Revision of Ordovician–Silurian gastropods from North Greenland

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Ordovician–Silurian gastropods from western North Greenland collected by the British Arctic Expedition (1874–1876) and described by R. Etheridge (1878) are reviewed. *Offleyotrochus* n. gen. is proposed, with type species *O. naresi* (Etheridge, 1878) from the Silurian of Offley Ø, and assigned to the family Euomphalidae.

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The British Arctic Expedition of 1874–1876 under the leadership of Sir George Nares (summary and bibliography in Koch, 1940), in addition to significant geological observations (Feilden & De Rance, 1878), made large collections of fossils from both western North Greenland and adjacent north-eastern Ellesmere Island. These fossils, described by Etheridge (1878), included the first well described Lower Palaeozoic faunas from North Greenland and provided a basis for early attempts at regional geochronology. Etheridge (1878) listed more than 90 species of Palaeozoic fossils of which two thirds were said to be derived from strata of "Silurian" age – in the pre-Lapworth sense to include both Ordovician and Silurian of current usage. Twelve new species or varieties were named, all but one of these from the Ordovician–Silurian.

A general faunal revision of Etheridge's described material, housed in the British Museum (Natural History), London, has seemingly not been undertaken, although several individual specimens, species or higher taxa have been referred to by subsequent authors, e.g. individual corals by Scrutton (1975) and McLean (1977). However, few of the then new taxa described by Etheridge (1878) are adequately known, although the possible age priority over subsequently described species gives these taxa considerable systematic importance.

Etheridge (1878) recorded 10 species of Ordovician–Silurian gastropods from the area adjacent to Kennedy Channel, of which three were new species. *Raphistoma aequale(?)*, a species of *Holopella* and *Maclurea magna* were reported only from Ellesmere Island and are not considered further. A preliminary discussion of the remaining species, collected from Greenland, is given below. It should be noted that not all the gastropod specimens referred to by Etheridge (1878) or registered in the accessions catalogue of the British Museum (abbreviated subsequently to BM) could be located in the time available.

With the exception of the specimen of *Maclurites*, all the examined specimens discussed below originate from localities with Silurian strata. It is presumed that the material was collected more

or less *in situ,* and there is no evidence from the fossil identifications to suggest otherwise. *Maclurites* is a characteristic Ordovician genus known to be widely distributed in Lower, Middle and Upper Ordovician strata in North Greenland (Troedsson, 1928; Christie & Peel, 1977). The Silurian taxa are not useful for precise age determination, at this time.

Silurian gastropods have subsequently been described from the same area of Greenland by Poulsen (1974), on the basis of collections made by Lauge Koch a half century previously. The fauna possibly has a single high spired gastropod in common with Etheridge's material, together with the ubiquitous platyceratids, but is not otherwise similar.

Murchisonia (?Murchisonia) latifasciata Etheridge, 1878

Fig. 1 A, B, D

Murchisonia latifasciata Etheridge, 1878, p. 600-601, Plate XXVII, fig. 1.
Murchisonia,? sp., Etheridge, 1878, p. 601, Plate XXVII, fig. 2.

Holotype. BM 89165, collected from the Silurian of Offley Ø, Coppinger collection C.01.X.

Additional material. BM 89164, a poorly preserved specimen from Offley Ø which Etheridge (1878) referred to *Murchisonia,?* sp. is almost certainly referable to *M. (?M.) latifasciata* (fig. 1 A).

