A revision of the Lower Cretaceous foraminiferal genus *Falsogaudryinella* from northwest Europe and Romania, and its relationship to *Uvigerinammina*

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ABSTRACT

We emend the definition of the foraminiferal genus *Falsogaudryinella* Bartenstein, 1977 based on observations of the type species, *F. tealbyensis* from the Barremian Lower Tealby Clay of Lincolnshire, U.K. The genus was described by Loeblich & Tappan (1987) as having initial triserial coiling which reduces to biserial and finally uniserial. However, topotype specimens display high trochospiral coiling in the microsphaeric generation, with at least four chambers in the initial whorl. The genus, therefore, does not belong in the family Verneuilinidae, but must be transferred to the Prolixoplectidae. The wall is solid, non-canaliculate. The connections between chambers are in the form of tubes that extend from the basal part of the chamber lumina toward a terminal aperture. This tubular connection is partially separated from the main part of the chamber lumina by a septum. The presence of this tubular connection in *F. tealbyensis* is closely analogous to that observed in the type species of *Uvigerinammina* Majzon, 1943. The two genera, therefore, are separated mainly on the basis of cement type, with *Falsogaudryinella* possessing calcareous cement and *Uvigerinammina* organic cement.

We illustrate five species of *Falsogaudryinella* from the Barremian of Lincolnshire, the U.K. sector of the Central North Sea, and from the Barremian and the Albian of Romania (*F. neagui* Bartenstein, 1981, *F. praemoesiana* n.sp. *F. tealbyensis* (Bartenstein, 1956), *F. xenogena* n.sp. and *F. moesiana* (Neagu, 1966)). Our investigations reveal that upper Hauterivian to Barremian specimens from the North Sea that have been previously regarded as *F. moesiana* (e.g. King *et al.*, 1989) in fact belong in a new species, *Falsogaudryinella praemoesiana* n.sp. A second new species, *Falsogaudryinella xenogena* n.sp. is described from the Barremian of the Central North Sea. Evolution within the mid-Cretaceous *Falsogaudryinella* group appears to progress by reduction of the terminal uniserial part, since the coiling in the stratigraphically youngest form (*F. moesiana*) is predominantly triserial. Our interpretations of the phylogeny of the Cretaceous *Falsogaudryinella* and *Uvigerinammina* lineages are presented.

INTRODUCTION

The mid-Cretaceous sediments of the Central North Sea and Romania contain abundant specimens belonging to the genus *Falsogaudryinella* Bartenstein, 1977 (type species *Uvigerinammina tealbyensis*). In 1966, Neagu described the species *Uvigerinammina moesiana* from the upper Albian of the Moesian Platform of Romania. This species has been subsequently transferred by Bartenstein to the genus *Falsogaudryinella*. In the central North Sea region several species of *Falsogaudryinella* commonly occur in Barremian and Hauterivian sediments, and King *et al.* (1989) have defined a lower Barremian "*Falsogaudryinella moesiana* Zone". Another species common in the mid-Barremian was called "*Falsogaudryinella* sp. x" by King *et al.* (1989) and defines a second zone.

The systematic affinities and evolution of the *Falsogaudryinella* group as well as its relationship to the genus *Uvigerinammina* are still poorly understood. However, new reports of occurrences of these Lower Cretaceous taxa in the Alpine-Carpathian regions, northwest Europe, the Canadian Arctic, and the deep sea now enable us to achieve more complete overview of their evolutionary history. In this study we examine the morphology and wall structure of the currently known species of *Falsogaudryinella* in order to determine more precisely the systematics and phylogeny of the genus, and investigate its affinities to *Uvigerinammina*.

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Previous studies

Bartenstein (1977) described the genus *Falsogaudryinella* [type species *Gaudryinella tealbyensis* Bartenstein, 1956] as differing from *Gaudryinella* by the shape of the aperture. In *Gaudryinella*, the aperture is terminal and rounded, whereas in *Falsogaudryinella* the aperture was described as "slit-like". The same feature distinguishes *Falsogaudryinella* from *Uvigerinammina* Majzon, 1943. Unfortunately the original description of *Uvigerinammina* was vague and the type locality is not easily accessible. Bartenstein illustrated specimens of the type species *Uvigerinammina jankoi* selected by Prof. Stanislaw Geroch from the Silesian Unit of the Polish Carpathians, and noted that "neither the structure of the test and aperture nor the agglutination of the granular wall coincide with *Falsogaudryinella*". He recommended designating a neotype based on Geroch's specimens from the Turonian of Lanckorona Poland. Bartenstein, however, was not able to clearly differentiate *Falsogaudryinella* from *Uvigerinammina*. Bartenstein remarked that a revision of the genus should depend upon the "re-examination of the type locality, type horizon, and erection of a neotype for *Uvigerinammina jankoi* Majzon, 1943".

In their classification of the foraminiferal genera, Loeblich & Tappan (1987) described *Falsogaudryinella* as follows:

> "Test elongate, rounded in section, early chambers triserial, later biserial and finally uniserial, chambers somewhat inflated, higher than wide, sutures slightly depressed; wall finely agglutinated, with considerable cement, surface smoothly finished; aperture terminal or subterminal oval to elongate slit, bordered by a narrow lip, but lacking a neck."

Loeblich & Tappan placed both *Falsogaudryinella* and *Uvigerinammina* in the subfamily Verneuilinoidinae, which comprises triserial genera that have solid, non-canaliculate walls. Comparison of the descriptions of both genera in Loeblich & Tappan (1987) reveals essentially no differences between them, other than the shape of the aperture (round in *Uvigerinammia*, oval or an elongate slit in *Falsogaudryinella*). In their remarks to *Uvigerinammina* Loeblich & Tappan stated that the genus "is typically restricted to the flysch facies". No mention is made of the wall structure of these forms.

The genus *Uvigerinammina* was first described by Majzon (1943), and the morphology and stratigraphic occurrence of the type species, *U. jankoi* Majzon, 1943 was examined in detail by Geroch (1957). In 1990, Neagu described the species *Uvigerinammina praejankoi* from the Turonian of the Romanian Carpathians. This species differs from the type species in possessing a final biserial stage. Neagu also proposed transfering the genus *Uvigerinammina* to the family Prolixoplectidae based on chamber arrangement and nature of the connections between the chambers, which are in the form of narrow tubes.

In his exhaustive monograph of Lower Cretaceous foraminifera from the Northern Calcareous Alps, Weidich (1990; Table 29) listed taxonomic characters used to separate *Uvigerinammina* from *Falsogaudryinella.* He regarded *Uvigerinammina* to be fully triserial, with a rounded, oval, or rarely three-lobed aperture at the end of a tubular extension of the last chamber, while *Falsogaudryinella* was described as having an aperture that is terminal, elliptical or slit-like (straight or bent), without a neck. However, Weidich himself illustrated specimens of *Uvigerinammina* which are clearly biserial in the latter stage. He did not list any differences in wall structure between the two genera.

