

Dimensions:

(in millimeters)

	Length	Width	Number of whorls
Holotype:	18.4	6.5	10.5
Paratype I:	14.4	5.0	10.0
Paratype II:	18.6	6.5	10.0
Paratype III:	13.5	5.5	8.0

(early whorls missing in all specimens listed above)

Type locality: Trawled off Punta de Juatinga, Lat. 23° 22' S., 48° 28' W., in 50 meters.

Repositories: Holotype, Stanford Univ. Paleo. Type Coll. no. 9738; Paratype I, Museu Nacional, Rio de Janeiro, no. Harvard; Paratype II, American Museum of Natural History, New York; Paratype III, Museu Nacional, Rio de Janeiro, no. 3117.

Discussion: This species is similar to *Epitonium fractum* DALL, 1927 but differs in having fewer costae on the body whorl, the costae never form spines or hooks at the shoulder angle, and also the whorls are less convex in outline. The new form is trawled together with *E. georgettina* (KIENER, 1839), from which it is easily separated by its smaller size and lower costae. A badly broken shell measured the maximum size of 25.7 mm in length, 9.1 mm in width.

This new species is dedicated to Dr. Maury Pinto de Oliveira, Brazilian malacologist.



Figure 5: *Epitonium mauryi*, holotype, Stanford Univ. Paleo. Type Coll. no. 9738. $\times 2.7$.
Recent, Rio de Janeiro.

ACKNOWLEDGMENTS

We wish to express our gratitude to Dr. Myra Keen for encouraging this work, critically reading the manuscript, and kindly helping in many ways. We thank Mr. Perfecto Mary, also of Stanford University, for the line drawings used here.

Provisional Classification of the Genus *Notocypraea* SCHILDER, 1927 (Cypraeidae)

BY

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THERE WAS ALWAYS a great confusion concerning the classification of the so-called species and varieties which belong to the genus *Notocypraea* SCHILDER, 1927, restricted to the coasts of southern Australia and Tasmania. Even the most modern "reviews" by GRIFFITHS (1961, 1962) are not satisfying, as he describes ten "species" in alphabetical order without indicating the essential characters which distinguish each from the other, so that identification by the aid of the photographs becomes difficult.

NAMES

The names established for genera, species, subspecies and "varieties" (nomenclatorially of subspecific rank) may be arranged chronologically as follows (\parallel designates pre-occupied names not valid on account of prior homonymy):

(nameless species, pl. 13, fig. QQ) GUALTIERI, 1742
(=*angustata* GMELIN)

Cypraea angustata GMELIN, 1791

Cypraea \parallel *maculata* PERRY, 1811

- Cypraea piperita* GRAY, 1825
Cypraea || *castanea* ANDERSON, 1836
Cypraea (em.) *piperata* CATLOW & REEVE, 1845
Cypraea pulicaria REEVE, 1846
Cypraea comptonii GRAY, 1847
Cypraea bicolor GASKOIN, 1849 (not 1848)
Cypraea declivis SOWERBY, 1870
Cypraea (err.) *pipitata* BRAZIER, 1882
Cypraea angustata var. *subcarnea* BEDDOME, 1896
Cypraea angustata var. *mayi* BEDDOME, 1898
Cypraea angustata var. *albata* BEDDOME, 1898
Cypraea angustata var. || *globosa* VAYSSIÈRE, 1910
Erronea (*Stolida*) *angustata piperita* var. *reticulifera* SCHILDER, 1924
Cypraea piperita var. *leucochroa* SULLIOTI, 1924
Notocypraea (n. g.) SCHILDER, 1927; type: *piperita* GRAY
Notocypraea bicolor emblema IREDALE, 1931
Notocypraea piperita dissecta IREDALE, 1931
Thelxinovum (n. g.) IREDALE, 1931; type: *molleri* IREDALE
Thelxinovum molleri IREDALE, 1931
Notocypraea verconis COTTON & GODFREY, 1932
Notocypraea declivis occidentalis IREDALE, 1935
Guttacypraea (n. g.) IREDALE, 1935; type: *pulicaria* REEVE
Notocypraea (*Notocypraea*) *emblema* syn. (em.) *mölleri* SCHILDER, 1941
Guttacypraea euclia STEADMAN & COTTON, 1946
Guttacypraea pulicaria (var.) *candida* COEN, 1949
Notocypraea angustata (var.) *lentiginosa* COEN, 1949 (err.) *Thelxinovum* ALLAN, 1956; type *molleri* IREDALE
Cypraea (*Notocypraea*) *wilkinsi* GRIFFITHS, 1959
Cypraea (*Notocypraea*) *trenberthae* TRENBERTH, 1961
Notocypraea casta SCHILDER & SUMMERS, 1963