Discussion. This species is delimited from other Silurian species of the Murchisoniacea principally on account of its large size – the holotype when complete probably approached 15 cm in height, of which about 9 cm are currently preserved. Etheridge's original illustration of the holotype is reasonably correct and clearly shows the rather wide selenizone between bordering threads. The selenizone is located rather low on the whorl periphery causing *M. (?M.) latifasciata* to resemble *M. (?Hormotoma) cingulata* (Hisinger, 1829) from the Silurian of Gotland and *M. (H.)* sp. A of Peel (1977) from the Early Silurian Ross Brook Formation of Arisaig, Nova Scotia. The Arisaig species, however, has steeply inclined, nearly orthocline, growth lines above the selenizone while corresponding growth lines in *M. (?M.) latifasciata* are much more oblique. *M. (H.) cingulata,* as illustrated by Lindström (1884, pl. XII, figs 9-10), is apparently distinguished from *M. (?M.) latifasciata* by its smaller size, and relatively narrower selenizone with less pronounced bordering threads.

The subgeneric position of all these species is to some extent unsatisfactory since assignment to *Murchisonia s.s.* or *Hormotoma* depends to a large extent on the degree of emphasis of the cords bordering the selenizone. In *Hormotoma* the selenizone is delimited by threads while in *Murchisonia s.s.* prominent cords are often present. The three species discussed here lie somewhere between the two extremes.

Undetermined murchisoniacean

Fig. 1 C

Material. BM G.14088, a single poorly preserved specimen from the Silurian of Offley Ø, Coppinger collection C.01.aa.

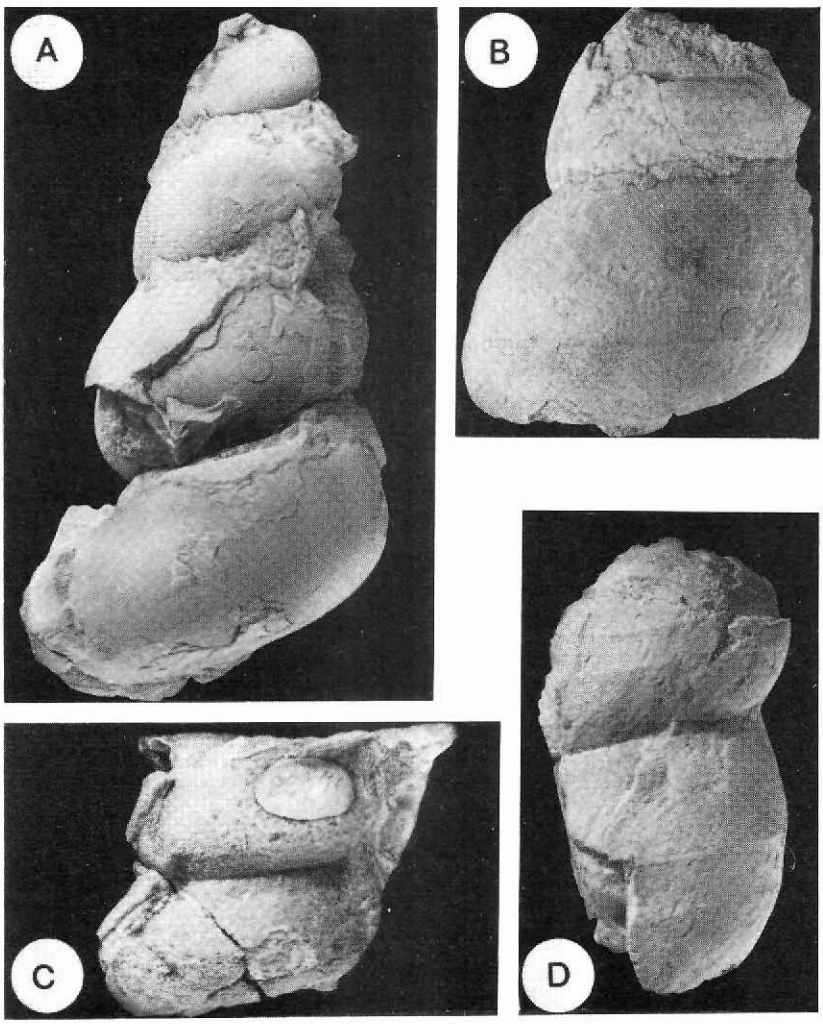

Fig. 1. A,B,D, *Murchisonia (?Murchisonia) latifasciata*, × 1. A, BM 89164; B,D, BM 89165, holotype. C, Undetermined murchisoniacean, BM G.14088, × 1.5.

