

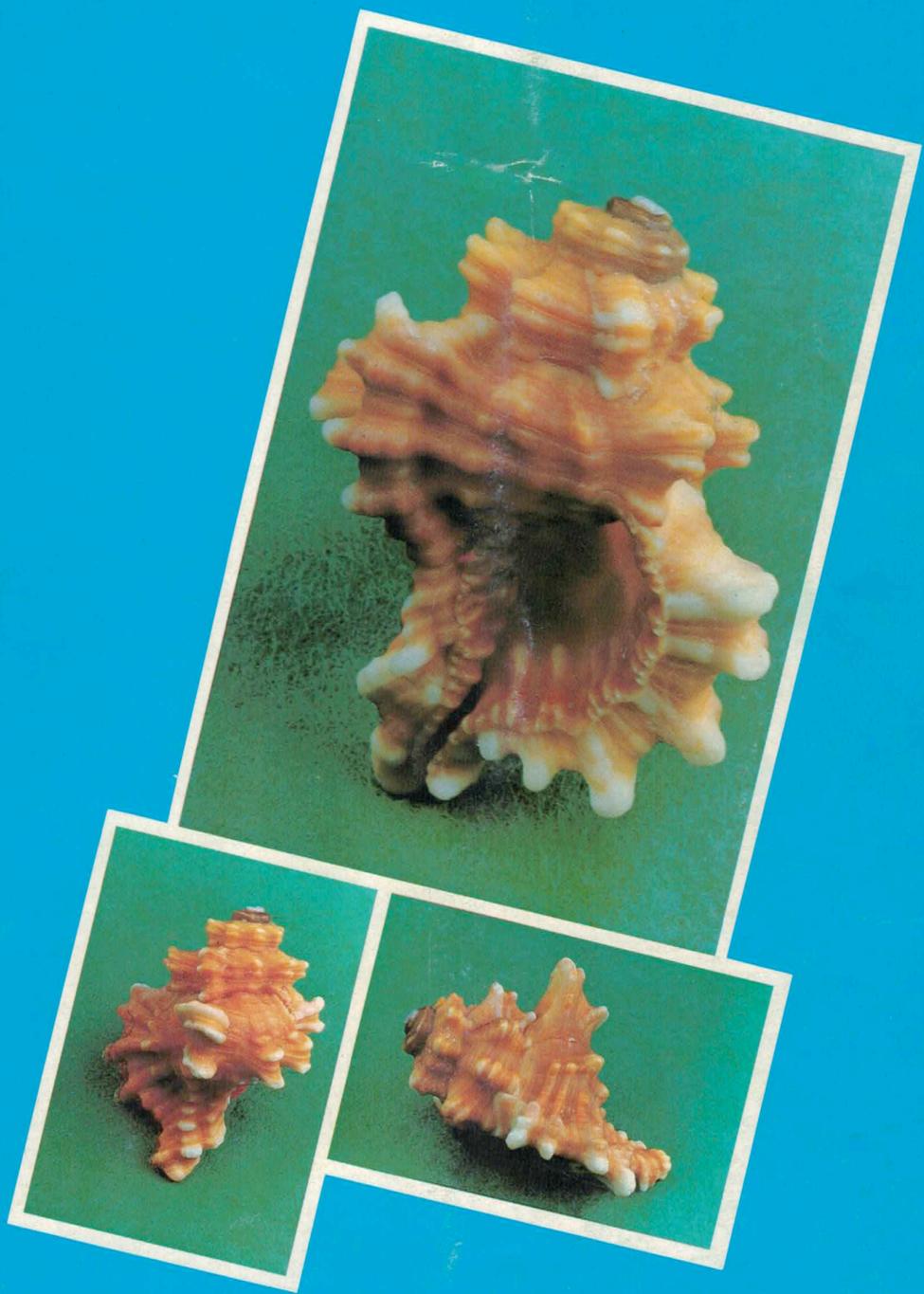
La Conchiglia

The Shell

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Year XIX - N. 230- 231 May - June 1988 \$ 4.25

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Considerations on the complex of *Umbilia hesitata* Iredale 1916 in Keppel Bay, Queensland

(Gastropoda: Cypraeidae)

Felix Lorenz jr.

