

Rectoprotomarssonella n. gen., a new agglutinated foraminiferal genus from the Upper Cretaceous of the Carpathian Flysch

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ABSTRACT: The new agglutinated foraminiferal genus *Rectoprotomarssonella* n. gen. is characterized by its high trochospiral coiling with multiserial to uniserial chamber arrangement and solid, noncanaliculate wall with calcareous cement. This taxon shows close relationship to the Cretaceous genus *Protomarssonella* Desai and Banner, from which it differs in possessing a uniserial part. The type species is a stratigraphic indicator in Campanian to Maastrichtian deep-water sediments in the Western Tethys and North Atlantic.

INTRODUCTION

The species "*Goessella*" *rugosa* (Hanzlíková) is a well-known stratigraphically important species in Upper Cretaceous deep-water sediments of the Western Tethys and North Atlantic, and serves as a zonal indicator in several zonal schemes (Neagu 1968; Geroch and Nowak 1984; Kuhnt et al. 1992; Neagu et al. 1992; Kuhnt and Kaminski 1997). The species was originally described as a species of *Marssonella*, and was later transferred to the genus *Goessella* by Hanzlíková (1969). However, the type species of *Goessella* is a modern form described from the Philippine Sea (Cushman 1913), characterized by a test wall perforated by canaliculae (Loeblich and Tappan 1987). Moreover, the stratigraphic range of *Goessella* was reported by Loeblich and Tappan (1987) as "Eocene–Recent", and reports of this genus in the Campanian were therefore deemed enigmatic.

The purpose of this study is to examine the wall structure of the largely isomorphic Campanian to Maastrichtian taxon formerly attributed to *Goessella* in order to more precisely determine its systematic affinities.

STUDIED MATERIALS

We used both archive material and specimens from newly collected samples to illustrate the morphology of the type species, *Marssonella rugosa* Hanzlíková 1953. We made an effort to locate the type specimens of *Marssonella rugosa* in the Hanzlíková Collection in the Czech Geological Survey, and made enquiries as to the whereabouts of type specimens of its junior synonym, *Goessella carpathica* Liszkowa 1959. Unfortunately, no primary type specimens of either species could be found. New specimens examined in this study derive from lower Maastrichtian marls from the Subsilesian Unit of the Polish Carpathians that outcrop in Węglówka, Poland. Samples were collected in the stream that flows alongside the main road at the entrance to the village. The Węglówka locality was described in detail by Huss (1966) and by Ślaczka and Kaminski (1997).

METHODS

To investigate wall structure, we used methods outlined by Desai and Banner (1987). Concentrated HCl was carefully applied to the outer test wall of a specimen with a picking brush in order to dissolve the cement of the outer agglutinated layer and reveal any possible canaliculate structure. The specimens were then rinsed in distilled water, mounted on stubs, and photographed in SEM. Photographed specimens are housed in the Micropalaeontological Collections of University College London.