SYSTEMATIC DESCRIPTIONS

Family Prolixoplectidae Loeblich & Tappan, 1985

Genus ***Falsogaudryinella*** Bartenstein, 1977, emended herein.

Description. Test conical or elongated conical; earliest chambers triserial in megalosphaeric forms and multiserial (up to 4 1/2 excluding the proloculus) in microsphaeric forms; later chambers sometimes reducing to biserial or uniserial. Chambers globular or globular ovate separated by sutures which may be depressed or flush and almost obscure. Aperture terminal, an elliptical opening or a slit, straight or slightly curved, bordered by a marginal lip. When the apertural lip is well-developed, it appears to form a short neck. Wall finely agglutinated, non-canaliculate, built of a multiple layer of fine particles with smooth inner and outer surfaces and a large quantity of calcareous cement.

Remarks. The type species *Falsogaudryinella tealbyensis* (Bartenstein, 1956) is clearly coiled in a high trochospiral manner. Topotype specimens of *F. tealbyensis* display three chambers in the first whorl in the megalosphaeric generation, but the microsphaeric forms have a proloculus that is surrounded by ~ 4 1/2 chambers in the first whorl. Based on these observations, we transfer *Falsogaudryinella* from the family Verneuilinidae to the Prolixoplectidae. The chamber interiors are sac-shaped, with the passageways between adjacent chambers in the form of a rounded-triangular tube extending from the basal part of the chamber along its leading edge. A septum separates the tube from the main body of the chamber. To our knowledge this feature has not been previously reported in *Falsogaudryinella.* The tubular passageways resemble those observed in silicified specimens of *Uvigerinammina jankoi*, as depicted by Geroch & Nowak (1984) and specimens of *U. praejankoi* Neagu, 1990. Neagu (1990) proposed transferring the genus *Uvigerinammina* to the Prolixoplectidae based on this

feature. The genus *Falsogaudryinella*, as emended here, can be differentiated from *Uvigerinammina* by the presence of calcareous cement as well as by its slit-like aperture.

Falsogaudryiella tealbyensis (Bartenstein, 1956)

Plate 1, Figs. 9-11; Plate 2, Figs. 1-14; Plate 3, Figs. 1-4; Plate 5, Figs. 1-7. 9, 11, 12

Gaudryinella tealbyensis Bartenstein, 1956, p. 513, pl. 3, fig. 63, textfig. 3.

Uvigerinammina alta Magniez-Jannin, 1975, p. 77, pl. 6, figs. 1-11.

Falsogaudryiella tealbyensis (Bartenstein). - Bartenstein, 1977, p. 396, figs. 2-1a,b; 4-7; 5-1 - 5-7; 6-1 - 6-4. (with synonymy).

Falsogaudryinella alta (Magniez-Jannin 1975). - Bartenstein, 1977, p. 392, Figs. 4.3 - 4.6.

Description. Test varies from conical to elongated conical, tapered at both ends. Coiling is clearly trochospiral, with the early stage consisting of a relatively large proloculus followed by three chambers in the case of the megalosphaeric generation, or a small proloculus followed by 4 to 4 1/2 chambers in the case of microsphaeric forms. Coiling reduces to biserial and finally uniserial. Chambers are globular-ovate, separated by depressed sutures that can be curved or oblique. The connection between adjacent chambers consists of a tube that extends from the basal part of the chamber interior. These tubes are located on the leading edge of the chamber (relative to the coiling axis) and are formed by a septum which separates it from the rest of the chamber. Wall is finely agglutinated (approximately 10 μm thick), made of a multiple layer of fine silt grains, non-canaliculate, with a large quantity of calcareous cement. Inside and outside surfaces consist of agglutinated grains with a terazzo wall texture. Aperture is terminal, a straight or slightly curved slit bordered by a distinct lip.

Remarks. Our topotype specimens from the Barremian Lower Tealby Clay of Nettleton, Lincolnshire display three chambers in the first whorl in the megalosphaeric generation, but the microsphaeric forms are distinctly trochospiral, with 4 to 5 chambers in the first whorl (Pl. 5, Fig. 5). The chamber interiors of *F. tealbyensis* are sac-shaped. The passageways between chambers are in the form of a rounded-triangular tube that extends from the basal part of the chamber along the leading edge of the chamber (Pl. 5, Figs. 5-7). This tube connects with the distal (with respect to the long axis of the test) part of the next chamber. A septum separates the tube from the main body of the chamber (Pl. 5, Fig. 3).

Carpathian specimens reported as *Falsogaudryinella* aff. *tealbyensis* by Geroch (e.g. Geroch & Nowak, 1984) appear to conform well to the topotypes. Indeed, the species is also recorded in the deep-water sediments in the Central North Sea (King *et al.*, 1989). Its stratigraphic range was reported by Bartenstein (1977) as unquestionably Valanginian to Barremian, or extending to the Albian if the species *Uvigerinammina alta* Magniez-Jannin, 1975 is considered synonymous (which it is here). Weidich (1990) reported *F. tealbyensis* from the Barremian to Aptian, and *F. alta* from Aptian to lower Albian deposits in the Northern Calcareous Alps. His drawings of *F. tealbyensis* depict specimens with as many as four chambers in the biserial part, which in some specimens becomes nearly uniserial. Weidich separated the two forms based on the shape of the aperture, which in *F. tealbyensis* is a simple slit, but in *F. alta* reportedly has grooves on the inner side.

Falsogaudryinella moesiana (Neagu 1965)

Plate 1, Figs. 1-8; Plate 4, Fig. 1

Uvigerinammina moesiana Neagu, 1965, p. 5, pl. 2, figs. 11-18.

cf. *Tritaxia subrotunda* Ten Dam, 1950, p. 12, pl. 1, figs. 11a - b.

Uvigerinammina triangula Fuchs, 1967, p. 271, pl. 3, figs. 6a - b.

Falsogaudryinella moesiana (Neagu). - Bartenstein, 1977, p. 389, fig. 2.1 a, b; p. 392, fig. 3.7.

Diagnosis. A relatively small, triserial form with subtriangular cross-section.

Holotype. Deposited in the collections of the Laboratory of Paleontology, Bucharest.

Description. Test conical shaped or elongated - conical. Early stage very short, consisting of three chambers, followed by a high three whorl trochospire. In the terminal stage the coiling may become biserial. Sutures depressed and oblique. Wall is finely agglutinated, made of a multiple layer of fine silt grains, non-canaliculate, with a large quantity of cement. Aperture a terminal slit on the last chamber, bordered by a distinct lip. Periphery subtriangular in cross section along the whole length of the test.