At the Keppel Bay Shell Show in July 1983 the great news was that a new cowry had been fished from very deep water in the Swains Reef area. Those who did not possess a specimen said it was a form of *hesitata* and those who proclaimed to have one said it was an "*armeniaca nana*" from Queensland.

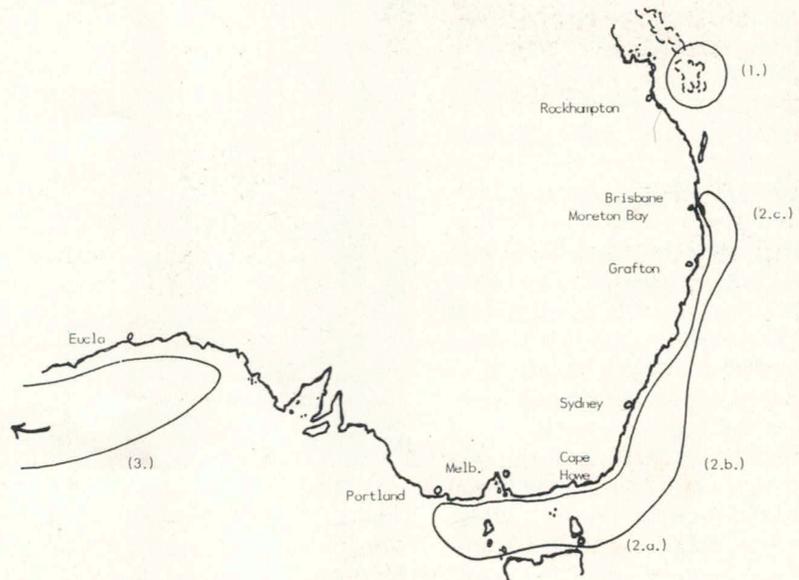
Since then, many specimens have come to light, both from the Swains Reef and from the area of the Islands of Lady Musgrave and Lady Elliott, all from depths of over 100 fathoms (approx. 180 m), some as deep as 300 fathoms (approx. 540 m). The differences between the new form and *U. hesitata* and *U. armeniaca* seemed to be so obvious and constant that everyone expected that someone would decide to establish a new taxon for "their" shell. And, in fact, a new name appeared: "*Cypraea capricornica*" (the Tropic of Capricorn passes through Keppel Bay and therefore the Strait is called Capricorn Channel) to indicate the smaller, more callous form coming depths from of less than 200 fathoms; soon another name was added "*Cypraea nordica*" for the darker, more inflated specimens from greater depths. However, no valid description of the cowry has ever been published, while the new volutes, caught at the same time, in the same localities and at the same depths have all been given a name, one by one. Some Australian collector friends have asked me to give a name at last to this cowry and I feel it is time to do something about it, of course taking all the necessary precautions.

In the study which follows, I have tried to demonstrate the conchological differences between the new form, *hesitata* and *armeniaca*, I have made a statistical comparison of the various data and shell features and have given a description of the most important characteristics of the animal of the new form.

Brief history: In the years 1980-1982 several specimens of a cowry

Distribution of *Umbilia* along the Australian Coasts

1. *U. "capricornica"*
2. *U. hesitata* a: typical and form *hovelli*
 b: *beddomei*
 c: *beddomei* form "*nordica*"
3. *U. armeniaca*



