are already threatened with extinction on earth. Mr Smith emphasised the importance of everyone to have the desired attitude for conservation because no law can replace man's own responsibility to conserve all forms of wildlife.

At our meeting of 23rd November it is hoped to follow up Dr. van Hoepen's Porto Amelia trip with colour slides.

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Natal Midlands Group, Pietermaritzberg. Our Group had a Field day outing on 14th October at Scotsborough South on the South Coast. The shelling was more profitable than on our previous outing at Reunion Rocks in April. A few cypraea and cones were found, the specimens being in excellent condition. The outing was enjoyed by all who attended.

The families Planaxidae, Modulidae, Potamididae and Fossaridae will be discussed at our next meeting on 1st December.

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Border Group, East London. With apologies from two there were 8 members and 2 visitors at our October meeting. Mrs. Latigan opened the meeting with her usual friendliness. The minutes of the August meeting were read, the September meeting having been cancelled because of the long weekend.

The subject for the meeting was allied cowry families. On display were many fine specimens, which were examined and discussed. Mrs. Viva Armstrong is the proud owner of three sinistral Cypraea capensis which were on display and were found at Sunrise-on-Sea and Glengariff. Mrs. Evans brought her C.lamarkii which was found at Gombie.

The name changes in Cato's revision of the Ovulidae were discussed. Mrs Lil Lentz narrated her visit to the British Museum mentioning especially how well the shells are displayed and the variety and beauty of the coral display.

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Eastern Cape Group, Port Elizabeth. With apologies from 7 members there were 9 at our October meeting. Mr Greave reported briefly on the field day held at Kini Bay on 16th September. The weather had been poor which explained the small turnout of only 6 members. In spite of the weather it had been a pleasant morning although without any special finds. It was decided to combine the next field day with the Christmas function in December. Details will be decided later.

It was decided to ask Mr McLachlan for further details of the check list of Eastern Cape shells that he had suggested that the Group could have printed. Members expressed keen interest in the idea of going shelling with a check list at hand.

Tea was served and the family Conidae was discussed. It was decided to study only the species occurring from the Atlantic coast to the Kei River. At the November meeting the same family would be studied but only the species found on the coasts of the Transkei, Natal and any foreign species.

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Minutes of a Meeting of the Society held on 30th October, 1973.

The Chairman, Mr. Freeman, welcomed those present with a special word of welcome to new members. Members were asked to stand in silence in memory of the late Mr. E.P. Graham Ivy.

Apologies were received from three members.

The Minutes of the previous meeting, as published in The Strandloper No. 156, were read and approved. Arising from these minutes the Secretary reported that a quantity of plastic bags, size 60 x 80 mm, had been purchased as a trial and that these were available at one cent each.

It was reported that the Saturday afternoon meetings have been cancelled till further notice. Mrs Fuller thanked Mrs Carlsson and other members of the Council for giving up their time to help the new members.

It was also reported that meetings would be held in Somerset West in the new year.

Members who had library books out on loan were requested to ensure that they were returned at the November meeting. This was to enable the Librarian to work on the library during the holiday period.

Those present were reminded of the collection for Manter, the Museum boy who saw to our needs every month. This would be handed to him at the November meeting and would take the form of a Christmas present.

As the November meeting would be the last of the year members were asked to supply a plate of eats for tea. Mr Gordon Verhoef has agreed to show a film on the Comores and surrounding areas.

After tea the films "Secrets of the Underwater World" and "Mysteries of the Deep" were screened by Mr. Hart. Our appreciation to Mr. Hart for obtaining these films.

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ADDITIONS TO THE LIBRARY:

- No. 232. Shells and Shell Collecting by S. Peter Dance.
- No. 233. Kingdom of the Sea Shell by R. Tucker Abbot.

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MEETING:

The next meeting of the Society will be held on Tuesday, 30th November, 1973 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 family Naticidae as illustrated on pages 96 to 99 of Sea Shells of Southern Africa. As this will be the last meeting of the year members are asked to bring a plate of eats. Mr. Gordon Verhoef has agreed to show a film on the Comores and surrounding areas.

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THE CONCHOLOGICAL SOCIETY OF SOUTHERN AFRICA
(Founded 1958)

OFFICE BEARERS 1973/74.

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Vice-President	Mr D. Freeman
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Border	Mrs M.J. Latigan
Eastern Cape	Mrs C.M. Watters

All enquiries should be addressed to The Secretary, The Conchological Society of Southern Africa, P.O. Box 98 Howard Place, Cape, South Africa.

Entrance Fee is R1-00, with a yearly subscription of R2-50. The financial year runs from 1st July to 30th June, and members joining after December need only pay one half of the annual subscription to ensure membership to the 30th June of that year.

Members who are full - time students at an Educational Institution in South Africa may join as Student Members on payment of an annual subscription of R1-00. No Entrance Fee is payable in respect of Student Membership.

The Society's Bulletin is published monthly and is issued free to members.

The Conchological Society of Southern Africa has active groups in the following areas:-

<u>Cape Town:</u>	Secretary, Mrs R.O. Carlsson, P.O. Box 98, Howard Place. Tel. 53-1536
<u>Port Elizabeth:</u>	Secretary, Mr. F. Greave, P.O. Box 2054, Port Elizabeth. Tel. 45744
<u>East London:</u>	Chairman, Mrs. M.J. Latigan, 29 Kennington Road, Nahoon. Tel. (Mornings only) 22623.
<u>Durban:</u>	Secretary, Mrs M. Smith, 6 Retief Place, Carrington Heights. Tel. 816335
<u>Pietermaritzburg:</u>	Secretary, Mrs G. Webber, 242, King Edward Ave., Scottsville. Tel. 52925
<u>Johannesburg:</u>	Secretary, Mrs. A.H. Adam, 37 Newport Road, Parkwood. Tel. 424298