Note: According to the International Rules of Zoological Nomenclature (1958), Art. 31 the name *comptonii* should be emended to *comptoni*, and according to Art. 32 *molleri* should be emended to *moelleri*, as this species was named after Capt. Möller [*sic*]; however, contrary to Art. 31, I do not recommend emending *verconis* to *vercoi*, though the latter name would not be preoccupied by *Zoila friendii vercoi* SCHILDER, 1930. The "emendation" of *piperita* to *piperata* is not justified.

NOMENCLATURE

The taxonomic arrangement of these cowries is rather difficult, especially for the following two reasons:

1. The genus *Notocypraea* is a relatively young one, so that the differentiation into clearly definable species

and widely distributed geographical races has not yet been completed: for *N. jonesiana* (TATE, 1890) seems to be the only Pliocene *Notocypraea* (known from Victoria and Adelaide), while its Miocene ancestor *subregularis* SCHILDER, 1935 from the Balcombian of Victoria still belongs to the ancestral genus *Notoluponia* SCHILDER, 1935.

2. GRIFFITHS (1962, p. 212) asserts a curious abnormality in the ontogeny of *Notocypraea*: it seems to be abbreviated by the absence of the veliger stage, so that young cowries hatch directly from the egg capsules. This process would favor the development of "local races" in restricted localities, as "the intermixture of genes caused by the long distances travelled by free-swimming larvae" would be suppressed.

Therefore, the views about the taxonomic value of species and "varieties" are very different: so, for instance, VERCO (1918) regarded all *Notocypraea* as varieties of one species only (*angustata*), while BEDDOME (1898) had distinguished seven species in Tasmania; IREDALE (1935) admitted eight species in the whole area inhabited by *Notocypraea*, and GRIFFITHS (1962) ten species; in my last catalogue (SCHILDER, 1941) I admitted four real species, and four to five in the present paper.

Besides there are nomenclatorial difficulties: so, for instance, I cannot agree with GRIFFITHS' views concerning the use of the specific name *piperita*, which he has submitted to the International Commission of Zoological Nomenclature (GRIFFITHS, 1962 a), and I continue to adhere to my interpretation of *piperita* as explained in a previous paper (SCHILDER, 1961), because I have examined personally the type shells preserved in the British Museum (Natural History). The names *angustata* and *comptoni* have been erroneously interpreted as cowrie species living in other regions, viz. as *Luponia fuscudentata* (GRAY, 1825) and *Erronea walkeri* (SOWERBY, 1832), and therefore have been unnecessarily renamed *verconis* and *trenberthae* by COTTON & GODFREY, (1932) and TRENBERTH (1961) respectively. There are many other misidentifications made chiefly by Australian malacologists, e.g. the deep water *bicolor* (called *euclia* later on) has been mistaken for *pulicaria* by VERCO, 1912 and VAYSSIÈRE, 1923; and *casta*, a light whitish unspotted *comptoni* used to be called *albata* in Australian collections, a name established for a monstrosity of *angustata* suffused with heavy white callus.

ANIMALS

There are probably constant differences in the color of the animal, but though some of them have been described already a hundred years ago (ANGAS, 1865), our present knowledge is very poor and not sufficient for taxonomic arrangement.

The radula shows differences which far exceed the limits observed between real species of other cowrie genera. The median tooth shows three types with regard to its basal teeth:

1 They are rather closely set near the center of the base; GRIFFITHS (1962, pl. 4) figured this type in *Notocypraea pulicaria*, *N. bicolor* (called "*piperita*"), *N. euchia*, *N. wilkinsi*, and *N. occidentalis* ("species W"), but also in the large median of the holotype of *N. emblema*; in *N. dissecta* and in the young specimen called "species Y" these basal teeth are slightly more separated.