Discussion. This high spired murchisoniacean gastropod was neither illustrated nor discussed by Etheridge (1878), but is too poorly preserved for determination. Poulsen (1974) referred a morphologically similar specimen from the Silurian of Kap Morton, northern Washington Land to *Michelia? persimilis* sp. nov., while Whiteaves (1884) had referred a similar shell from the Silurian of Canada to *Murchisonia turritiformis*. The correct generic assignment of the species, or group of species is uncertain, but the Offley Ø example does not contribute to the issue.

Offleyotrochus n. gen.

Type species. Helicotoma naresi Etheridge, 1878.

Derivation of name. After Offley Ø, western North Greenland, the collection locality of the holotype of the type species.

Diagnosis. Seemingly discoid, dextral gastropod with shallow, widely phaneromphalous umbilicus and a V-shaped emargination on the umbilical wall near the adpressed suture with the previous whorl.

Discussion. The upper surface of *Offleyotrochus* is unfortunately unknown, although characters of the basal surface, particularly the subsutural emargination, are quite distinctive. *Helicotoma* Salter, 1859, an Early – Middle Ordovician genus (Knight *et al.*, 1960), has a more convex base and a narrower, deeper umbilicus without the diagnostic emargination of *Offleyotrochus.*

Common Silurian genera which may appear superficially similar to the North Greenland genus include *Euomphalopterus* Roemer, 1876, *Centrifugus* Bronn, 1834, and *Poleumita* Clarke & Ruedemann, 1903. *Euomphalopterus* has a wide peripheral flange seemingly wanting in *Offleyotrochus,* and a narrow umbilicus with incised rather than adpressed sutures. In addition, growth lines in *Euomphalopterus* on the base of the whorl are concave adaperturally, not convex as in *Offleyotrochus,* and show no subsutural emargination. Growth lines in *Centrifugus* are convex adaperturally in the immediate vicintity of the tiny peripheral emargination, but soon sweep with adaperturally concave form into the widely phaneromphalous umbilicus; a subsutural emargination is not developed. In *Poleumita* and related euomphalaceans, the umbilicus tends to be widely phaneromphalous, as in *Offleyotrochus,* but the base is generally less flattened. A subsutural emargination is not present although Knight (1941, p. 122) noted a slight adapertural swing of the growth lines immediately adjacent to the umbilical suture in the Carboniferous *Euomphalus pentangulatus* Sowerby, 1814.

Affinities and suprageneric classification. Offleyotrochus most closely resembles *Centrifugus,* a characteristic Gotland snail of slightly younger, Late Silurian, age than the Greenland occurrence. There is some suggestion in *Offleyotrochus* of a narrow peripheral angulation of the type seen in Bronn's genus. The latter is also characterised by a subsutural sinus but on the upper surface of the whorl as distinct from on the umbilical, as in *Offleyotrochus.* Although the umbilical emargination is absent in *Centrifugus,* the adapertural concavity of the growing edge is sufficient to excavate a broad shallow sinus in the basal lip, with growth lines curving adaperturally as they approach the umbilical suture. However, there is little to suggest that this emargination is morphologically or functionally related to the narrower, deeper emargination seen in *Offleyotrochus.*

Offleyotrochus is tentatively referred to the archaeogastropod family Euomphalidae de Koninck, 1881 *sensu* Knight *et al.* (1960), as modified by Taylor & Sohl (1962), to lie close to *Centrifugus.*

Offleyotrochus naresi (Etheridge, 1878)

Fig. 2

Helicotoma Naresii Etheridge, 1878, p. 602, Plate XXVII. fig. 3.

Holotype. BM 89163, collected by Coppinger from the Silurian of Offley Ø.