Remarks. The Albian species *Falsogaudryinella moesiana* is generally smaller than *F. praemoesiana* (0.3 mm and 0.5 mm respectively). In addition, *F. moesiana* remains triserial throughout ontogeny, has globular to ovate chambers, and is subtriangular in cross section. Neagu (1965) first described the species from the mid Albian, but Bartenstein (1981) extended the known stratigraphic range of *F. moesiana* to the lower Albian based on his restudy of Hecht's (1938) fauna from northwest Germany. Weidich (1990) reported it to range from the upper Aptian to the upper Albian in the Bavarian Alps. We agree with Bartenstein (1977) in placing the species *Uvigerinammina triangula* Fuchs, 1967 in the synonymy of *F. moesiana*.

The species *Tritaxia subrotunda* Ten Dam, 1950 described from subsurface Albian deposits of the eastern Netherlands is very similar to *F. moesiana* in external appearance, and might in fact be synonymous (W. Kuhnt, written communication to MAK, 1993). The type specimens from the Steenwijksmoer

well no. 12 (800 - 829 m), preserved in the collections of the Netherlands State Geological Survey in Haarlem, are rounded-triangular in outline, coiled trochospirally, and possess an oval aperture. The type figure of Ten Dam (1950, Pl. 1, Fig. 11) does not adequately display the trochospiral coiling. The four syntypes preserved in the Ten Dam collection all possess three chambers in the final whorl. If dissections of *T. subrotunda* reveal that the species does indeed belong in *Falsogaudryinella*, this species might be regarded as a senior synonym of *F. moesiana.*

Falsogaudryinella neagui Bartenstein, 1981
Plate 1, Figs. 18-23; Plate 4, Figs. 4-5

Uvigerinammina hannoveriana tealbyensis (Bartenstein). - Neagu, 1975, p. 36, pl. 18, figs. 1-23.

Uvigerinammina hannoveriana hannoveriana (Bartenstein & Brand). - Neagu, 1975, p. 36, pl. 18, figs. 32-41.

Falsogaudryinella neagui Bartenstein, 1981, p. 319, figs 3.8 - 3.11.

Falsogaudryinella tealbyensis Weidich, 1990, pl. 35, fig. 20.

Diagnosis. A large Barremian form with a well-developed uniserial part.

Holotype. Deposited in the collections of the Senkenberg Museum, Frankfurt.

Description. Test relatively large in size, elongated, cylindrical-conical. Early stage probably triserial, rapidly reducing to biserial, and finally uniserial. Uniserial part may have as many as three chambers. Periphery is generally rounded in cross section along the whole length of the test. Chambers globular, with depressed sutures. Sutures are oblique in the biserial part, becoming nearly horizontal in the terminal stage. Wall finely agglutinated, with calcareous cement. Aperture oval to rounded, surrounded by a lip.

Remarks. Bartenstein (1981) rightly separated this species from *F. tealbyensis* based on its more cylindrical shape, rounded periphery and well-developed uniserial part. Specimens of *Falsogaudryinella* from Dambovicioara Valley display a wide variety of morphologic form (e.g. Neagu, 1975, Pl. 18, Figs. 1-40). The most distinctive characteristic is the long uniserial part with elongated chambers. Bartenstein placed all of the specimens illustrated by Neagu in the species *F. neagui*. However, we restrict this species to include only the long cylindrical specimens illustrated by Neagu (1975) in Pl. 18 Figs 1-23, and 32-40. We place the more conical specimens with globular chambers illustrated in Neagu's Pl. 18, Figs. 24-31 in the new species *F. praemoesiana* n.sp. (see below).

The aperture in the early part of *F. neagui* is areal and oval or slit-like. However, some specimens with a long uniserial part display round apertures protruding on a neck (e.g., Bartenstein, 1981, Pl. 3, Figs. 8-10). This feature is not typical of the genus *Falsogaudryinella*, and more closely resembles the apertural necks of *Uvigerinammina*. We retain this species in *Falsogaudryinella* because of the calcitic (not organic) cement and the shape of the aperture in the early part of the test.

Falsogaudryinella praemoesiana n.sp.
Plate 1, Figs. 12-17, 24-29; Plate 5, Fig. 8

Uvigerinammina hannoveriana tealbyensis (Bartenstein). - Neagu 1975, p. 36, pl. 18, figs. 24-31.

Diagnosis. A large form with a well-developed biserial part, typical of Barremian sediments.

Derivation of name. From latin "prae" meaning "before".

Holotype. Specimen illustrated in Pl. 1, figs. 24-27. Deposited in the collections of the British Museum (Natural History) BMNH PM PF 53062.

Material. Numerous specimens from North Sea wells and the Dambovicioara Valley.

Locality and Horizon. Barremian, U.K. Block 21 of the Central North Sea (Shell 21/23b-1 well).

Description. Test relatively large in size; elongated, a high trochospire with 3 to 4 1/2 chambers in the early stage, later becoming gradually biserial, and finally nearly uniserial. Chambers globular, increasing rapidly in size such that the final chamber occupies about half of the whole test. Sutures depressed, slightly curved, well visible at least in the later stage. Wall finely agglutinated consisting of small particles gathered in a large quantity of calcareous cement. Aperture an elongated elliptical orifice or a slit bordered by a rim.

Dimensions. Length of holotype - 0.43 mm.

Remarks. *Falsogaudryinella praemoesiana* differs from *F. moesiana* in its large size, and more globular chambers. The species rapidly becomes biserial. Some specimens display a very distinctive pseudo-uniserial arrangement of the final stage. Bartenstein (1981) placed some of the specimens illustrated by Neagu (1975) as *Uvigerinammina hannoverana tealbyensis* in the species *F. neagui*, but the biserial forms with rounded chambers are here placed in *F. praemoesiana*. This species occurs in the upper Hauterivian in Romania (Dambovicioara Valley) and in the upper Hauterivian to Barremian in the Central North Sea (King *et al.*, 1989). It has been observed from the lower Hauterivian and upper Valanginian of some North Sea wells, but these reports are based on ditch cuttings and must be viewed with caution (H.W. Bailey, written communication to MAK, 1993).

Falsogaudryinella xenogena n.sp.
Plate 1, Figs. 30-38; Plate 4, Figs. 2-3, Plate 5, Figs. 10, 13

Falsogaudryinella sp. X King *et al.*, 1989, p. 410, pl. 8.1, fig. 11.

Diagnosis. A small form with a broadly rounded base typical of Barremian strata in the North Sea.

Derivation of name. From the Greek prefix xeno- meaning "foreign", alluding to the fact that this

species is new to Carpathian Palaeontologists (nothing similar has ever been observed in the Romania or Poland). Also in reference to the informal name "*Falsogaudryinella* sp. X" of King *et al.* (1989).

Holotype. Specimen illustrated in Pl. 1, figs. 30-33. Deposited in the collections of the British Museum (Natural History) BMNH PM PF 53063.

Material. Numerous specimens from North Sea wells.

Locality and Horizon. Barremian, U.K. Block 22 of the Central North Sea (Shell 22/24-1 well).