2 They are displaced to the corners of the median where they form oblique denticles in *Notocypraea comptoni*, *N. casta* (according to a personal communication by GRIFFITHS), *N. declivis* (according to VAYSSIÈRE, 1923) as well as in the "species Z" the median of which looks like a monstrosity.

3 They unite with the corners themselves so that they appear less distinct in *Notocypraea angustata* and *N. moelleri*.

Personal examination of some few radulae showed *Notocypraea reticulifera* (from Albany) to be like *N. bicolor* as figured by GRIFFITHS, while two *N. bicolor* (from Tumby Bay in the Spencer Gulf) show short broad basal teeth approaching each other as it is in *N. dissecta*, but they protrude behind like in *N. emblema*, and the plate itself is almost as oblong as in GRIFFITHS' "species Y". Oliviform *N. piperita* (*sensu* SCHILDER) from Albany agree with GRIFFITHS' "*comptonii*" as well as my *piperita* (Phillip Island) and my *trenberthae* (Tumby Bay), and as a radula of "*comptonii*" (from Victoria) preserved in the British Museum, but without a shell; an "*angustata*" (from Tasmania) preserved in the British Museum in the same way agrees with the latter and not with *angustata* of GRIFFITHS.

The admedians and laterals are tricuspid anteriorly in *Notocypraea reticulifera* (Albany), *N. euchia* ("*pulicaria*" VAYSSIÈRE, 1923), and *N. wilkinsi* (GRIFFITHS, 1959). In the five smallest specimens among eight oliviform *N. piperita* (Albany) the admedian exhibits four to five denticles on its anterior border, as it is in *N. piperita* (Phillip Island), *N. trenberthae* (Tumby Bay), *N. comptoni* (Victoria), and *N. declivis* (Tasmania: VAYSSIÈRE, 1923). Occasionally the laterals also may be adorned by more than three denticles in front.

These observations point to a great variability in the features of the radula, which has been noted also in other cowrie species {e. g. *Bistolida stolidus* (LINNAEUS, 1758): median with or without basal teeth; *Staphylaea limacina* (LAMARCK, 1810): laterals long and slender or broadly hook-like}. Nevertheless the five species conchologically distinguished below may be characterized by the basal teeth of the median of the radula as follows:

- 1 Strong, conspicuous 2
 - Obsolete, confluent with the corners
 - *Notocypraea angustata*
- 2 Rather central .. *N. pulicaria*, *N. bicolor*
 - Near to the corners *N. piperita*, *N. declivis*

SHELLS

The characters of the shell are also rather variable, so that extreme varieties become hardly distinguishable, if one compares each pair of adjacent species of the sequence *Notocypraea pulicaria*, *N. bicolor*, *N. piperita* and *N. angustata*. The great majority of rather typical specimens, however, is always well recognizable. Moreover, most species are separable into several "subspecies" of various degree (see below), which can be identified according to the following dichotomous key:

- 1 Fossula concave, projecting in its posterior half; teeth extremely fine; shell cylindrical, dorsum low; pale, with 4 narrow interrupted zones and well defined fulvous dots

Notocypraea pulicaria

- Fossula shallow, projecting at most in its anterior half; teeth fine; shell oblong to ovate, dorsum raised, irregularly freckled if spotted at all (2)
- 2 Anterior edge of the fossula not connected with the interior wall of the dorsum; dorsum not humped, extremities produced, outer lip margined, basally narrow and convex, teeth short, fine, fossula and columellar sulcus often concave
- Anterior edge of the fossula connected with the interior wall of the dorsum; dorsum humped, extremities short, outer lip less margined, broad (so that the aperture becomes more central) and flattened, labial teeth produced to ribs, columellar teeth slightly coarser; fossula and columellar sulcus reduced as well as the inner part of the anterior terminal ridge; dorsal zones absent to obsolete, terminal blotches conspicuous

Notocypraea (angustata) (13)

- 3 Dorsum whitish, mostly freckled or reticulate with fulvous, 4 zones (if present) interrupted into large blotches, posterior zone also distinct, anterior terminal spots obsolete

Notocypraea bicolor (4)

