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OLSSONELLA SCALATELLA (GUPPY) LIVING OFF NORTHERN SOUTH AMERICA (MOLLUSCA: NEOGASTROPODA: CANCELLARIIDAE)

by

A. VERHECKEN

Verhecken, A.: *Olssonella scalatella* (Guppy) living off northern South America (Mollusca, Neogastropoda, Cancellariidae).

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Key words: Mollusca; Cancellariidae; *Olssonella*; South America.

Olssonella scalatella (Guppy, 1873), originally described from early Pliocene deposits in Jamaica, still occurs as a recent species off the northern coast of S. America. This opinion is based on shells collected off Surinam and French Guyana, fossil specimens from the type-locality, and data from the literature. *O. smithii* (Dall, 1888) is considered a closely related recent species, occurring more to the north; it differs from *O. scalatella* mainly in characters of the protoconch. Conchological characters of the two taxa are discussed and some general notes are given concerning the importance of protoconch characters.

A. Verhecken, Ed. Arsenstraat 47, B-2510 Mortsel, Belgium.

INTRODUCTION

The cancellariid genus *Olssonella* Petit, 1970, was introduced for a clearly defined group of species with a roughly Central American distribution. The genus consists of: (1) nine fossil species from the SE. United States, the Panama region and some Caribbean islands, and (2) three recent species, viz. the Panamic-Pacific *Cancellaria funiculata* Hinds, 1843 and *Trigonostoma campbelli* Shasky, 1961, and the Western Atlantic *Cancellaria smithii* Dall, 1888. This last species is the type by original designation of the genus *Olssonella*.

No other recent species of *Olssonella* has been mentioned under that name from the Caribbean or the Western Atlantic. Petuch (1981: 333, figs. 79, 80), however, reported a species taken off Venezuela, that he refers to as *Agatrix epomis* (Woodring, 1928) but that, after his figures, appears to be either *Olssonella smithii* or *O. scalatella* (Guppy, 1873); the eleven specimens are kept in

the Invertebrate Museum Collection of the Rosenstiel School of Marine and Atmospheric Science at Miami, Florida. A repeated request to this Institution for loan of the shells remained unanswered. Two specimens in a private Venezuelan collection, from a locality close to Petuch's and reported by Princz (1982: 174) as *Agatrix* cf. *A. smithii* (Dall, 1888), probably belong to this same species.

The present paper reports on recent specimens, here identified as *O. scalatella* (Guppy, 1873), that were collected off Surinam and French Guyana. This species was originally described from assumedly Miocene deposits, for which planktonic Foraminifera studies now indicate an early Pliocene age (Bolli & Premoli Silva, 1973: 489, 493).

Abbreviations used: AV, Author's collection; KBIN, Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels; NMB, Naturhistorisches Museum, Basel; MNHN, Muséum National d'Histoire Naturelle, Laboratoire de Biologie des Invertébrés Marins et de Malacologie, Paris; RMNH, Rijksmuseum van Natuurlijke Historie, Leiden; USNM, United States National Museum, Smithsonian Institution, Washington; ZMA, Zoölogisch Museum, Amsterdam.

MATERIAL

Nine specimens of a recent *Olssonella*, taken off Surinam and French Guyana, are kept in RMNH. These shells have been collected by three Dutch Guyana Shelf Expeditions: the "Onderzoek Continentaal Plat Suriname" (OCPS), 1966, by R.V. "Snellius"; and the "Luymes Guyana Shelf Expeditions" (LGSE) in 1969 and 1970 by R.V. "Lyumes". Lists of stations have been published for the 1966 and 1969 expeditions (Vervoort, 1967, 1971); one specimen was taken at each of the following stations: OCPS D 33, LGSE I 70 (specimen preserved in alcohol), LGSE I 116, LGSE K 104. For the 1970 campaign the relevant stations are given below (also one specimen at each station).

