

THE OLDEST KNOWN NOWAKIID (TENTACULITOIDEA)

by S. P. TUNNICLIFF

ABSTRACT. Specimens of the tentaculitoidean *Nowakia brevis* sp. nov. are described from the type locality of *Monograptus sedgwickii* (Portlock) in the Silurian of Pomeroy, Co. Tyrone, Ireland. This is the oldest known representative of the Nowakiidae, a family not known again in the fossil record until the early Devonian.

A NUMBER of small tentaculitoideans are present among the specimens collected by J. E. Portlock from the Silurian rocks of Pomeroy, Co. Tyrone (see Tunnicliff 1980), and are closely associated with the type specimens (Elles 1942) of the zone fossil *Monograptus sedgwickii* (Portlock). Portlock labelled some of these specimens as *Tentaculites brevis* (MS.) and recorded them as *Tentaculites?* (1843, p. 231, pl. 19, figs. 12a, b). In recent years, officers of the Geological Survey of Northern Ireland have collected further specimens. These are described here as *Nowakia brevis* sp. nov.

The *M. sedgwickii* horizon of the Limehill Beds of Pomeroy (Llandoverly, Fronian, *M. sedgwickii* Zone) contains fine black mudstone associated with paler, grey, somewhat siltier beds (Fearnside *et al.* 1907, pp. 108, 109). The fauna is restricted to graptolites (Fearnside *et al.* 1907, p. 110 recorded five monograptid species plus *Climacograptus* and *Petalograptus*) and *N. brevis* with occasional bivalves (Pl. 84, figs. 15, 17, 18), a small atrypoid brachiopod (Pl. 84, fig. 16), indeterminate orthoconic nautiloid fragments, and *Aptychopsis*. Neither the graptolites nor the *Nowakia* show any preferred orientation, although graptolites are numerous and specimens several inches long are preserved. There is no evidence of bioturbation within the mudstones, which suggests an absence of benthic and burrowing organisms. A calm, deep-water, offshore palaeoenvironment above slowly accumulating sediment is inferred for *N. brevis*. The mode of life of the associated shells is open to speculation, but *Guerichia* Rzehak, 1910 (= *Karadjalia* Sadykov, 1962) (Pl. 84, fig. 15) is thought to have lived byssally attached to floating weed (House 1975, p. 481) and a similar habit is cited for certain brachiopods (Rudwick *in* Moore 1965, p. H201; Rudwick 1961, p. 475; 1970, p. 77). *N. brevis* was probably planktonic, associated with the free-floating monograptids, a mode of life suggested for *Nowakia* by most authorities (e.g. Fisher *in* Moore 1962, p. W104; Bouček 1964, p. 37; Lardeaux 1969, p. 90). Lardeaux (1969, p. 191) emphasized the similarity of mode of life and occurrence between the Dacryoconarida and monograptids. Hurst and Hewitt (1977, p. 151), while reviewing the facies distribution of the tentaculitid *Tentaculites*, mentioned that the Dacryoconarida occur abundantly in offshore facies in the Devonian while *Tentaculites* has not been recorded from graptolitic shales. Previously recorded Llandoverly age tentaculitoideans are of the thicker-walled, bottom-dwelling *Tentaculites* type (see Hurst and Hewitt 1977, p. 163; Larsson 1979). The small, thin-walled, pelagic *N. brevis* represents an early development of nowakiid morphology and to some extent shared an ecological niche with the monograptids. It is, perhaps, significant that nowakiids are not known otherwise from the graptolitic Silurian and it is possible that there is a correlation between the decline of the graptolites in the Devonian and the flourishing of the nowakiids. If these specimens represent, as they seem to, a true *Nowakia*, the range of the genus and of the family Nowakiidae is extended considerably, the earliest previous records having been from the early Devonian (Gedinnian) (Bouček 1964, p. 58; Lardeaux 1969, p. 89). Some of the faunal elements with which *N. brevis* has been found appear morphologically similar to later, especially Devonian, forms which have been suggested to have been pelagic or epiplanktonic, in particular *Guerichia* and '*Leiorhynchus*'. Therefore, the Lime Hill fauna is an assemblage which includes early examples of morphological types which are not uncommon in Devonian rocks. The question remains: what happened to the nowakiids in the period between the Llandoverly and the Devonian?

SYSTEMATIC PALAEONTOLOGY

The classification used in the *Treatise on Invertebrate Paleontology* Part W (Moore 1962) is adopted below class level. This is compatible with that of other authors (Bouček 1964; Lardeaux 1969; Larsson 1979). The material cited is in the collections of the Institute of Geological Sciences, London (IGS), and the Ulster Museum, Belfast (UM).

Order DACRYOCONARIDA Fisher, 1962
Family NOWAKIIDAE Bouček and Prantl, 1960
Genus *Nowakia* Gürich, 1896

Nowakia brevis sp. nov.

Pl. 84, figs. 1-14

- v. 1843 *Tentaculites?* Portlock, p. 231, pl. 19, figs. 12a, b.
1980 *Tentaculites brevis* Portlock MS.; Tunnickliff, p. 91 [catalogue entry recording *brevis* as a *nomen nudum*].

Holotype. IGS NIE1238 (Pl. 84, fig. 10), the largest and most complete specimen known.