- Dorsum mostly fawn (though varying from white to dark purple), often with chestnut spots in its lateral parts, 4 zones narrow but less interrupted, the central pair being accentuated while the terminal zones become obsolete, anterior terminal spots conspicuous

Notocypraea piperita (8)

- 4 Dorsal zones distinct, lateral spots dark (5)
 - Dorsal zones absent, lateral spots obsolete (pale to absent)

- 5 Shell oblong, light, white with pale fulvous markings, dorsal zones narrow and distant
Notocypraea bicolor occidentalis
- Shell subpyriform, solid, pale flesh color with fulvous markings (6)
- 6 Dorsal zones narrow and distant, shell less solid
Notocypraea bicolor reticulifera
- Dorsal zones broad (the central pair often confluent), shell solid
Notocypraea bicolor bicolor
- 7 Shell subpyriform; lives in shallow waters
Notocypraea bicolor wilkinsi
- Shell very oblong; lives in deep waters
Notocypraea bicolor euclia
- 8 Shell oblong to subcylindrical, base less callous (9)
 - Shell rather pyriform, attenuated in front .. (10)
- 9 Fossula rather projecting and concave; anterior extremity constricted
Notocypraea piperita dissecta
- Fossula less developed; anterior extremity dilated
Notocypraea piperita piperita
- 10 Margins spotted, dorsum zonate (11)
 - Margins unspotted, dorsum inzonate, whitish ..
Notocypraea piperita casta
- 11 Shell rather slender and light, dorsal zones pale (the central pair often confluent), lateral spots fine, base mostly fulvous, convex (12)
 - Shell broad, callous, dorsal zones conspicuous (central pair mostly disjunct), lateral spots coarser, base whitish, flattened
Notocypraea piperita mayi
- 12 Dorsum dark brown to purplish, base fuliginous
Notocypraea piperita trenberthae
- Dorsum fawn, base pale orange
Notocypraea piperita comptoni
- 13 Dorsum pale, closely freckled, lateral spots rather fine
Notocypraea (angustata) declivis
- Dorsum unspotted, lateral spots rather coarse ...
Notocypraea angustata (14)
- 14 Shell rather light, dorsum pale, mostly with 4 indistinct zones, base often pale flesh color
Notocypraea angustata moelleri
- Shell solid, dorsum chestnut to gray-brown, inzonate, base white
Notocypraea angustata angustata

ILLUSTRATIONS

Typical shells of the species and subspecies characterized above are represented by the following figures in SOWERBY (1870) [S], BEDDOME (1898) [B], ALLAN (1956: bad and distorted) [A], and GRIFFITHS (1961 [G'] and 1962 [G'']):

	[S]	[B]	[A]	[G']	[G'']
<i>Notocypraea pulicaria</i>	290-291		2:35-36	31-32	45-46
<i>occidentalis</i>					57-59 64-66
<i>reticulifera</i>					
<i>bicolor</i>	288-289 533	17-18	4: 7- 8	26-30	47-50
<i>wilkinsi</i>				33-35	60-63
<i>euclia</i>			4: 1- 2	18-20	34-36
<i>dissecta</i>			4:11-12	14-17	28-33
<i>piperita</i>	285-286		2:15-16	8	10-12
<i>trenberthae</i>	293			9	13
<i>comptoni</i>	294-295	15-16	(4:4a)	6	17
<i>mayi</i>		4- 7	4:3a	7	19-20
<i>casta</i>					21
<i>declivis</i>	328*-329*	12-14	4: 9-10	10-13	22-24
<i>moelleri</i>		(2??)	2:29-30	21-25	37-39
<i>angustata</i>	296-297	1	4:19-20	1-5	1-7

Besides: *N. subcarnea* [B] 8-10; *N. albata* [B] 11; *N. emblema* [A] 4:13-14.

QUANTITATIVE CHARACTERS

The following table has been calculated by Dr. Maria Schilder; it contains L = length of the shell in mm, BL = maximum breadth expressed in % of L, and the number of labial (= LT) and columellar (= CT) teeth reduced to shells of L = 25 mm (see Proc. Malac. Soc. London 23: 124; 1938). The figures taken from about 900 shells measured by us have been balanced with those given by GRIFFITHS, 1962. The first figure designates the mean, the two figures added in parentheses express the variation of about 90% of the specimens (i. e. four times the standard deviation), thus excluding the rare extreme shells. One will observe a general increase in L and BL, but a decrease in LT and CT.