Locality data of LGSE 1970 stations

Date	Stat.	Coordinates	Depth	Remarks
Off Surinam				
24.viii	3	7°2'N 53°35'W	80 m	trawl, grab; calcareous sand
28.viii	41	6°43'N 53°53'W	40 m	grab; sand, shells
Off French Guyana				
24.viii	6	6°32'N 53°35'W	44 m	dredge, grab; muddy calcareous sand
26.viii	14	6°44'N 52°45'W	76 m	trawl, grab; muddy calcareous sand
26.viii	15	6°36'N 52°50'W	72 m	detritus sledge, grab; calcereous sand

Three shells have remains of a thin fawn periostracum, and one specimen

has the soft parts preserved, so that there is no doubt that these specimens are really recent.

At first sight, these specimens were identified as *Olssonella smithii*. However, comparison with the syntypes of *O. smithii* (USNM 83543) and with seven more specimens of that species, reveals that the South American shells have a more impressed suture and, especially, a very different protoconch (figs. 3a–b, 4a–b). *O. smithii* seems to be confined to the waters off the Atlantic coast of the United States near Cape Hatteras (type-locality), the Carolinas (Abbott, 1974: 248), and Florida (specimens in ZMA). A single specimen is reported under this name from Campeche Bank, west of Yucatan Peninsula (Rice & Kornicker, 1965: 125, pl. 6 fig. 3). The difference in protoconch, together with the complete separation of the known ranges, seem to justify a separation of *O. smithii* and the South American taxon.

The RMNH specimens have also been compared with the description of *Cancellaria scalatella* by Guppy (1873: 78), with enlarged photographs of the lecto- and paralectotype of that taxon, and with fossil specimens of it from the type-locality, kept in NMB. This comparison leaves little doubt as to the identity of the RMNH specimens with *O. scalatella*; the protoconch is clearly of the same type. *O. scalatella* has been described from the Bowden Formation of Jamaica. The Bowden shell bed has been assigned to the "*Globorotalia margaritae* Zone" by Bolli & Bermùdez (1965: 125), which is of early Pliocene age (Bolli & Premoli Silva, 1973: 489, 493).

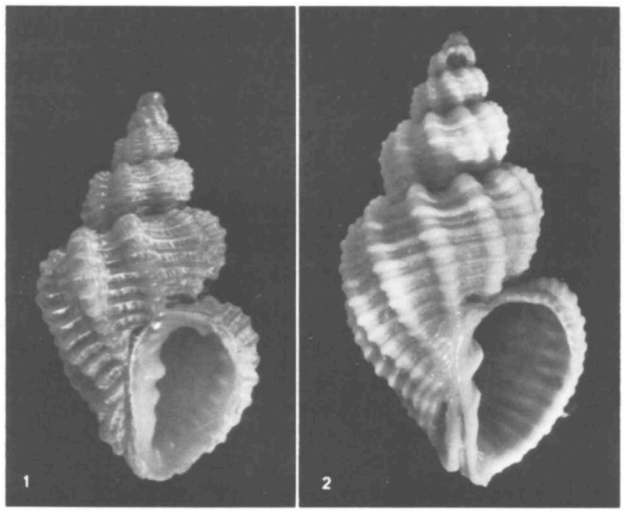
Olssonella scalatella (Guppy, 1873)

Cancellaria scalatella Guppy, 1873: 78, pl. 2 fig. 4.
Trigonostoma scalatella — Woodring, 1928: 224, pl. 13 fig. 1.

Type-material. — USNM 115474: lectotype (height 15.9 mm, width 8.8 mm) and paralectotype (14.0 × 7.4 mm).

Description. — Shell fusiform, white to pale brownish, with up to six whorls, a height of 13.9 mm and a width of 7.2 mm. Brownish specimens with a single white band just above the suture, continuing near the periphery of the body-whorl. Traces of a very thin periostracum remain on three specimens.