Additional material. Etheridge (1878) referred only the holotype to his species, although an additional, poorly preserved specimen from Offley Ø (BM G.14086 from Coppinger collection C.01.K) is undoubtedly conspecific.

Description. Large, widely phaneromphalous, probably discoidal gastropod with slowly expanding whorls. Apical whorls and upper surface unknown. Base with broad, flattened basal surface passing via angular umbilical shoulder into a concave subsutural channel (the umbilical wall), the adumbilical margin of which is adpressed against the base of the previous whorl. Aperture poorly known; basal lip convex adaperturally, curving strongly into the subsutural channel which is the locus of a V-shaped emargination. Base ornamented with growth lines; shell structure and thickness unknown.

Discussion. About three and a half whorls are preserved in the holotype (fig. 2 A) but the apex and aperture are both lacking.

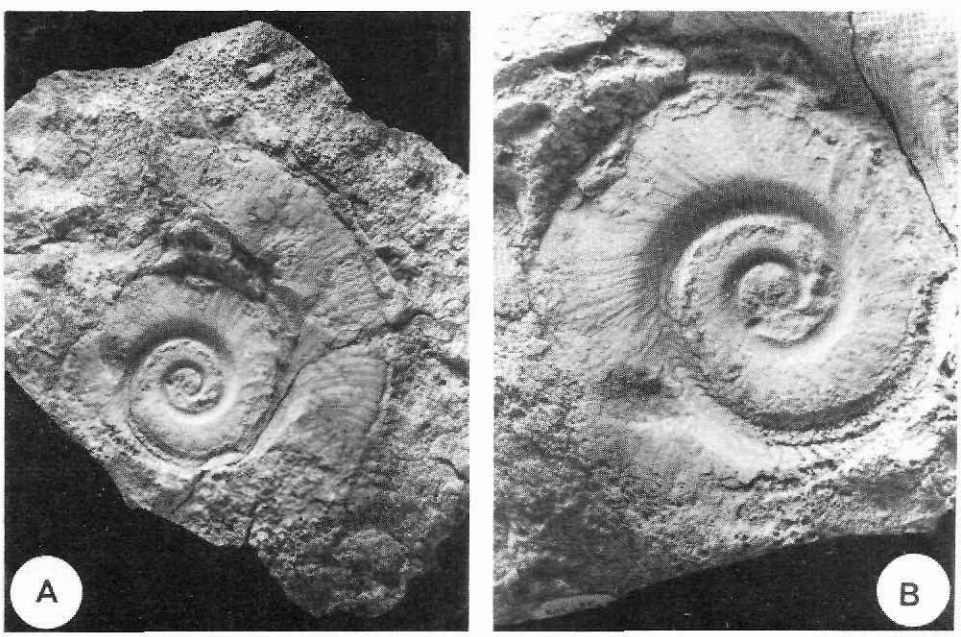

Fig. 2. *Offleyotrochus naresi*, BM 89163, holotype, umbilical surface. A, × 1; B, × 2, to show the emargination at the suture with the previous whorl.

Platyceras (Platyostoma) naticoides (Etheridge, 1878)

Fig. 3 C, E-G

Platyceras naticoides Etheridge, 1878, p. 603-604, Plate XXVII, fig. 4, *non* fig. 4a.

Holotype. BM 89166, from collection C.B. 8[1]. Silurian, collected (according to Etheridge, 1878, p. 604) by Coppinger from Bessels Bay (= Bessel Fjord), Washington Land.

Additional material. In addition to the figured specimen of Etheridge (1878), the following specimens from the Silurian of Bessel Fjord were located: BM 89178, BM G.14093, BM G.14096-14105, BM G.14107, from collections attributed to Feilden. Coppinger and, possibly Hart.

Discussion. The classification of most platyceratid gastropods at the generic as well as specific levels is not on a sufficiently firm footing to justify discussion of the status of Etheridge's new species. *Platyceras naticoides* is referred to the subgenus *Platyostoma* Conrad, 1842 rather than to the capuliform *Platyceras s.s.* Conrad, 1840. *Platyostoma* is characterised by a rather naticiform whorl profile, often with a narrow umbilicus of the type seen in the Washington Land material.