(see table, page 41)

DISTRIBUTION

The geographical range of the species and subspecies distinguished above is as follows (only reliable localities of specimens examined by us, or described or figured by other writers in a satisfactory way have been considered)

<i>Notocypraea pulicaria</i>	Rottneest Island to Flinders Bay
<i>occidentalis</i>	Cape Naturaliste to Cape Leeuwin
<i>reticulifera</i>	Flinders Bay to Esperance
<i>bicolor</i>	Fowlers Bay to Eden; Tasmania
<i>wilkinsi</i>	Victoria: Flinders to Liptrap
<i>euclia</i>	West of Eucla (deep water)
<i>dissecta</i>	Green Cape to Twofold Bay (deep water)

	L	BL	LT	CT
<i>Notocypraea</i>				
<i>pulicaria</i>	17 (15-20)	56 (53-59)	29 (26-31)	27 (24-31)
<i>occidentalis</i>	19 (16-23)	59 (56-62)	27 (24-29)	23 (20-25)
<i>reticulifera</i>	20 (17-25)	59 (56-63)	26 (24-28)	22 (19-25)
<i>bicolor</i>	22 (18-25)	60 (57-64)	26 (24-28)	22 (19-25)
<i>wilkinsi</i>	20 (17-24)	59 (54-62)	27 (25-29)	22 (20-25)
<i>euclia</i>	20 (17-24)	53 (51-55)	28 (26-30)	25 (23-27)
<i>dissecta</i>	20 (17-23)	56 (53-59)	28 (26-31)	23 (21-25)
<i>piperita</i>	21 (18-26)	60 (57-64)	25 (22-28)	21 (19-24)
<i>trenberthae</i>	24 (20-27)	59 (56-62)	24 (22-27)	21 (19-23)
<i>comptoni</i>	23 (19-27)	62 (59-66)	24 (21-27)	21 (19-24)
<i>mayi</i>	23 (20-27)	65 (61-68)	24 (22-27)	21 (19-24)
<i>casta</i>	24 (21-28)	62 (59-65)	24 (22-27)	19 (18-22)
<i>declivis</i>	24 (20-27)	66 (63-69)	24 (22-27)	19 (17-22)
<i>moelleri</i>	24 (20-27)	62 (58-65)	26 (23-28)	20 (19-23)
<i>angustata</i>	26 (22-30)	67 (64-71)	24 (21-27)	19 (17-22)

<i>piperita</i>	Cape Leeuwin to Eden
<i>trenberthae</i>	Spencer Gulf: Tumby Bay (locally)
<i>comptoni</i>	Hopetown to Malacoota; Tasmania
<i>mayi</i>	Port Mac Donnell to Malacoota; Tasmania
<i>casta</i>	Port Mac Donnell (locally)
<i>declivis</i>	Port Mac Donnell to Lorne; Tasmania
<i>moelleri</i>	Lakes Entrance to Eden (deep water)
<i>angustata</i>	Port Drummond to Eden; Tasmania

Therefore, *Notocypraea pulicaria* is almost restricted to the southern west coast of Australia, with the center at Cape Naturaliste. - Its range approximately coincides with that of *N. occidentalis* which is connected both geographically and morphologically by *N. reticulifera* (western south coast) with the typical *N. bicolor* (eastern south coast and Tasmania); *N. wilkinsi* seems to be at most a local mutant from Victoria, and *N. euclia* is the deep water representant of *N. bicolor* in the Great Australian Bight. - The third species, *N. piperita*, is not represented on the west coast, but otherwise its range is similar to that of *N. bicolor*; however, the slender subspecies do not reach Tasmania (the typical *N. piperita* occurs from south-western Australia to Eden, and is replaced by *N. dissecta* in the deep waters of southern New South Wales), while the pyriform *N. comptoni* and *N. mayi* reach Tasmania (the latter evidently does not spread west of Victoria); *N. trenberthae* and *N. casta* seem to be local mutants living in restricted areas only. - The fourth species, *N. angustata*, evidently originated in the Bass Strait: while *N. declivis* seems to be restricted to this area, *N. angustata* occurs sporadically as far as to the Spencer Gulf and Eden, and is replaced by *N. moelleri* in the deep waters of southern New South Wales.