Protoconch slightly heterostrophic, white to brown, paucispiral, with 0.75 to one whorl (counted according to Kerney & Cameron, 1979: 13). Maximum diameter 0.7–0.9 mm, visible height 0.7–0.9 mm. There are numerous arrays of tiny nodules or short ridges, arranged into spiral lines. This spiral sculpture is conspiuous on the first half whorl only, and almost non-existent on the last



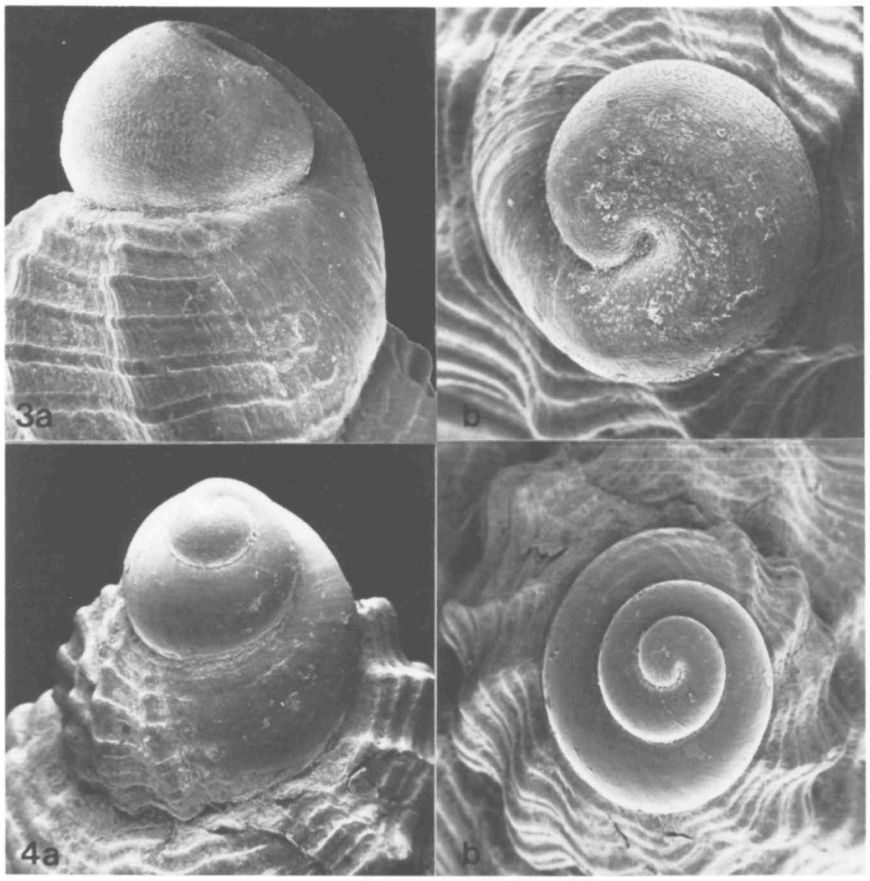
Figs. 1, 2. *Olssonella* spec. 1, Recent *O. scalatella*, actual dimensions 10.2 × 5.5 mm; LGSE 1970, station 6, depth 44 m (RMNH). 2, *O. smithii*, actual dimensions 14.8 × 7.9 mm; Florida, East of St. Augustine, depth 40 m; T. Yocius leg. (ZMA). Photographs: G. J. van Zonneveld, RMNH.

half whorl, which shows merely some faint growth-lines. The protoconch sculpture ends abruptly at the rim of the protoconch, where the teleoconch sculpture starts with the spiral bands.

Teleoconch whorls separated by a very deep suture. Sculpture consisting of strong broad rounded axial ribs, crossed by strong spiral cords. From the second teleoconch whorl on, secondary spirals may occur between the main spirals. Number of axial ribs and spiral cords respectively: on first teleoconch whorl, 8–12 and 6–8; on second, 8–10 and 8–9; on third, 7–10 and 8–10; on fourth, 7–9 and 8–10; on fifth, 8 and 9.

Aperture rounded trigonal, often with a parietal tooth. Columella straight, with two folds near its middle; the uppermost fold is the strongest. Outer lip in most specimens with seven to ten inner lirae. The umbilicus varies from almost closed to clearly marked.