Platyceras (Platyostoma) cf. *P. (Pl.) cornutum* (Hisinger, 1837)

Fig. 3 A, B, D

Acroculia haliotis (Sow.), Etheridge, 1878, p. 603.

Figured material. BM G.14090, BM G.14095 from the Silurian of Bessel Fjord, Washington Land.

Additional material. BM G.14091, BM G.14092, BM G.14094, Silurian of Bessel Fjord. The two figured, and three additional specimens are from collections C.B. 25, C.B. 9, B. 22, C.B. 11, B. 31.

Discussion. Etheridge (1878) commented that "many examples of this shell are in the collection, and, as usual, as many varieties; for no two are alike". The species was not illustrated but 6 specimens labelled *Acroculia haliotis* were located in the British Museum (Natural History) collections. One of these, BM G.14093, labelled C.B. 8 Bessels Bay (= Bessel Fjord), would appear to be an example of *P. (Pl.) naticoides*, above. A second, BM G.14095, may be a juvenile of *Naticopsis (?)* sp., discussed below, but is tentatively retained here. The remaining examples are of a naticiform platyceratid with a much greater rate of whorl expansion than in *P. (Pl.) naticoides*. Poulsen (1974) figured similar platyceratids from Kap Morton, northern Washington Land, which he also referred to Hisinger's species.