TAXONOMY

The *Notocypraea* characterized in the dichotomous key should be comprised into four or five species:

1. *Notocypraea pulicaria*, which is geographically the only species restricted to less cold waters, and morphologically the only well separable species among its allies, showing characters least aberrant from other Cypraeovulinae; nevertheless I do not recommend to separate it as a monotypical subgenus *Guttacypraea*;

2. *Notocypraea bicolor*, which approaches it in some respects and evidently originated farther west along the south coast, than

3. *Notocypraea piperita* did, which approaches especially in color the most eastern species,

4. *Notocypraea angustata* (from which *N. declivis* possibly can be separated as a more primitive species): this species is restricted to the coldest regions around the Bass Strait and shows the most unusual features (fossula!) so that it should be regarded as the last extreme offspring of the phylogenetic branch called *Notocypraea*.

Therefore, this sequence of species seems to indicate the way of evolution of the genus; it is confirmed by other units named in the key above, which partially seem to be connecting links between the typical representatives of the four species.

The other eleven taxa should be classified as subspecies according to the International Rules of Zoological Nomenclature, though their significance in evolution is quite unequal: but this essential fact has not been considered by the Rules so that all units must be treated formally as equal.

There are only three taxa forming a cline, which are separated geographically so well that they should be

called geographical (chorological) races: *occidentalis*, *reticulifera*, and *bicolor* (the former is more separated morphologically than the two last named each from the other). In other pairs excluding each member from the other, viz. *piperita* - *dissecta* and *angustata* - *moelleri* there are differences in the depth of the inhabited waters; *euclia* is a deep water "race" of *reticulifera* inhabiting the adjacent shores. The relation between *piperita* - *comptoni* - *mayi* is less evident: as their geographical distribution is greatly overlapping (though differing slightly in border areas) they look like an ecological cline. Other "subspecies" (for which the unofficial term "infraspecies" would be more adequate) seem to represent local mutants which recently arose so that there was no time to spread ("no veliger"!): *wilkinsi* from *bicolor*; *trenberthae* and *casta* from *comptoni*. Possibly the status of *declivis* may be similar, as it agrees with *angustata* in all essential characters except the freckled dorsum; but it has spread to a large area within that of *angustata*, and there are few intermediates so so that one could treat *declivis* also as a fifth species, especially if the differences in the radula should be proved.

The other names mentioned above in the chronological list should be regarded as synonyms as they designate individual modifications at most: *subcarnea* and || *globosa* refer to *angustata* pathologically suffused with yellowish enamel, and *albata* likewise with white enamel so that the lateral spots become hidden and the base very callous; *leucochroa* is a name for the "albinism" of "*piperita* (SOLANDER) GRAY", therefore it may be a *piperita* the dorsum of which is white instead of fawn (I have seen such a zonate white shell with spotted margins), or even - if it should be interpreted as pure white - a prior synonym of *casta*; *candida*, however, probably is an albinotic *pulicaria* or based on a beach worn shell of this species; *emblema* seems to be identical with *moelleri* in spite of the differences in radula; *lentiginosa* (not preoccupied!) is an absolute synonym of *declivis*, as well as || *maculata*, || *castanea* and *verconis* are synonyms of *angustata*.

CLASSIFICATION

The *Notocypraea* discussed above can be arranged in the following list which shows the evolutionary trend (s = subspecies and i = infraspecies limited c = chorologically (geographically) or e = ecologically; ir = restricted mutants; v = individual variants; the = sign indicates important synonyma, || designates preoccupied names, / denotes authors who used the name not in the original meaning).