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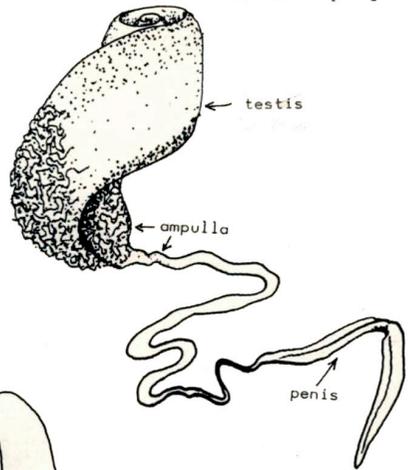
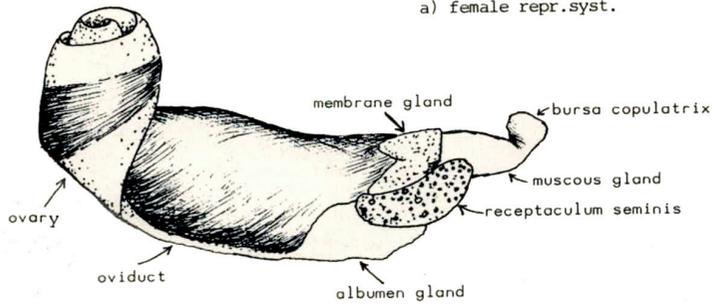
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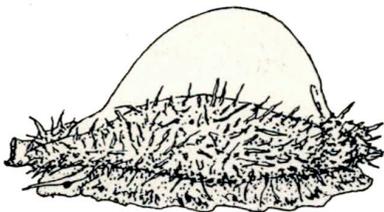
Cypraea (UMBILICA) capricornica : Reproductive system

a) female repr.syst.

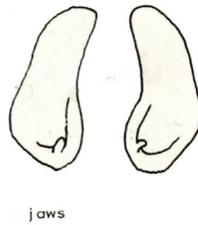
b) male repr.syst.



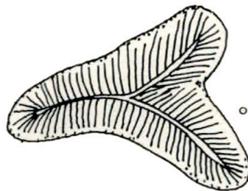
Cypraea capricornica : Animal



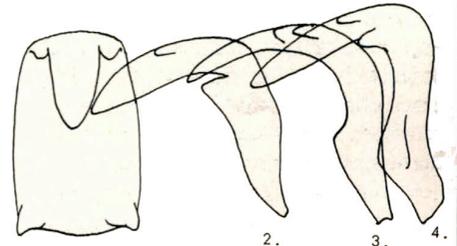
reconstruction of living Mollusc



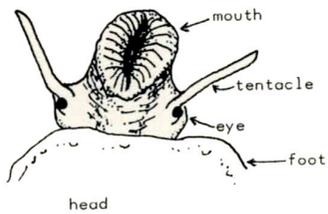
jaws



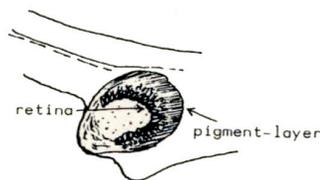
osphradium



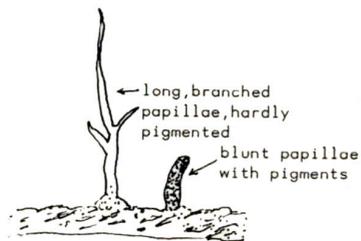
half row of the radula



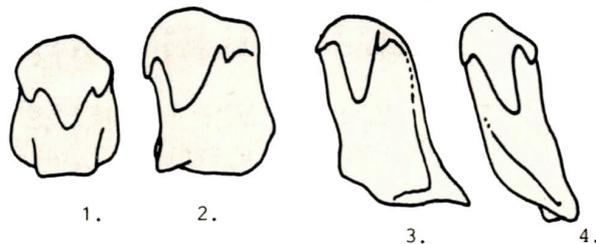
head



section through eyestalk



section through mantle



half row of the radula of U.hesitata (by VAYSSIÈRE 1923)

similar to *hesitata* were fished at great depths in the Capricorn Channel, together with unknown species of Volutidae, Fasciolaridae, Turridae and Conidae. In 1983 at Keppel Bay I was given two specimens of the new form, on which I had a short note published in the paper of the German Shell Club. In his second book on cowries, Dr. C.M. Burgess (1985) mentioned the new form in a footnote to the page on *hesitata*: "significant variation", "differ consistently from *hesitata* by having a more prominent dentition, a more rounded dorsal hump and a more prominent anterior dorsal tubercle". However, in a letter dated 3 December 1985, he wrote to me that he did not intend to accept any other *hesitata* because three "would be enough" and that he refused to give a name to this form. In December, 1986 Raybaudi, in his "Connoisseur", illustrated three specimens, only one of which is the new form and he called them "*hesitata nordica*" giving in his price list the localities of "Cape Moreton" (2 specs.) and "Capricorn Group" (1 spec.). In this case, the name "*nordica*" was used for a form of *hesitata beddomei* from Cape Moreton (where the new form does not occur) and not in the sense used by Queensland collectors for their "*nordica*" or "*nordis*".