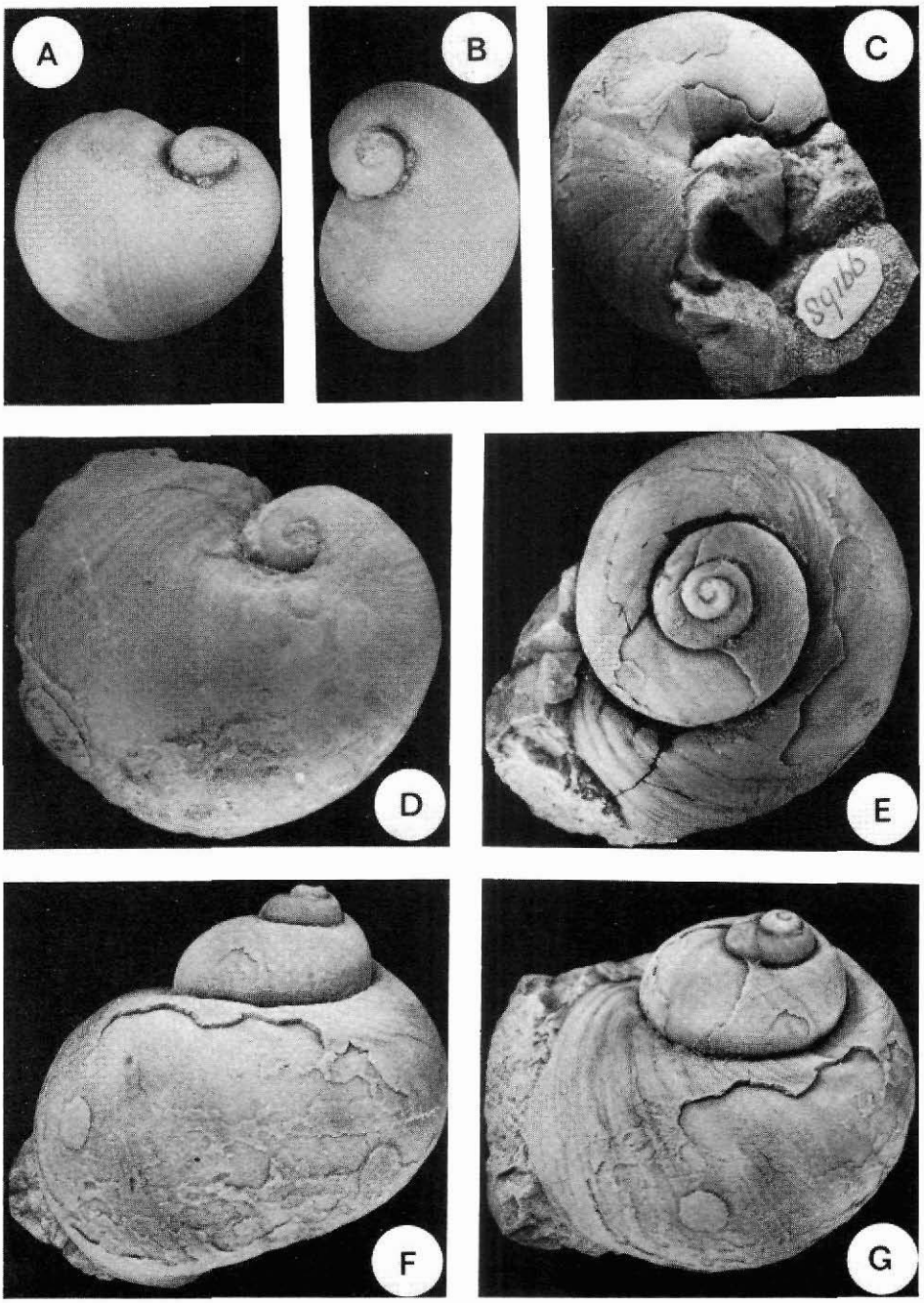

Fig. 3. A,B,D, *Platyceras (Platyostoma)* cf. *P. (Pl.) cornutum*, × 2. A,B, BM G.14095; D, BM G.14090. C,E-G, *Platyceras (Platyostoma) naticoides* BM 89166, holotype, C, × 1.2; E-G, × 1.5.

Naticopsis (?) sp.

Fig. 4 C, E, F

Platyceras naticoides Etheridge, 1878, p. 603-604, Plate XXVII, fig. 4a, *non* fig. 4.

Material. BM 89167, Coppinger collection C.B. 10, from the Silurian of Bessels Bay (= Bessel Fjord).

Discussion. Etheridge (1878) recognised this specimen as a variety of the present *Platyceras (Platyostoma) naticoides* which was characterised by a greater rate of whorl expansion. The specimen is well preserved, although slightly flattened and with the apex missing. A narrow umbilicus is present. Growth ornamentation is slightly over emphasised in the original illustration, and forms a slight emargination near the suture. Fine spiral striations are also present. The specimen is tentatively referred to *Naticopsis* but, allowing for the infamous variability of platyceratids and the lack of additional material, the possibility of assignment to the latter mentioned family should not be excluded.

Maclurites sp.

Fig. 4 A, B, D

?Maclurites Logani, Etheridge, 1878, p. 606.

Figured specimen. BM G.14084, locality unknown, possibly Bessel Fjord, Washington Land or arctic Canada.

Discussion. Etheridge (1878) recorded *Maclurites logani* from collections made by Coppinger and Hart in Bessel Fjord. The only specimen located bearing this identification (BM G.14084) is *c.* 40 mm wide and without locality information. The label, with the identification written in pencil (subsequently?), states (also in pencil) "? Capt. H.W. Feilden coll.". In view of the confusion concerning origin, the specimen is not further discussed. Several other macluritids collected on the Canadian side of Kennedy Channel are present in the collection. *Maclurites* is currently restricted to the Ordovician (Knight *et al.,* 1960).

Bellerophon sp.

Bellerophon, sp., Etheridge, 1878, p. 606.

Discussion. Etheridge (1878) recorded two specimens of a bellerophontacean gastropod from Bessel Fjord but the specimens were not located in the British Museum collections.