Description. Test small, stout, almost as wide as high, with a pear-like general shape increasing rapidly in width at the base. The early stage consists of three chambers, followed by few (up to 6) trochospirally coiled chambers. The later stage may become biserial. Chambers are separated by barely visible, slightly curved sutures. Wall agglutinated, built from very fine particles in a large quantity of cement, with a smoothly finished exterior. Periphery is rounded triangular in cross section. Aperture terminal, an elliptical opening bordered by a distinct rim.

Dimensions. Length of holotype - 0.22 mm.

Remarks. *Falsogaudryinella xenogena* n.sp. appears to be most closely related to *F. praemoesiana* n.sp., differing in its more broadly rounded, flairing initial stage, generally smaller dimensions, and lack of inflated later chambers. Its overall shape has been described as "reminiscent of a child's inflatable toy which has a weight at its base, so that when you knock it down it always returns to an upright position" (H.W. Bailey, written communication to MAK, 1993). The stratigraphic ranges of both species in the Central North Sea overlap, but *F. xenogena* n.sp. occurs mostly in the lower- to mid- Barremian. Its last occurrence in the North Sea is above that of *F. praemoesiana* n.sp.. However, *F. xenogena* n.sp. has not been observed in Romania, possibly because of ecological restriction to the boreal seas.

DISCUSSION

We cannot be absolutely certain that the species here referred to the genus *Falsogaudryinella* form a lineage, or are even closely related, because there is an apparent stratigraphic gap between the Barremian species *F. praemoesiana* n.sp. and *F. xenogena* n.sp. and the essentially Albian species *F. moesiana*. However, when the morphology of the mid-Cretaceous *Falsogaudryinella* group is examined in detail, a clear evolutionary trend appears. Evolution within the *Falsogaudryinella* group appears to take place by progressive reduction and finally loss of the terminal uniserial part. The oldest representative of the group, *F. neagui* from the Hauterivian of Romania, has a well-developed uniserial part with elongated chambers. The predominently Barremian taxa *F. tealbyensis* and *F. praemoesiana* n.sp. clearly become biserial, with some specimens becoming uniserial. By contrast, the coiling in the stratigraphically youngest form *F. moesiana* is predominantly triserial. The test outline, when viewed in cross-section, also displays a trend. *Falsogaudryinella neagui* and *F. praemoesiana* n.sp. are rounded in cross-section, and the type species *F. tealbyensis* as well as *F. xenogena* n.sp. are rounded-triangular. The youngest species *F. moesiana* displays a triangular cross section.

Our interpretation of the phylogeny of the mid-Cretaceous *Falsogaudryinella* lineage shows a remarkable parallel to the evolution of the organically-cemented genus *Uvigerinammina* (Fig. 1). The earliest known representative of the Cretaceous *Uvigerinammina* group is a form that one of us (Th. Neagu) has recently found in the Kimmeridgian of Romania (Neagu & Neagu, this volume). This form, assigned to *Uvigerinammina uvigeriniformis* (Seibold & Seibold, 1960), has a coarse wall, globular chambers, and a distinctly uniserial terminal part. An unnamed taxon illustrated by Kaminski *et al.* (1992; Pl. 7, Figs. 8-9) as *Uvigerinammina* sp. from the Berriasian to Valanginian of ODP Site 765 on the Argo Abyssal Plain displays an even more well-developed uniserial part possessing as many as three globular chambers. The coiling in this abyssal form, however, is still clearly trochospiral because the chambers in the uniserial part are asymmetrical with the tubular connection on alternate sides of the chambers. Another species recently described as *Uvigerinammina laxa* from the Hauterivian of the Canadian Arctic by Fowler & Braun (1993) is similarly uncoiled in its later stage, and differs only in its apparently coarser wall and less globular chambers.

This uncoiling chamber arrangement is also observed in *Falsogaudryinella neagui*, and strongly recalls that of the genus *Pseudoreophax* Geroch, 1961 (The latter genus is known from the Tithonian). We speculate that the ancestral form of *Uvigerinammina* and possibly *Falsogaudryinella* may have been a species resembling *Pseudoreophax cisovnicensis* Geroch, 1961. The mid-Cretaceous species *Uvigerinammina manitobensis* (Wickenden, 1932) displays a pseudobiserial arrangement of the final chambers similar to *F. tealbyensis*, whereas *U. praejankoi* Neagu, 1990 from the lower Turonian of Romania (as well as specimens from the upper Albian to Cenomanian of the Northern Calcareous Alps illustrated as *"U. jankoi"* by Weidich, 1990) has a terminal stage that is wholly biserial (see Pl. 4, Figs. 6-9). The type species *Uvigerinammina jankoi* Majzon, 1943, which ranges from the late Turonian to the early Campanian, remains triserial throughout ontogeny (see Pl. 4, Figs. 10-12). Evolution in both *Falsogaudryinella* and *Uvigerinammina* therefore consists of progressive reduction of the uniserial part and expansion of the triserial part, with the youngest representatives of both genera fully triserial.