SYSTEMATIC TAXONOMY

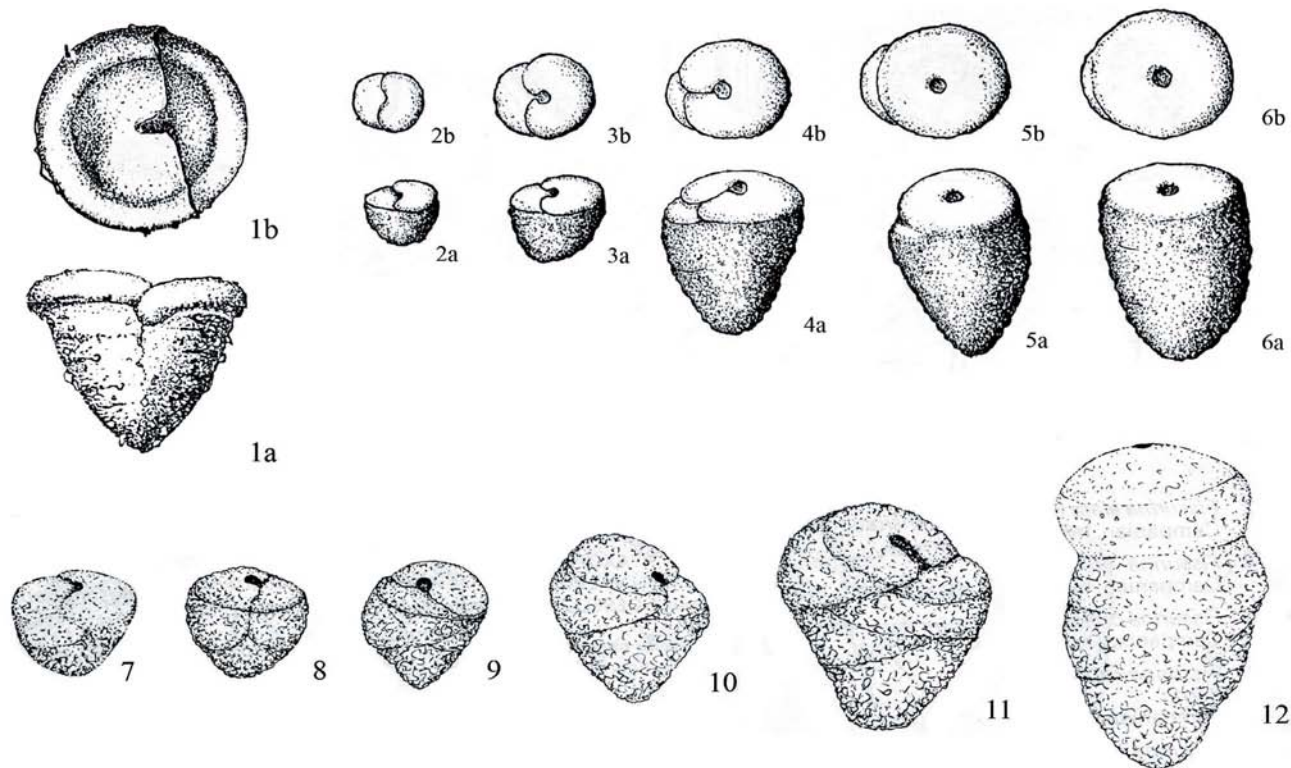
Suborder VERNEUILININA Mikhalevich and Kaminski 2004
Superfamily VERNEUILINACEA Cushman 1911
Family PROLIXOPLECTIDAE Loeblich and Tappan 1985

Rectoprotomarssonella Kaminski, Bubík, and Cetean n.gen.

Type species: *Marssonella rugosa* Hanzlíková, in Homola and Hanzlíková 1953 (monotypic)

Description: Test large, elongate, up to 1 mm in length, tapering toward the base, and later nearly cylindrical in section, with a flattened terminal face. Early stage trochospirally coiled with four to five chambers per whorl, later reduced to triserial, biserial, and finally uniserial. Chamber interior not subdivided. Sutures mostly indistinct, slightly depressed. Wall coarsely agglutinated, noncanaliculate, with sparse calcareous cement, comprised of coarse particles held in a fine-grained groundmass. Aperture initially interior marginal, a low slit situated in a re-entrant at the base of the last chamber, moving to terminal position in the uniserial part, rounded, without a tooth. Campanian–Maastrichtian; Carpathians (Poland, Czech Republic, Romania); Spain.

Remarks: This genus differs from *Protomarssonella* Desai and Banner 1987 in possessing a uniserial part. It differs from the Cenozoic genus *Goessella* in having a solid wall and in lacking any trace of an apertural tooth.



TEXT-FIGURE 1

Original illustrations of the type species of *Rectoprotomarssonella* n. gen., from the Carpathian Upper Cretaceous. 1a,b. Holotype of *Marssonella rugosa*, from Hanzlíková (1953), $\times 110$; 2a-6b. Type specimens of *Goesella carpathica* from Liszkowa (1959), holotype not indicated, $\times 14$; 7-12. Specimens of *R. rugosa* from the southern Carpathians, from Neagu (1968), $\times 45$.

Derivation of name: With reference to the fact that this genus possesses a uniserial part.

***Rectoprotomarssonella rugosa* (Hanzlíková 1953)**

Plate 1, figures 1-9e, Text-figure 1

Marssonella rugosa Hanzlíková, in HOMOLA and HANZLÍKOVÁ 1953, p. 395, pl. 2, figs 5, 7.— MORGIEL and OLSZEWSKA 1981, p. 22, pl. 5, fig. 18.