Distribution. — The Guyana Shelf has been extensively investigated by the Dutch expeditions. During the three campaigns samples were taken at a total of 154 stations. *O. scalatella* was collected at nine stations only, with one specimen at each station. This could indicate a low-density distribution for this species. It must be emphasized, however, that the mesh-size of the sampling nets used (Agassiz trawl and triangular dredge) was 10 mm, which is near the maximum size of this species. Thus, most probably *O. scalatella* has only been



Figs. 3, 4. Protoconchs of *Olssonella* spec. 3a–b, Recent *O. scalatella*, × 72; LGSE 1970, station 14, depth 76 m (RMNH). 4a–b, *O. smithii*, × 32; trawled by scallop fishermen, off Mt. Pleasant, South Carolina, U.S.A. (AV). SEM-photographs: SEM-laboratory, University of Basel; M. Düggelin, operator.

collected exceptionally, e.g. when the net was clogged by sand and other material (such as worm-tubes, as reported by Vervoort, 1971: 40). Therefore, it could be assumed that the species is more generally distributed than is apparent from the data available here.

The stations that yielded *O. scalatella* are concentrated in the eastern half of the explored area: eight stations are situated between 6°30′–7°N and 52°45′–55°W. Two of these stations (LGSE 14 and 15) are on the extreme eastern limit of the sampled area; this suggests that the species might range still further east. Although the area has been sampled to almost 58°W, no *O.*

scalatella was collected west of 56°W. The nature of the bottom of these stations is sandy, varying from muddy sand to calcareous sand.

The Guyana Shelf stations have been chosen on parallel lines roughly perpendicular to the general coast-line. The depths are mostly between 20 and 200 m, but the extremes are 6 and 940 m. Specimens of *O. scalatella* were found only at depths between 40 and 80 m; the single specimen with soft parts coming from 40 m.

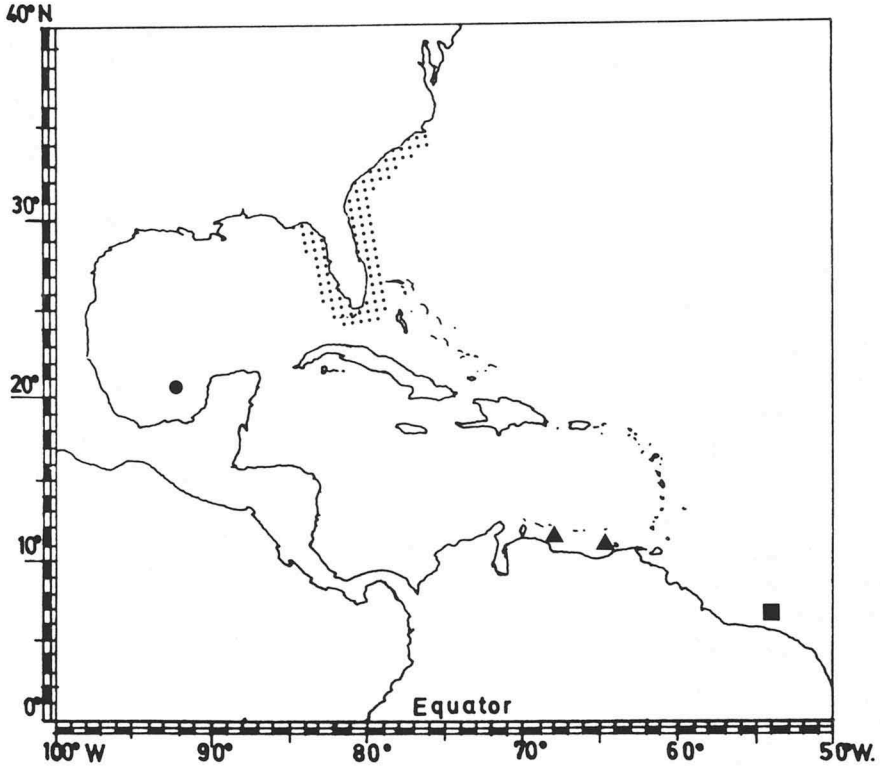


Fig. 5. Distribution of *Olssonella* spec. *O. smithii*: dotted area and single larger dot (Campeche Bank). Recent *O. scalatella*: square (RMNH-specimens) and triangles (after Petuch, 1982, and Princz, 1983).