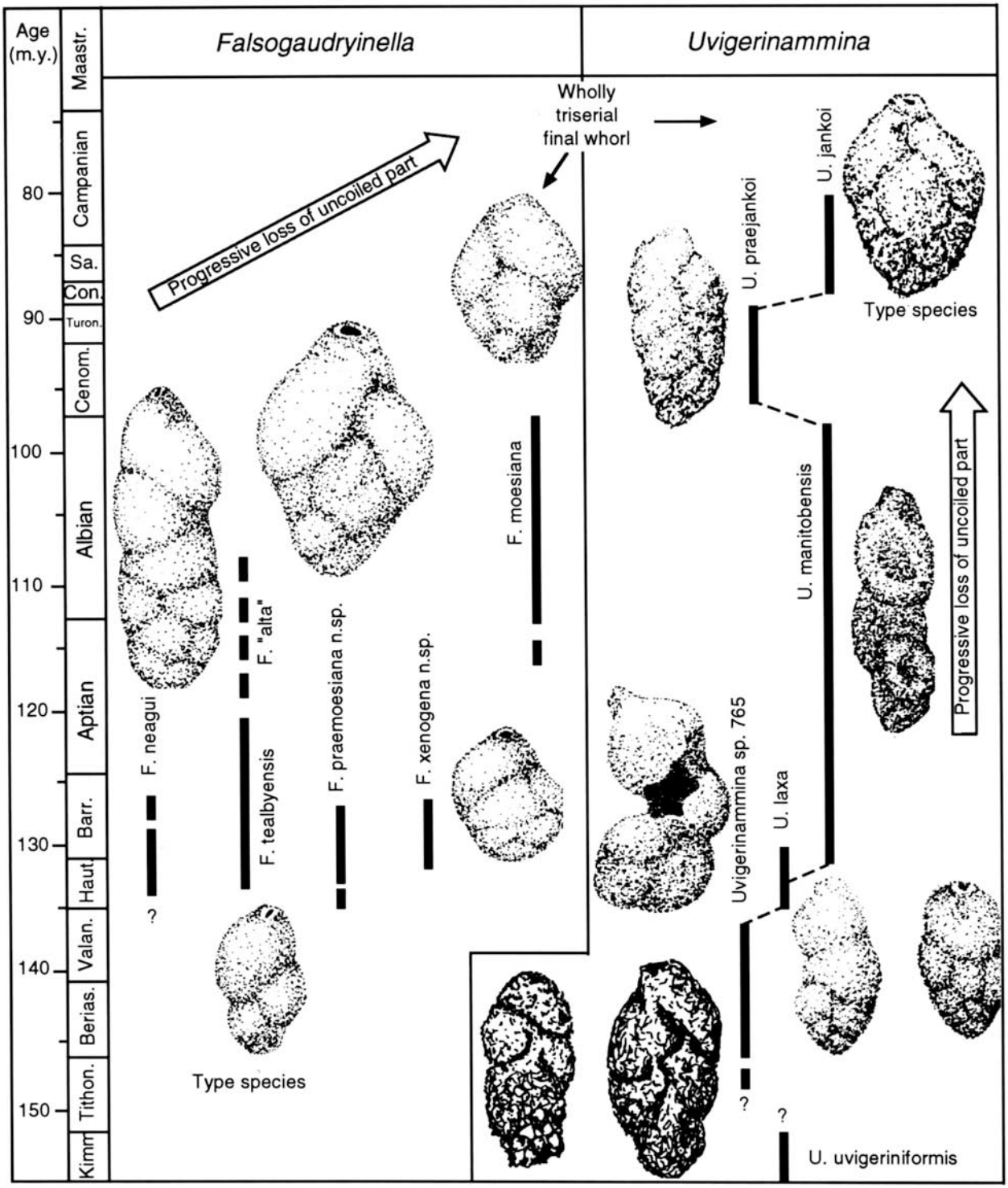

Figure 1. Proposed phylogeny of the *Uvigerinammina* and *Falsogaudryinella* lineages. Specimens are not drawn to scale. Drawings of *U. laxa* are after Fowler & Braun (1993); drawing of *U. manitobensis* is after Cushman (1937). The lower limits of the stratigraphic ranges of *U. manitobensis* and *U. praejankoi* were compiled from Weidich (1990).

The similarities in their internal structure and the coeval morphological trends in the evolution of both *Falsogaudryinella* and *Uvigerinammina* are uncanny. The nature of the coiling of the type species *F. tealbyensis* (and the number of chambers) requires us to transfer the genus from the Family Verneuilinidae to the Family Prolixoplectidae in the classification of Loeblich & Tappan (1987). However, fundamental differences in the wall structure between *Uvigerinammina* and *Falsogaudryinella* necessitate placing the two genera in different orders according to the suprageneric classification of Loeblich & Tappan (1992). Our observation of coeval evolutionary trends in both genera raises important questions about the origin of the Cretaceous calcareous-cemented taxa such as *Falsogaudryinella* and their true relationship to organically-cemented forms.

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Plate 1.

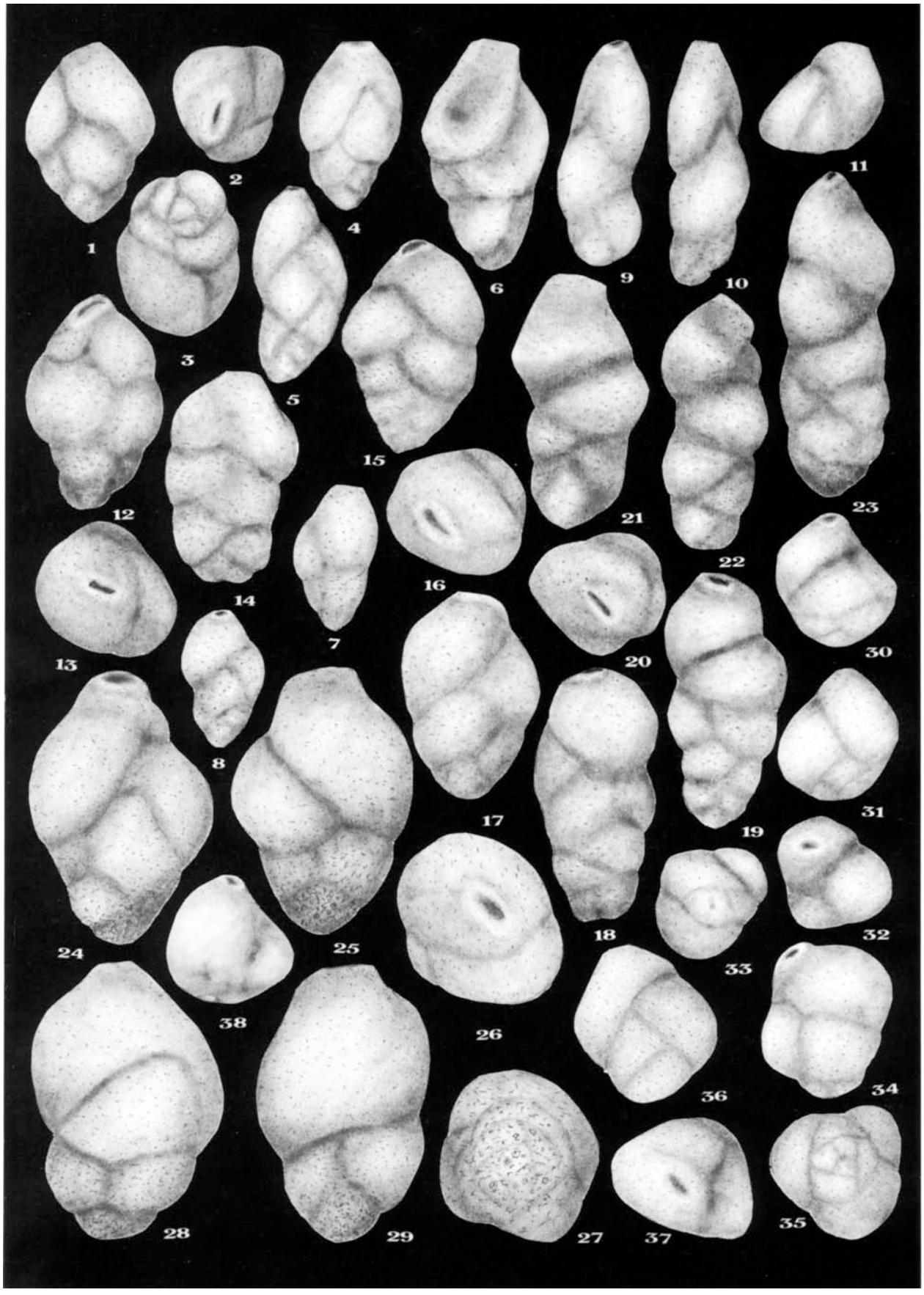
Fig. 1-8. *Falsogaudryinella moesiana* (Neagu, 1965). **1-3.** Holotype, Middle Albian, Giurgiu, Romanian Plain, L.P.B.IV.5032, x134. **4-6.** Paratypes, Albian, Craiova drilling no. 215 (-1154 m), Romanian Plain, L.P.B.IV.5446, 4, x127, 5, x119, 6, x123. **7-8.** Upper Albian, Speeton England, L.P.B.IV.0208, x127.