As can be seen, there is quite a lot of confusion which I will do my best to clear up both from the conchological and the nomenclatural points of view, even though some names do not have, at least for the moment, taxonomical value.

Material used for this study: twenty specimens of the new form were examined in private collections in Australia, seven in the collection of Dr. Hubert from Erlangen and twenty seven in my own collection. For the comparative study I used eighty specimens of *hesitata* from the Bass Strait area and thirty given from various localities in NSW and southern Queensland. Two specimens of the new form, with the animal conserved in alcohol, were kindly made available to me by Mrs. Rhonda Harris, who I wish to thank heartily.

The taxa and varietal names which I will take into consideration for this study are:

Umbilia hesitata hesitata Iredale, 1916

Umbilia hesitata howelli Iredale, 1931

Umbilia hesitata beddomei Schilder, 1930

Umbilia hesitata beddomei forma *nordica* (sensu Raybaudi, 1985)

Umbilia armeniaca Verco, 1912

Umbilia hesitata forma *capricornica* and its varieties.

- Conchological comparison: see table pag. 18

The table shows that quite a number of significant differences exist between *hesitata hesitata* and "*capricornica*" while there are characteristics like the stronger teeth, the darker base, the spotting, common both to "*nordica*" and "*capricornica*". The absence of a fossula, the smooth margins, the less pronounced extremities indicate that the "*nordica*" from Moreton Bay is a variety of *hesitata beddomei*. As I said before, Raybaudi indicates with this name shell of two different origins, Moreton Bay and Capricorn Channel, but only one specimen from the latter locality. As I have not been able to examine this shell personally, I have decided to use the name "*nordica*" only for the shells from Moreton Bay. I wish to point out once again that I use "*nordica*" and "*capricornica*" only as varietal names, with no taxonomical value. I kindly ask readers to note the differences listed in the table and to examine them along with the illustrations.

The first impression of the *hesitata* complex is that the colour of the shell darkens gradually as it goes northwards as far as Moreton Bay, while there are no considerable changes in shape. The dentition becomes stronger, while the average size decreases steadily as far as the Sydney-Newcastle area, where the smallest specimens seem to come from; at Moreton Bay the dimensions known to me vary from 58 to 78 mm. and are on an average larger than those from the Sydney area. Also the shells from the Capricorn Channel vary greatly in size, from 59 to 88 mm. and especially the sphaerica form from deeper water can be very large.

There is no real problem in separating "*capricornica*" from *hesitata*

hesitata, but I believe that a complete series of intermediate stages up to "*capricornica*" could be had from an adequate quantity of shells from Moreton Bay.

There seem to be three forms, more or less distinct in the populations of the Capricorn Channel. The most common is the typical one, with a rather small heavy shell which is found at depths of 100-150 fathoms in the area of Swains Reef, Lady Musgrave Is., North Reef, Lady Elliott Is. The specimens are mostly tuberculated along the edges and their colour is not too dark, albino specimens are known with a pale yellow base.

The less common but more interesting form in my opinion comes from depths of over 180 fathoms of Hexon Cay (Swain Reef). It is a light shell with a distinctly inflated dorsum and the flat extremities are highly rostrated. The margins are tuberculated and flare out like wings at the extremities. The aperture is rather narrow, the fossula well developed; the colour is usually light brown, similar to that of the typical "*capricornica*". Only a few specimens are known and therefore I cannot give hypotheses about the constancy of the differences from typical "*capricornica*" but it must be said that there is very little in this extraordinary form which is similar to *Umbilia hesitata*.