Notocypraea SCHILDER, 1927

type: *piperita* GRAY

= *Thelxinovum* IREDALE, 1931, type: *moelleri* IREDALE

= *Guttacypraea* IREDALE, 1935, type: *pulicaria* REEVE

pulicaria REEVE, 1846

= *candida* COEN, 1949

bicolor GASKOIN, 1849

sc *occidentalis* IREDALE, 1935

sc *reticulifera* SCHILDER, 1924

ie *euclia* STEADMAN & COTTON, 1946

= *pulicaria* /VERCO, 1912, VAYSSIÈRE, 1923

sc *bicolor* GASKOIN, 1849

= *piperita* /SOWERBY, 1832 /GRIFFITHS, 1961, 1962

ir *wilkinsi* GRIFFITHS, 1959

piperita GRAY, 1825

se *piperita* GRAY, 1825; GASKOIN, 1849

= *comptoni* /GRIFFITHS, 1961, 1962

ie *dissecta* IREDALE, 1931

se *comptoni* (em.) GRAY, 1847

ir *trenberthae* TRENBERTH, 1961

ir *casta* SCHILDER & SUMMERS, 1963

= *comptoni* var. /COTTON & GODFREY, 1932

? = *leucochroa* SULLIOTI, 1924

se *mayi* BEDDOME, 1898

declivis SOWERBY, 1870 (ir of *angustata*?)

= *angustata* /GRAY, 1828

= *lentiginosa* COEN, 1949

angustata GMELIN, 1791; GRAY, 1825

= || *maculata* PERRY, 1811

= || *castanea* ANDERSON, 1836

= *subcarnea* /SCHILDER, 1927

= *bicolor* /IREDALE, 1931

= *verconis* COTTON & GODFREY, 1932

v *subcarnea* BEDDOME, 1896, 1898

= || *globosa* VAYSSIÈRE, 1910

v *albata* BEDDOME, 1898

ie *moelleri* (em.) IREDALE, 1931

= *emblema* IREDALE, 1931

ACKNOWLEDGMENTS

The present study is based mainly on several hundred specimens with exact locality data, sent to me chiefly by Dr. C. M. Burgess, Col. R. J. Griffiths, Mr. Ray Summers, and Mr. B. R. Wilson (they had been collected in part by Mrs. Bowman, Constantine, Crabbe, Lang, Marsh and Trenberth). I am much obliged to these malacologists for allowing me to keep about 600 specimens in

my collection for permanent study; this number is about six times as large as the sum total of all *Notocypraea* which I could study in the public and private collections of almost all countries of Europe. Most specimens came from Victoria and West Australia, some interesting shells also from South Australia, whereas my personal knowledge of specimens from Tasmania and New South Wales is still rather limited.

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The Egg Capsule and Young of *Beringius eyerdami* SMITH (Neptuneidae)

BY

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(Plate 7)

Beringius eyerdami SMITH, 1959, though only recently discovered and described, is widely distributed along the coast of British Columbia. I now have specimens from seven localities between Swiftsure Light in the entrance to Juan de Fuca Strait and Hakai Pass near Calvert Island. More specimens have been secured in Hecate Strait than in any other region. Here it occurs at depths of about 50 fathoms on relatively smooth bottoms of sandy mud with some gravel and shell. Associated with it here are *Neptunea lirata* (GMELIN, 1791), *N. smirnia* (DALL, 1919) and an unnamed species of *Neptunea* that is presently under study by Allyn Smith of the California Academy of Sciences.

On a voyage that lasted from April 8 to 13, 1962, a trawler operating on Goose Island Banks, Hecate Strait, B. C., brought up in its net three specimens of *Beringius eyerdami* and, along with them, a valve of *Pecten caurinus* to which were attached three egg capsules of a type new to me. While the mere association of the capsules with the adult *B. eyerdami* would not in itself

serve to identify them, a close study of the young in the capsules has convinced me that they are that species.

The capsules are larger than any reported so far in this group of mollusks and differ also in some other features. Each capsule is cemented to the substrate by a double flap-like extension of its outer material arising from its long edge. Each is a thin pouch-like vessel placed so as to overlap the next one (Plate 7, fig. 1). The capsules measured wet were 42.2 mm by 32.6 mm; 41.5 mm by 31 mm and 41 mm by 38 mm. When dry, corresponding measurements are 38 by 25, 38 by 24, and 35 by 28 millimeters.

The outer surfaces of the capsules are of an off-white colour, and when wet appear very pale yellow. Each capsule is a complete envelope within an envelope, the two differing in structure but of approximately equal thickness. The inner envelope, however, is much tougher, more difficult to cut than the outer, and when wet, is strongly resistant to tearing. Two of the capsules were intact, and in these the edges were firmly closed all



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