Goëssella carpathica Liszkowa 1959, p. 60, pl. 3, fig. 9a-f. — NEAGU 1968, p. 238, pl. 1, figs 16-21. — NEAGU 1970, p. 45, pl. 7, figs 25-30.

Goesella rugosa (Hanzlíková). — HANZLÍKOVÁ 1969, p. 24, fig. 19 [n.comb.]. — HANZLÍKOVÁ 1972, p. 59, pl. 12, fig. 5. — GEROCH and NOWAK 1984, pl. 4, figs 8, 13, 18. — KUHNT and KAMINSKI 1990, p. 469, pl. 5, figs k-m. — KUHNT and KAMINSKI 1997, pl. 7, figs a,b.

Description: Test large, elongate, up to 1 mm in length, tapering toward the base, and later nearly cylindrical in section, with a flattened terminal face. Early stage trochospirally coiled with about five chambers per whorl, later reducing to triserial, biserial, and finally uniserial, with as many as four uniserial chambers. Chamber interiors simple. Sutures mostly indistinct, only slightly depressed. Wall coarsely agglutinated, noncanaliculate, with sparse calcareous cement, comprised of coarse detrital particles held in a fine-grained groundmass. In places large grains protrude from the peripheral surface of the test. Apertural face more finely agglutinated, lacking protruding larger grains. Aperture initially interiomarginal, a low slit situated in a re-entrant at the base of the last chamber, moving to an areal position in the biserial part, and finally to terminal position in the uniserial part, rounded, in a slight depression, without a tooth.

Remarks: Acid treatment of the exterior wall reveals a solid wall texture, with no sign of canaliculae. Acid treated specimens display holes in the wall where calcareous grains have been dissolved away, but no sign of a regular pattern of rounded pseudopores, as in the genus *Marssonella* (see Desai and Banner 1987). The presence of sparse larger grains interspersed in the peripheral wall is a characteristic feature of this species. Where larger grains appear, the wall is only a single grain thick.

Only rare specimens have a well-developed uniserial part, a fact already noted by Hanzlíková (1969). In fact, the specimens illustrated by Hanzlíková (1953, 1969) were all terminally biserial. Our specimens from Węglówka mostly possess only one or two uniserial chambers, and our largest specimen has four uniserial chambers. Even if no uniserial specimens are present in a population, the species can still be distinguished from other *Protomarssonella* species by its larger dimensions and by its characteristic wall texture, with coarse grains protruding from the lateral chamber wall. The first chambers of the uniserial part still display some aspect of biseriality, and can be described as “lax-uniserial”, while later chambers are truly uniserial, with horizontal sutures.

Hanzlíková (1969) also regarded the Paleocene species *Dorothia beloides* Hillebrandt 1962 to be synonymous with this species. We do not agree with this view, as *D. beloides* is much narrower than *R. rugosa* and has a long biserial portion that does not become uniserial. Furthermore, *D. beloides* ranges to the end of the Paleocene, whereas *R. rugosa* is largely confined to the Cretaceous.

Occurrence: This species has been reported as “*Goesella rugosa*” or as “*Goesella carpathica*” from numerous localities in the Czech, Polish, and Romanian Carpathians, as well as from localities outside the Carpathians. Liszkowa (1959) regarded the species as “characteristic” for the Campanian–Maastrichtian Subsilesian Series of the Polish Carpathians, recording it from several localities (Bachowice, Wadowice, Bielsko, Wieliczka, Tarnów, Sanok). Neagu (1968) established a “*Goesella carpathica* Zone” for the lower to middle Campanian of the Teleajen Nappe in the Romanian Carpathians. In the Zumaya section of northern Spain, the species has been reported to range from the lower Campanian to the lowermost Danian, with its maximum abundance in the lower to middle Campanian (Kuhnt and Kaminski 1997). It has also been found in the Campanian–Maastrichtian of the Subbetic Unit of southern Spain (Kuhnt and Kaminski 1990).