Fig. 9-11. *Falsogaudryinella tealbyensis* (Bartenstein, 1956). Middle Albian, Giurgiu, Romanian Plain, L.P.B.IV.5022, x112.

Fig. 12-17; 24-29. *Falsogaudryinella praemoesiana* Kaminski, Neagu & Platon n.sp. **12-17.** Upper Hauterivian, Dambovicioara Valley, Romania, L.P.B.IV.11049, x119. **24-27.** Holotype, Barremian, Block 21 of the Central North Sea, (Shell 21/23b-1 well), BMNH PM PF 53062, x119. **28-29.** Paratypes, Barremian, Block 21 of the Central North Sea, (Shell 21/23b-1 well), x119.

Fig. 18-23. *Falsogaudryinella neagui* Bartenstein, 1981. **18-23.** Paratypes, lower Barremian, Izvorului Valley, Dambovicioara Basin, L.P.B.IV.9807, 18, 19, 20 x119; 21, 22 x98; 23 x108.

Fig. 30-38. *Falsogaudryinella xenogena* Kaminski, Neagu & Platon n.sp. **30-33.** Holotype, Barremian, Block 22 of the Central North Sea, (Shell 22/24-1 well), BMNH PM PF 53063, x119. **34-38.** Paratypes, Barremian, Block 22 of the Central North Sea, (Shell 22/24-1 well), x112.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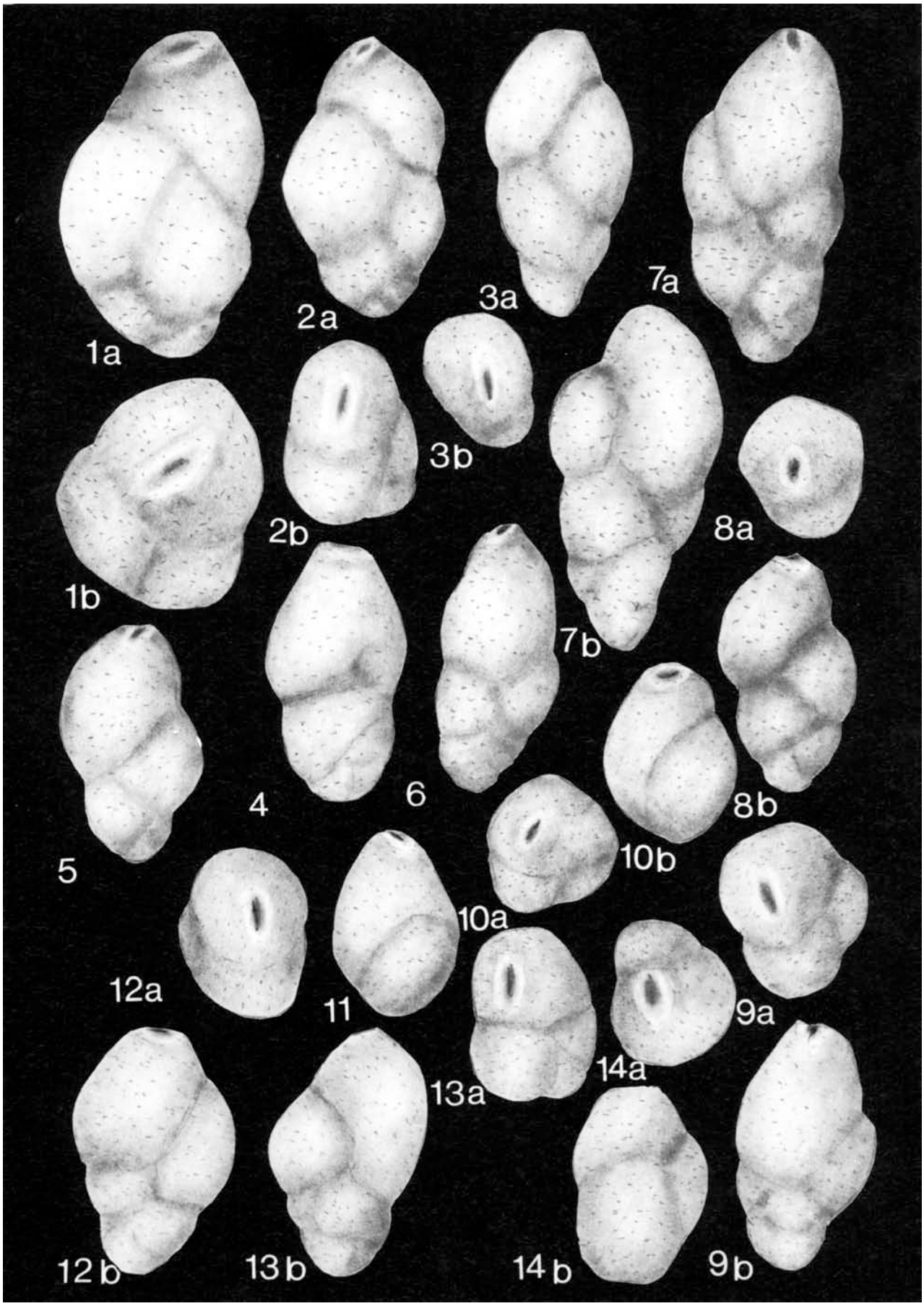

Plate 2. **1-14.** *Falsogaudryinella tealbyensis* (Bartenstein, 1956). 1-14. Topotypes, Barremian, Lower Tealby Clay of Nettleton, Lincolnshire, 1, x350; 2, 3, 13, 14, x208; 4, 5, 6, 9, 10, x227; 7, x215; 8, 11, 12, x202.