Finally there is the already mentioned deep water variety which the Australian collectors call "*nordis*" which I would prefer to call "*sphaerica*". As far as I know, it comes from depths of over 220 fathoms in the area of the Islands of Lady Musgrave and Lady Elliott. The shell is large and heavy, the base often very dark, the shape spherical and the extremities short but strongly tuberculated; the teeth extend far onto the lips. The first specimen I had, belonged to this form, as do all the other specimens I saw in Queensland. The most common typical "*capricornica*" appeared about 1983/84. This extreme variability of a single species in a relatively small area can be explained by the different depths in which the animals live, with a consequent diversity of habitat, temperature and pressure.

Habitat: *Capricornica* is usually dredged at depths of over 100 fathoms on relatively smooth floors and



(from left to right)

I row: *hesitata howelli*, Bass Strait, W. of Flinders Is., - 140 m.; *hesitata hesitata*, Bass Strait - 150 m.; *hesitata hesitata*, Bass Strait, -140 m.; *U. armeniaca*, W. of Eucla - 160 m.

II row: *hesitata beddomei*, Sidney - 110 m.; *h. beddomei*, Sidney, - 110 m.; *h. beddomei*, Grafton - 45 m.; *h. beddomei* "nordica", Moreton Bay, -135 m.

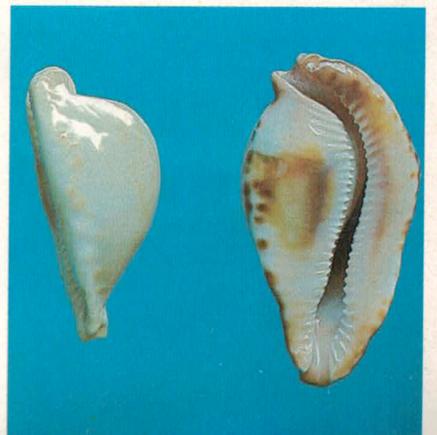
III row: "*capricornica*", Hexon Cay, -325 m.; "*capricornica*" (with male mollusc used for dissection), Swain Reef, - 200 m.; "*capricornica*" *sphaerica*, Lady Musgrave Is, - 400 m.; "*capricornica*" *sphaerica*, Lady Elliott Is., - 420 m.

IV row: 4 typical "*capricornica*" specimens, Swain Reef, about - 200 m.



From top: *h. hesitata beddomei*, "*capricornica*" *sphaerica*, "*capricornica*", *armeniaca*