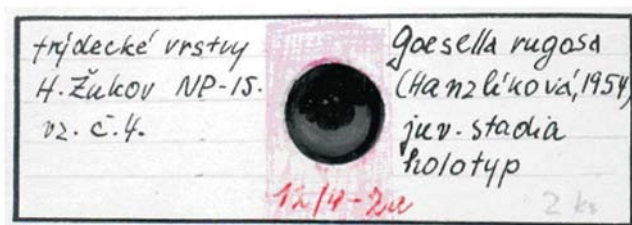
Type locality: This species was first described by Hanzlíková (1953) from surface outcrops of the Púchov Marls (Couches Rouges facies) in Hluk, Czech Republic. Hanzlíková (1969, 1972) later reported it from the Maastrichtian (A. mayaroensis Zone) of the Frydek Formation of the Subsilesian–Zdanice Unit at its type locality in Frýdek-Místek, Czech Republic. The junior synonym, *Marssonella carpathica*, was described by J. Liszkowa (1959) from the Subsilesian Unit of the Polish Carpathians. The samples studied by J. Liszkowa were collected by Prof. Marian Książkiewicz from trenches dug in the forest about 1 km above the church in the village of Bachowice, Poland (M. Cieszkowski, personal communication, 2007). In summer 2007, we searched the forest near Bachowice, but unfortunately no outcrops were found.

Type specimens: A single slide labelled “*Goesella rugosa*, Holotype” is preserved in the Hanzlíková Collection in the Czech Geological Survey (text-fig. 2). Unfortunately, this slide does not contain the specimen drawn by Hanzlíková (1953), and the locality written on the slide (Frydek beds, Žukov NP-15 borehole) does not agree with the locality given in the original description of the species. The slide was obviously made at a later date and the label “Holotype” was added to the slide mistakenly. In our opinion, this specimen has only metatype status (a specimen from a different locality identified by the author of the species at some later date).

The whereabouts of the Liszkowa collection are still unknown, and the collection is presumed lost. Janina Liszkowa was employed at the Polish Geological Institute, Carpathian Branch, and only very few slides made by her are preserved in the collections (Barbara Olszewska, personal communication, 2007), none of which are from her Bachowice study (Liszkowa 1959). Her husband, Stanisław Liszka, was employed at the AGH University of Science and Technology in Krakow, but an extensive search of the AGH micropalaeontological collections did not uncover any slides prepared by Janina Liszkowa (Michał Krobicki, personal communication, 2007). We likewise searched the collections of Stanisław Geroch at the Institute of Geological Sciences, Jagiellonian University, for samples from Bachowice, without results (J. Liszkowa collaborated with S. Geroch, and there was the possibility that they exchanged samples). In her retirement, Janina Liszkowa worked from her home in Kraków, and we assume her collection was disposed of shortly after her death.

DISCUSSION

The taxonomic revision of the stratigraphically-important species *Marssonella rugosa* was initially hampered by the lack of



TEXT-FIGURE 2

The “false holotype” slide from the Hanzlíková collection, Czech Geological Survey, Prague.

archived type specimens. The types of both *M. rugosa* and *M. carpathica* have not been preserved. Nevertheless, the species concept of these species is well-established, so according to Article 75.2 of the ICZN, there is no need to designate a neotype. Fortunately, the species can be found at numerous localities in the Carpathians, mostly in the marly Campanian–Maastrichtian Subsilesian–Zdanice facies.

Our observation of the solid, non-canalliculate wall structure of this species implies closer relationship to the Cretaceous genus *Protomarssonella* rather than to the Recent genus *Goesella*. It is more probable that the genus *Rectoprotomarssonella* is simply derived from a terminally biserial species such as *Protomarssonella crassa* (Marsson) by phylogenetic size increase that eventually resulted in the formation of a terminally uniserial part.