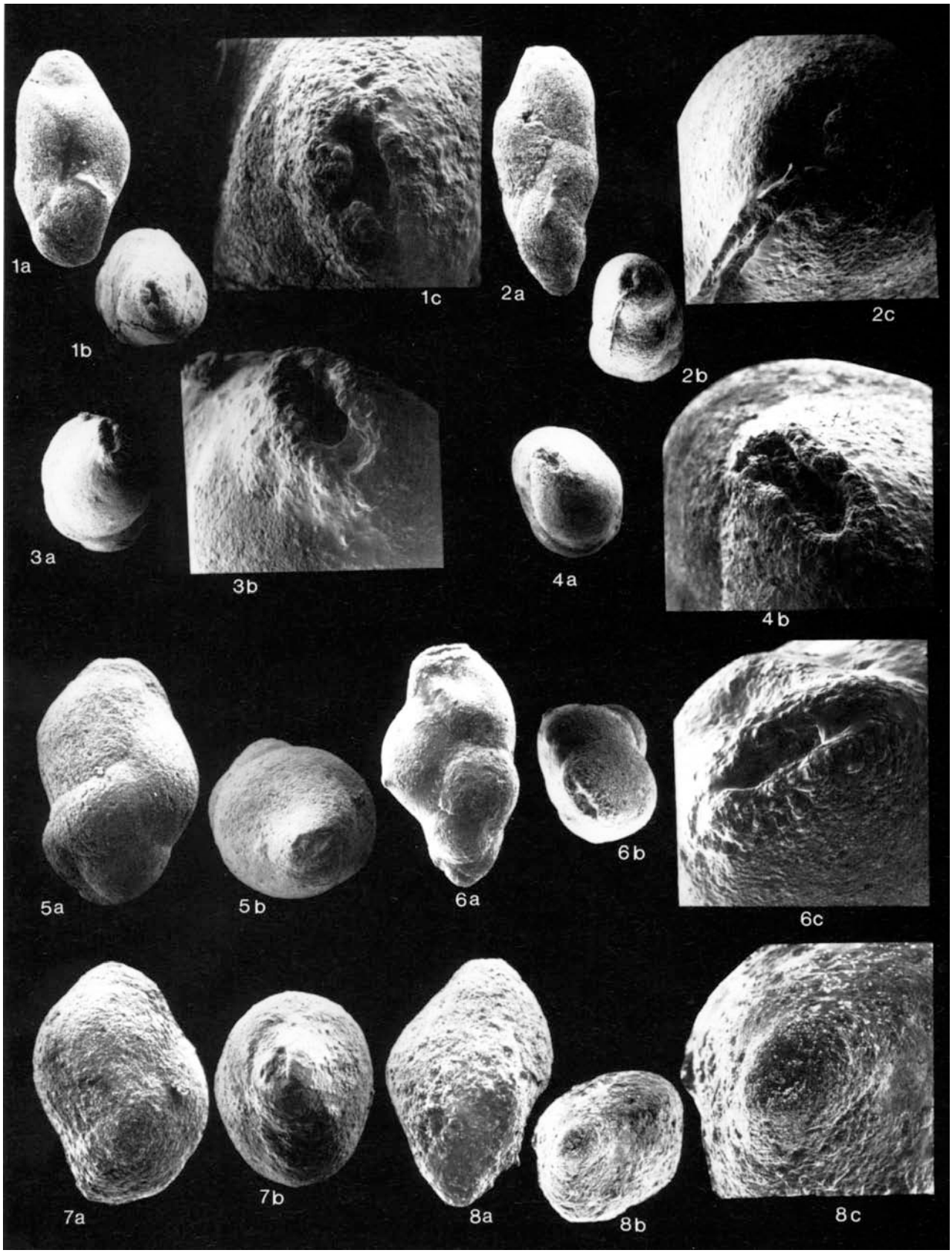

Plate 3. **1-4.** *Falsogaudryinella tealbyensis* (Bartenstein, 1956). Topotypes, Barremian, Lower Tealby Clay of Nettleton, Lincolnshire, 1a,b, 2a, b, 4a x120; 3a, x125; 1c, 2c, 3b, 4b, x480. **5-7.** *Falsogaudryinella praemoesiana* Kaminski, Neagu & Platon n. sp. **5.** Paratype, Barremian, Block 21 of the Central North Sea (Shell 21/23b-1 well) 5a,b, x89. **6.** Barremian, Lower Tealby Clay of Nettleton -Lincolnshire, 6a,b, x145; 6c, x480. **7.** Barremian, Block 29 of the Central North Sea (Shell 29/5A-7 well) 7a,b, x130. **8.** *Falsogaudryinella moesiana* Neagu, 1965, Paratype, Albian, Craiova drilling no. 215 (-1154 m) - Romanian Plain, L.P.B.IV. 5446, 8a,b, x193; 8c, x480.