2 specimens of *h. "capricornica"*



Cypraea (Umbilia) hesitata, armeniaca, capricornica - Conchological comparison

	<i>hesitata</i>	<i>h. howelli</i>	<i>h. beddomei</i>	<i>h. b. "nordica"</i>	<i>h. "capricornica"</i>	<i>armeniaca</i>
Distribution:	Portland - Bass Strait - Cape Howe	C. Howe - Grafton	Moreton Bay	Capricorn Channel	Albany - E. of Eucla	
Length mm	92.3 +/- 12	67.5 +/- 11	71 +/- 5	68 +/- 6.6	84 +/- 10	
width (% to l.)	61.3%	61.2%	56.4%	60.2%	62.5%	
labr. teeth (reduced)	21	21	21	20	22	
col. teeth (red.)	20	19	19	17	18	
height (% to l.)	48%	50.5%	48.2	48%	54.3%	
surface	fine granules covering entire shell, less close on dorsum, rather coarse at base	rather dull, due to strong granulation	dorsum almost smooth, extr. and base granulated	dorsum smooth, extr. and base with fine granulation	no granulation either on dorsum or base.	
gloss			dull at base, dorsum rather shiny	rather shiny, fine sculpturing visible under magnification	always very shiny, very fine sculpturing at base and extr.	
ground colour, dorsum	plain white rarely greyish-brown	greenish-gray	greenish-gray	brownish or whitish rarely dirty-white	pale yellow-orange	
colour of extremities	same colour as dorsum	Often darker	dark brown	same colour as dorsum sometimes brownish	little darker than dorsum, often same colour	
colour of base	same as dorsum, rarely pale yellow-brown	sometimes pale reddish brown	dark reddish-brown conspicuous	pale brown, sometimes dark reddish brown	bright orange, very evenly distributed	
colour of labrum	always white	always white rarely darker	same colour as base, conspicuous	mostly same colour as base, often striped	same colour as base	
spotting at margins	fine, often confluent, pale yellow or absent in h. howelli, same colour as dorsal mottling		coarse, dark brown, esp. on col side, at extr. often confluent to darker zone.		usually indistinct small and scarce	
tubercle-like elevations at margins and extr.	always absent, margins and extremities always smooth, never tuberculate. Spots on col side sometimes with a slight impression, anterior dorsal extremity sometimes slightly grooved			lateral spots mostly elevated, extremities tuberculate	never tuberculate, ant. dors. ext. hardly grooved	
margins at extremities	always rounded, not angular posteriorly, often depressed anteriorly in beddomei		very slightly margined anteriorly	margins often wing-like, angular	slightly angular at extremities	
dorsal mottling	fine, rather pale, confluent, absent in howelli		dark, rather fine, confluent	pale, larger, indist. spots, hardly confl.	fine, mostly pale, confluent	
aperture	narrow curved behind			often straight, curved in deep water variety, often wider	strongly curved posteriorly	
teeth	rather fine, not extending too far onto base or labrum, indistinct midway on col. side		produced and rather coarse either side	coarse, well produced, esp. on col. side, extending onto base and lab.	always fine, not extending	
fossula	absent		visible, sl. projecting		absent	

it feeds on sponges, small molluscs and algae. The stomach contained calcareous skeletons and fibres of small sponges, fragments and a complete shell of an unidentified microshell (possibly a larval stage). Like many other cold water species of great depths, also "*capricornica*" is carnivorous. It is dredged together with other deep water gastropods like *Conus whiteheadae*, *C. minnamurra*, *C. queenslandis*, *Voluta gardneri*, *V. intruderi* etc. but it seems that it is the only cowry living in this habitat.

Animal: As I have already said, two animals have been available for study, both in perfect condition. The results of the dissection are illustrated here. The ground colour of the animal is light tan, which goes white when put into 30% alcohol. The pigmentation is rather scarce, the foot is framed by a 2-3 mm. ring of brownish to black pigmented cells, while the rest is a very light colour. The crawling surface is yellowish-cream. The mantle is relatively smooth, only slight irregular marbling (also present on the foot) is visible under magnification. There are two types of papillae, some short (2-3 mm) and blunt and with dark pigmentation and others longer (6-12 mm) branched and filiform, without much pigmentation.

In a fresh and living state the mantle must appear thick and speckled with brown because the

papillae are very numerous and close together.

The tentacles are relatively short (12 mm), the eyes are well visible on very short eyestalks. In a section through one of these I found that the eye is very developed, that there is a horny layer which protects the eye bulb, which I presume is a sort of primitive lens. However, I was surprised at the fact that a mollusc which lives at depths where the light does not penetrate has sight organs capable of providing clear pictures while there are species which, even though they live in shallower water, have very reduced sight organs, due to the low visibility in their habitat (e.g. *Cypraea mus donmoorei* Petuch).

All in all, the external aspect of the animal of "*capricornica*" is very similar to the description of the animal of *hesitata* given by Burgess (1985:pg.56), only "*capricornica*" seems to be less coloured and with denser and branched papillae.

The internal morphology of "*capricornica*" has never been described, as far as I know. The digestive system is similar to that described for *Cypraeovula fuscorubra* by Liltved and Gosliner, the stomach extends onto the right side of the internal mantle, the elongated triangular-shaped osphradium is above the proboscis.