DISCUSSION

The finding of living specimens of *Olsonella scalatella*, considered an early Pliocene species up till now, leaves a gap of about four million years between

documented fossil and recent forms. Petit (1970: 84) mentions an *Olssonella* "species cf. *smithii* Dall" from the Moín Formation, Pleistocene of Costa Rica, but no additional data are given.

The resemblance between *O. smithii* and the recent specimens of *O. scalatella* suggests a close relationship. If it were not for the different type of protoconch, the present writer would be inclined to consider these taxa one species, notwithstanding the large gap between their ranges (fig. 5).

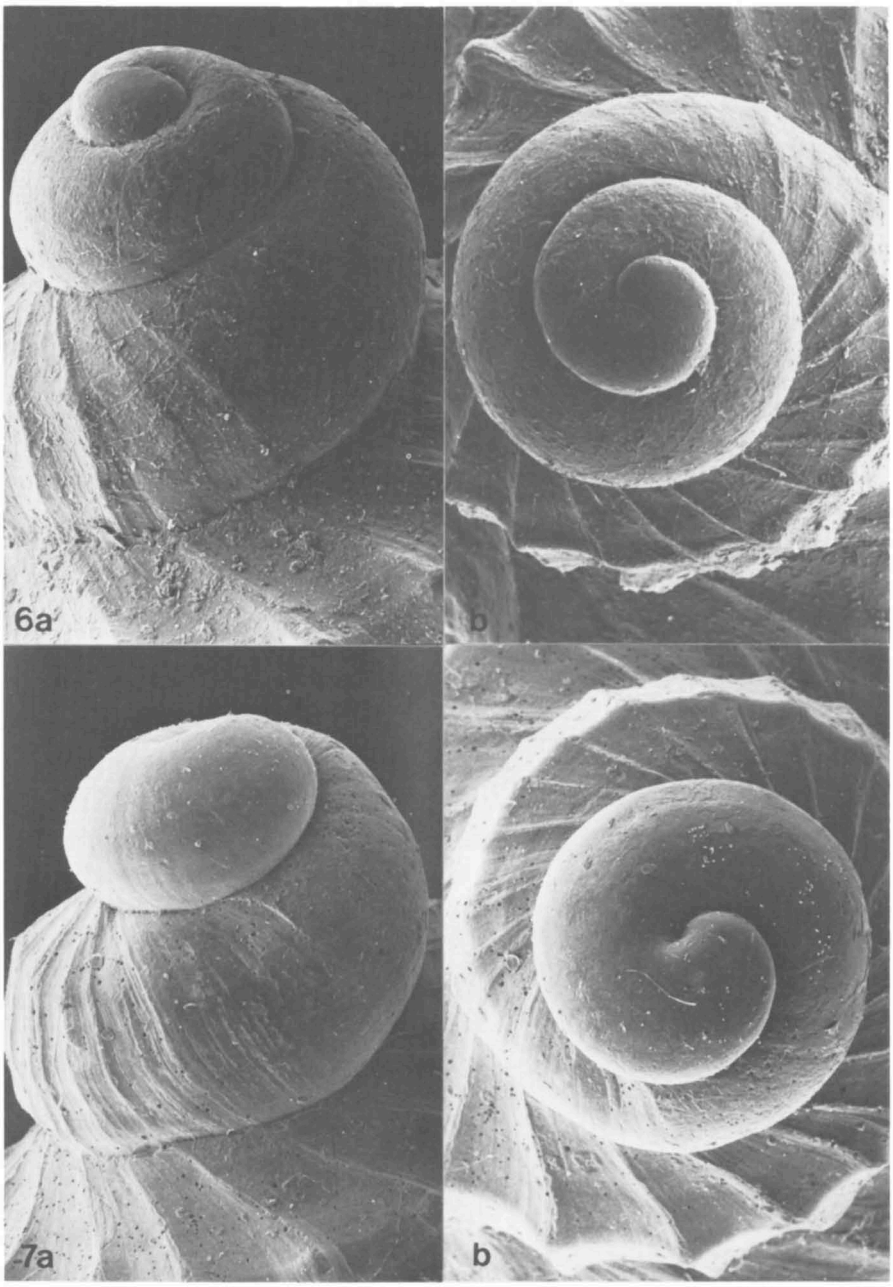
According to Dall (1889: 130) *O. smithii* has a more attenuated form, fewer varices, and a smaller aperture, as compared to *O. scalatella*. This could not be confirmed by the material studied. It should be remarked, however, that Dall's specimens of *O. smithii* are comparatively small: height 10.5 and 5.8 mm, with 3.75 and 2.75 teleoconch whorls respectively. The species can reach a height of 15 mm, with 4.5 teleoconch whorls.