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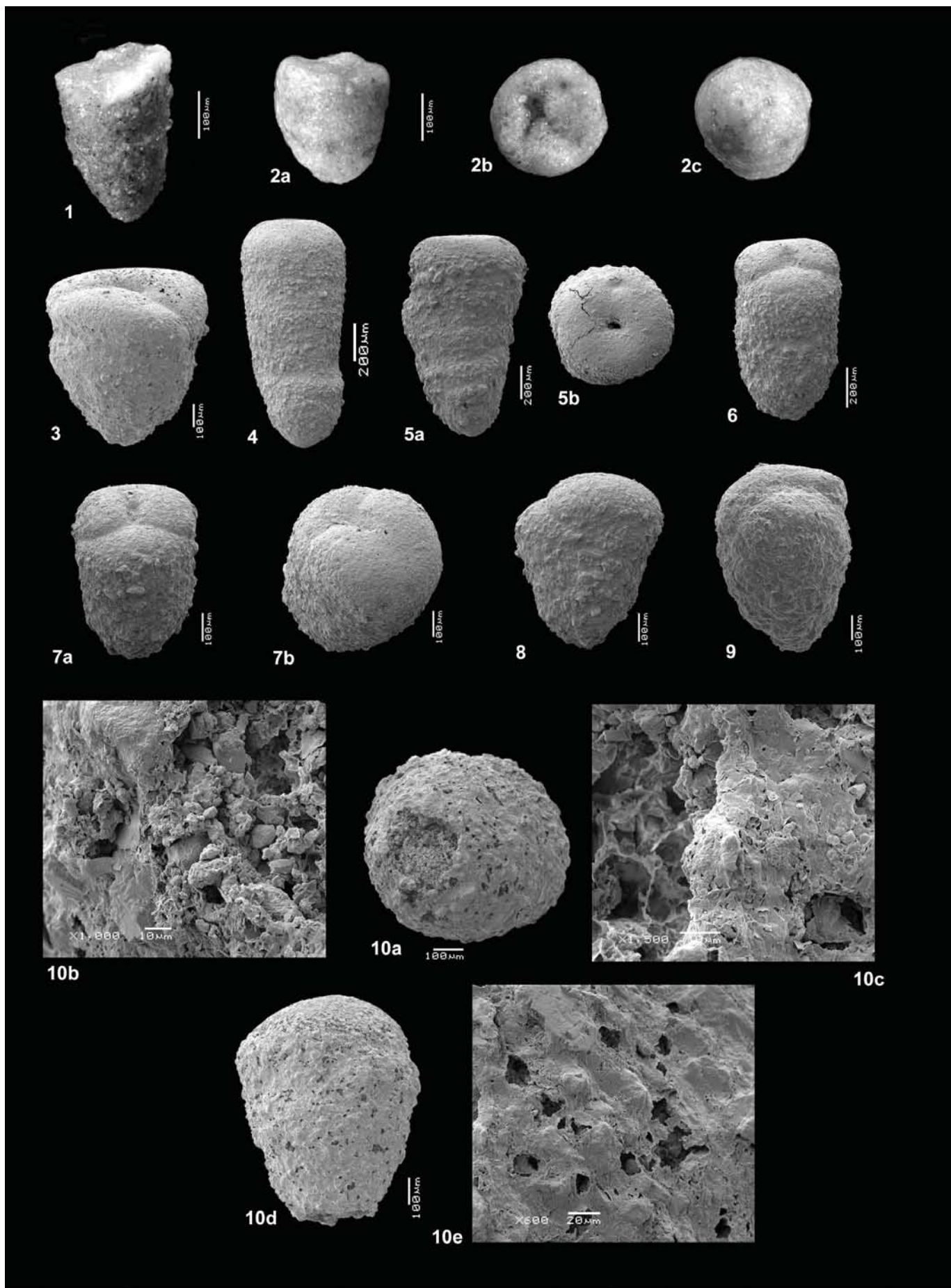
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PLATE 1

- 1 The "false holotype" Hanzlíková collection, Czech Geological Survey, Prague, lateral view.
- 2 The "false paratype", Hanzlíková collection, Czech Geological Survey, Prague, 2a, lateral view, 2b, view of apertural end, 2c, initial end.
- 3 Topotype specimen from Hluk – Okluky, Czech Republic, Púchov Marls.
- 4-9 Specimens from Węglówka, Poland, Stream bank at entrance to village.
 - 4 Specimen with four uniserial chambers.
 - 5a,b Specimen with only two uniserial chambers, 5a, lateral view, 5b, apertural view. Note central aperture in a shallow depression.
 - 6-8 Terminally biserial specimens.
 - 9 Specimen from the *Radotruncana calcarata* Zone, lower part of Upper Campanian, Plaiu Formation, Izlaz Valley, Cotenești, southern Eastern Carpathians (Dâmbovița Valley), Romania.
 - 10 Specimen etched in HCl to expose wall structure. 10a, View of initial end, acid has opened up early chambers. 10b,c, Detail of wall, showing solid, noncalliculate structure. 10d, lateral view of specimen, 10e, detail of wall, showing holes after calcareous agglutinated grains have been etched away. Specimen shows no sign of other perforations.





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