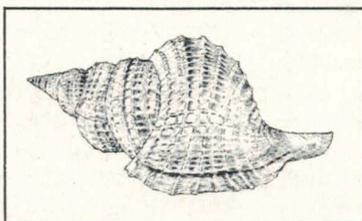
The female reproductive system seems on the whole almost identical to that of *Cypraea cruikshanki*

(Liltved & Gosliner), the ovary seems to be divided into a yellow part and a darker dorsal part. The receptaculum seminis is sickle-shaped, the membranal gland and the bursa copulatrix are arranged in the same way as in *cruikshanki*. The male reproductive system consists of a grey testicle with a slightly darker central area, the ampulla is wound around a brain-like body below the testicle, the penis is rather short.

The digestive tract is made up of a radula 2 mm in width and 35 in length and two 4 mm jaws. The radular formula is 94:3:1:3. The denticles of the radula are very long, the rachidian is rather long, with two sharp basal pegs. The drawing of the radula differs notably from that given by Vayssière for *hesitata* (which he still called *umbilicata* Sow.) while that of the osphradium is similar to that of *capricornica*.

On the whole, the animal of "*capricornica*" is similar to that of *hesitata*, except for minor differences in the structure of the mantle and in the radula.

Personally I do not think, on the basis of what I know of this form at the moment, that "*capricornica*" is separable from *hesitata* at specific level, but perhaps the significant shell differences and the geographical distance between the two forms could justify a separation at subspecific level. However, before reaching this conclusion, the status of "*nordica*" must be cleared up, the



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animal of *hesitata* studied deeply and, above all, research must be carried out in the area between Moreton Bay and Keppel Bay which has not yet been explored.

Acknowledgements.

I wish to heartily thank the following persons for their valid contributions to my study: Mrs. Rhonda Harris, GinGin, Qld; Mr. Graham McGrath, Bundaberg; Dr. Alex Hubert, Erlangen; William Liltved, S. Francisco; Mrs. Ena Coucom, Yeppoon; Mrs. Thora Whitehead, Brisbane; Dr. Clarence Burgess, Honolulu.

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From left: *armeniaca*, *hesitata hesitata*, *hesitata beddomei*, *h. beddomei* "nordica", "capricornica"

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More about *Cymatium armatum* (Sowerby III, 1897)

Manfred Parth (1)



In this magazine about five years ago (Sep./Oct. 1983 no. 174-175:5) our friend Alex Arthur (London) illustrated exhaustively this species, which is justly considered the rarest and most beautiful of the whole Ranellidae family. At the time, apart from the holotype kept in the BM (NH), only four other specimens were known: 2 found after a storm in the New Hebrides, 1 juvenile from N. Queensland and 1, with unknown origin, kept in the Academy of Natural Sciences in Philadelphia. Even the origin of the holotype, the Marchesi Islands, seems doubtful. In his article, A. Arthur expressed the hope that further news would come forward on this species. I can now do this, as I have recently acquired, by

a stroke of luck, the 6th specimen known: a splendid shell in perfect condition, as can be seen from the cover photo. This is not the first time that something like that has happened to me. Perhaps some readers may remember my previous records of *Ranularia oblita* and *Bursa bardeyi*. Unfortunately, also for my specimen the locality data is dubious, or at least vague: New Hebrides. However, I am making inquiries about it from the previous owner (who has lived for years in the New Hebrides) and hope to get more precise information. The measurements of my specimen are: height 50 mm. width 40 mm.

I do not have much to add to the minute and precise description given by A. Arthur in the abovementioned article. It seems to me worth noting that the first postnuclear spiral whorl (the protoconch is com-

pletely white) is a dark brown colour, which turns bright orange in the following whorls. This is to be found also in the holotype.

I feel that G. B. Sowerby III had a very good idea of calling this species "armatum". Its extreme robustness, the solid spiral cords, the heavy white nodules, the sharp columellar plicae which just out from the aperture like the claws of an eagle, give the idea of something aggressive, something "armed". To conclude amusingly, after finding all these rarities, I have had to purchase an "armadium armatum" (a strong-box). Of course, there is still lots of room in it, I could find a special place ad hoc for a beautiful *Bursa fernandesii*, for example....

(1) Via Masotto, 19 - 20133 Milano