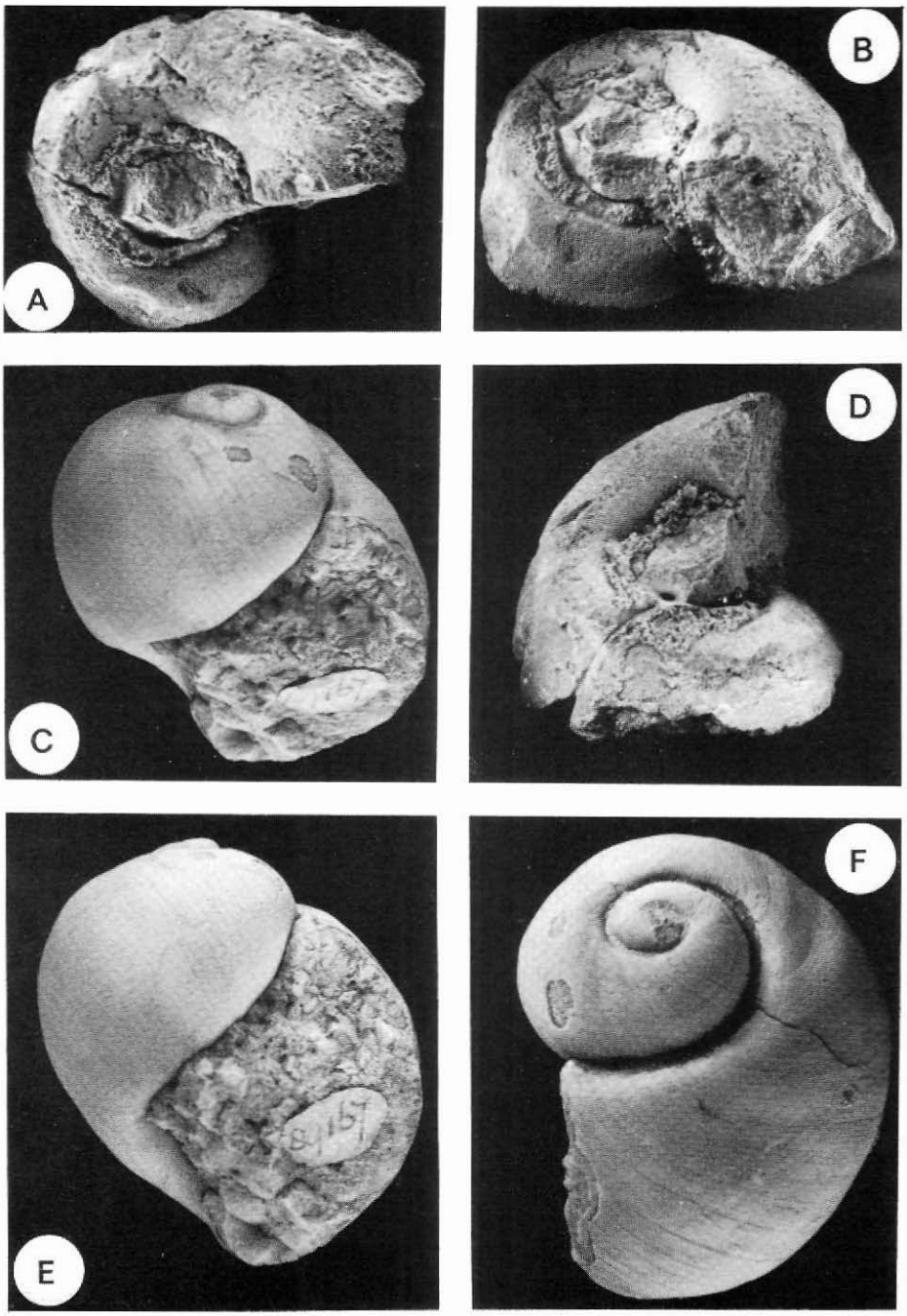

Fig. 4. A,B,D, *Maclurites* sp., BM G.14084, × 2. C,E,F, *Naticopsis(?)* sp., BM 89167, × 1.5.

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