Woodring (1928: 224), comparing *O. scalatella* and *O. smithii*, states that the latter species "has the same kind of sculpture and aperture, but its peristome is attached to the greater part of the parietal wall, and consequently its umbilicus is much narrower". In his description of *Olsonella*, Petit (1970: 83) states: "umbilicus may be present in varying degrees, differing even in the same species between juvenile and adult specimens". This is confirmed by the specimens studied of *O. smithii* and also by the Recent South American specimens. Not enough fossil specimens of *O. scalatella* were available to ascertain this same fact for the fossil form, but the umbilicus of the paralectotype is much more closed than that of the lectotype. Anyway, the relative dimension of the umbilicus does not seem to be of high diagnostic value.

According to the figure published by Gardner (1937: pl. 45 fig. 12), *O. smithii* has the same type of protoconch as *O. sphenoidostoma* (Gardner, 1937), a Miocene species reported from Florida and Jamaica. Also the other two Recent species of *Olssonella*, viz. *O. funiculata* and *O. campbelli*, have this same type of protoconch. This might suggest an other phylogenetic lineage for this group of species than for *O. scalatella*, or it could simply reflect different environmental factors in the habitat of the species involved.

STABILITY OF PROTOCONCH FORM IN CANCELLARIIDAE

In molluscan studies, the general tendency has been to classify very similar shells with a different type of protoconch as different species. Robertson (1974: 223) states that "the following characters generally vary little within a species, and are generally diagnostic of a species when related species are compared: 1° spawn (structure); 2° egg size; 3° stage of development at



Figs. 6, 7. Protoconch of *Solatia piscatoria* Gmelin, × 56; Cotonou, Dahomey (KBIN no. 10,951). 6a–b, normal form; 7a–b, unusual form. SEM-photographs: Dr. Grootaert, KBIN, Brussels.

which hatching occurs; 4° veliger (shape and coloration of shell and velum, sculpture of shell, etc.); and 5° size at which metamorphosis can occur". Most of these factors are reflected in the protoconch of the adult gastropod shell. However, already Thorson (1949: 33), and some authors after him, e.g. Robertson (1974: 227) and Bandel (1975: 93), cite some species that have been reported with different types of protoconch in relation to environmental factors such as temperature, salinity, depth.

Nothing has been published on this matter concerning the family Cancellariidae. In a lot of *Solatia piscatoria* (Gmelin, 1791) collected at Cotonou (Dahomey) by the Mission Gruvel in 1910, and kept in the Dautzenberg collection, KBIN, a single shell was noted having a protoconch that differs in shape from that normally found in this species (cf. figs. 6a–b, 7a–b). This example might indicate that the type of protoconch indeed is not necessarily constant within a single species, even not at the same locality.

No literature data are available on the stabilty, in geological time, of the cancellariid protoconch type within a given lineage. The Recent specimens of *O. scalatella* studied here do have the same type of protoconch as the early Pliocene representative of this species.

CONCLUSION

The species studied in this paper closely resembles *O. smithii*, mainly the protoconch being different. Although, as indicated in the previous chapter, a different protoconch might not necessarily indicate a different species, it is proposed here that the South American specimens are *O. scalatella* and not *O. smithii*. This opinion is based on the geographical separation between both groups of populations, and on the similar protoconch of the fossil *O. scalatella* and the species studied. The diagnostic value of the protoconch is regarded higher than that of the size of the umbilicus.

A final answer will have to await a thorough study of the phylogenetic relations between the species of *Olssonella*, or a comparison of the soft parts of *O. smithii* and *O. scalatella*.

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