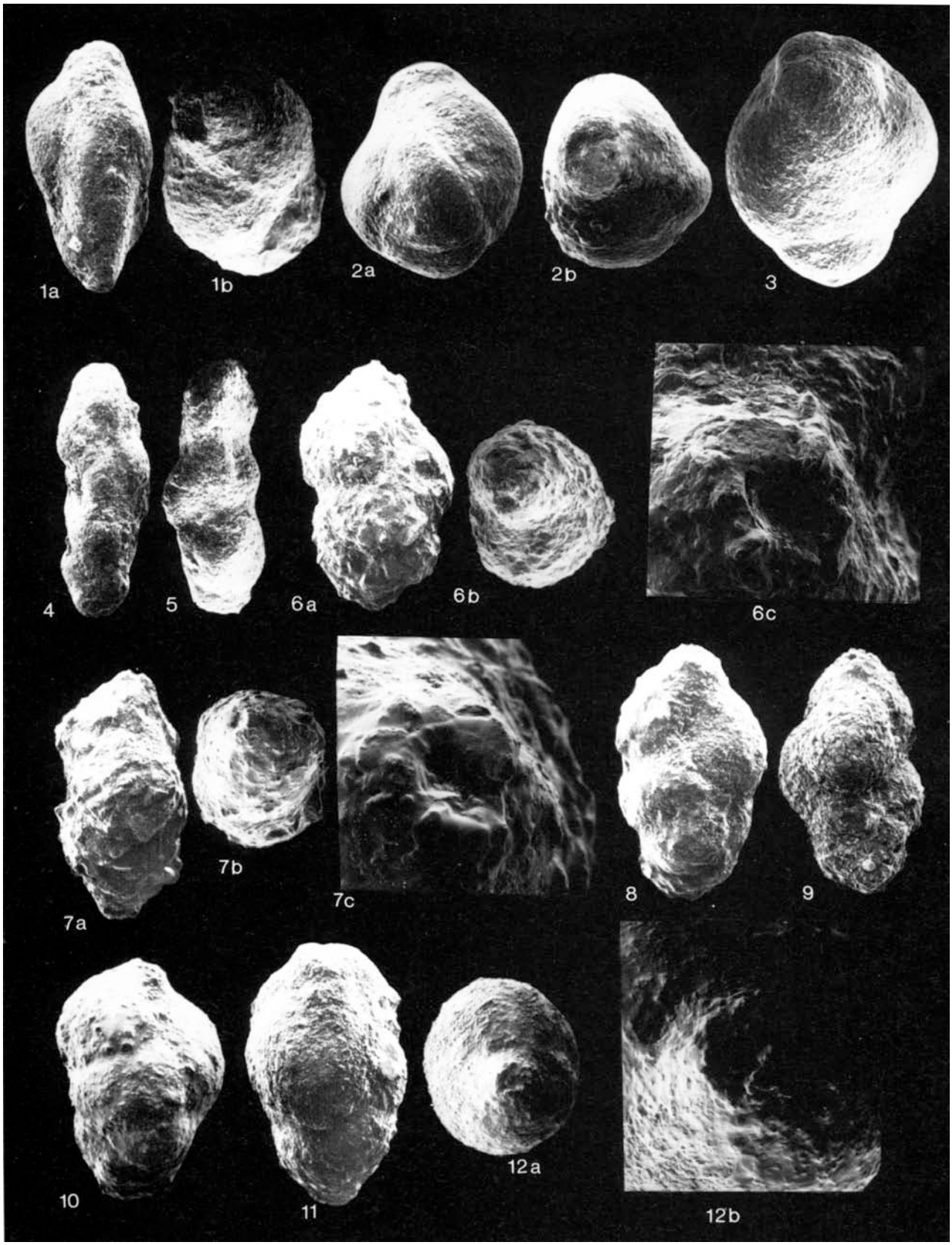

Plate 4. 1. *Falsogaudryinella moesiana* Neagu, 1965. Paratype, Albian, Craiova drilling no. 215 (1154 m), Romanian Plain, L.P.B.IV. 5446, 1a,b, x168. **2-3.** *Falsogaudryinella xenogena* Kaminski, Neagu & Platon n.sp. Barremian, Block 29 of the Central North Sea (Shell 29/5A-7 well), 2a,b, 3, x178. **4-5.** *Falsogaudryinella neagui,* Bartenstein, 1981, Paratypes, Lower Barremian, Izvorului Valley, Dambovicioara Basin, L.P.B.IV.9807, 4, x76; 5, x84. **6-9.** *Uvigerinammina praejankoi* Neagu, 1990. Turonian, Curbicortical Flysch Nappe, Eastern Carpathians, 6a,b, 8, x122; 6c, 7c, x510; 7a,b, x112; 9, x102. **10-12.** *Uvigerinammina jankoi* Majzon, 1943. Turonian, Curbicortical Flysch Nappe, Eastern Carpathians, 10,12a, x102; 11, x100; 12b, x255.

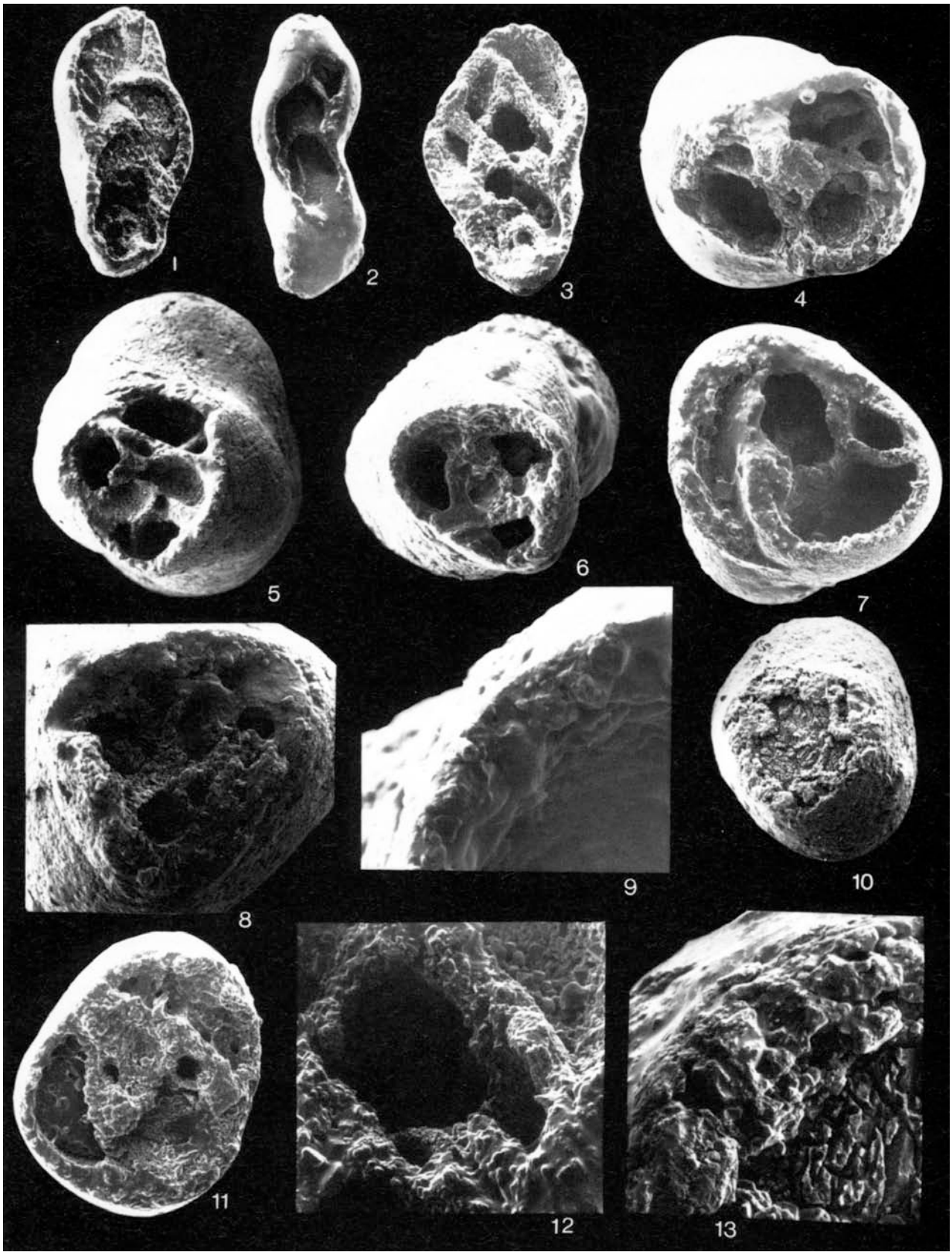

Plate 5. 1-7, 9, 11, 12. *Falsogaudryinella tealbyensis* (Bartenstein, 1956); Lower Tealby Clay. 1-3. Longitudinal sections, 1 x135; 2 x108; 3 x163. 4, 6, 7. Cross sections through early stage, macrosphaeric forms, 4, x244; 6, x298; 7, x244. 5. Cross section through early stage, microsphaeric form, x298. 9. Cross section, wall structure, x1625. 11. Cross section, x271. 12. Cross section, inner wall structure, x542. **8.** *Falsogaudryinella praemoesiana* Kaminski, Neagu & Platon n.sp., North Sea, Cross section through early stage, x271. **10, 13.** *Falsogaudryinella xenogena* Kaminski, Neagu & Platon n.sp., North Sea, 10. cross section through early stage, x190. 13. cross section - wall structure, x949.