Material, horizon and locality. Individual specimens and groups of specimens on slabs from the Portlock Collection and recent Geological Survey of Northern Ireland collections: IGS GSM12664, 62652, 103609, NID2088, 2090, NIE1199, 1238, 1240, RU3863; and UM K4100, 4274, 4390-3. All from the Limehill Beds (Llandoverly, *M. sedgwickii* Zone) at Lime Hill, Pomeroy, Co. Tyrone. (Irish grid ref. H 6945 7390). All preserved as moulds, mostly external, but some (Pl. 84, fig. 7) showing internal detail.

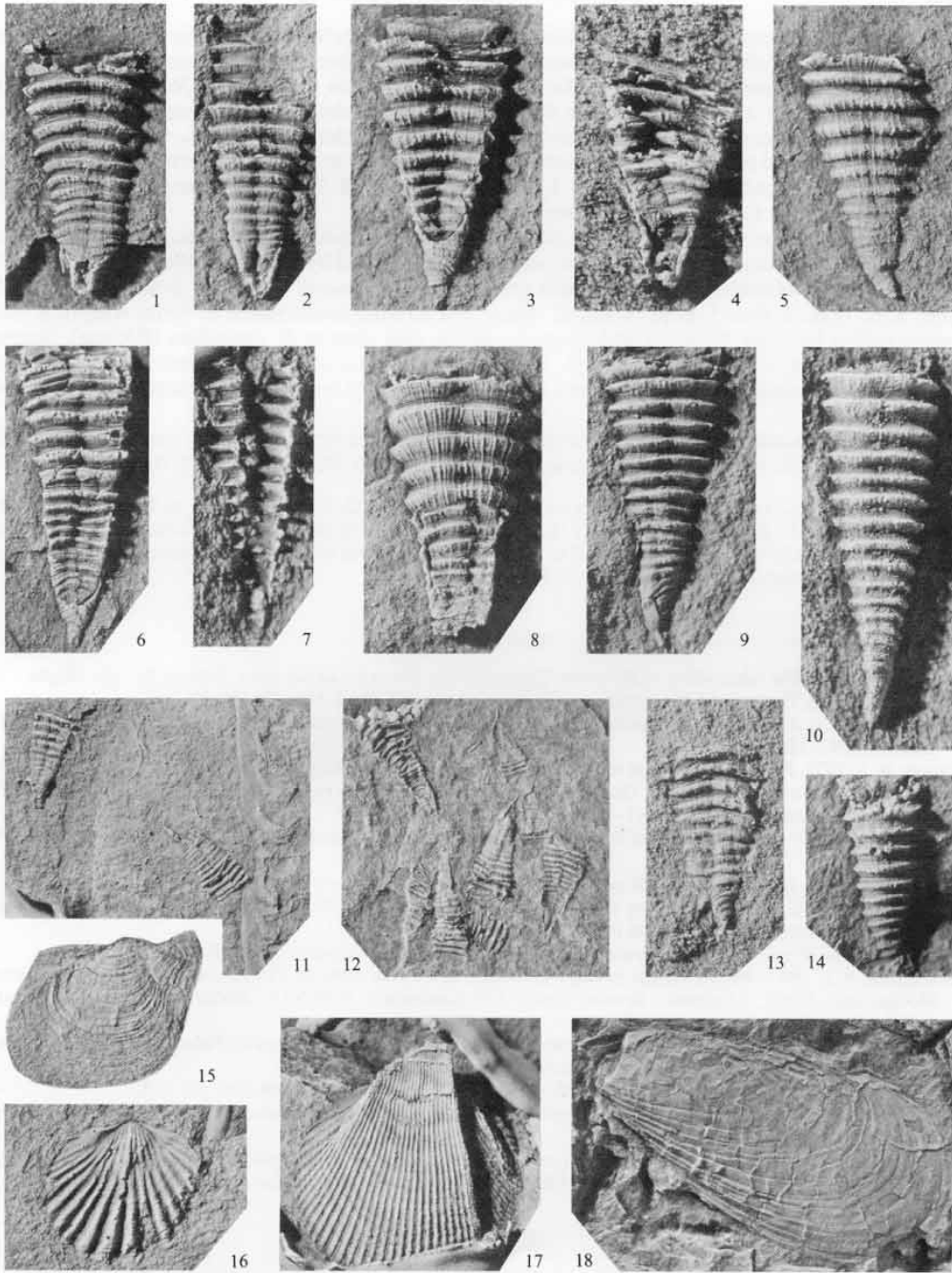
Diagnosis. Medium-sized nowakiid with strong, fairly sharp rings, and fine transverse and longitudinal striae. Growth angle initially *c.* 30°, reducing to 20-25°.

Description. Straight, conical shell with a thin wall (*c.* 0.03 mm between rings and up to 0.1 mm at rings: Pl. 84, fig. 7). Initial stage tear-drop shaped (Pl. 84, figs. 5, 6, 10) and often slightly curved away from the main axis of the shell (Pl. 84, figs. 5, 10). The cross-section is assumed to have been circular in life. External surface marked by strong, fairly sharp rings (in the 2 to 3 mm interval, five specimens show 3½, 4, 4, 4, 5 rings, and in the 3 to 4 mm interval they show 3, 3½, 4, 4, 4 rings) and fine transverse striae (*c.* 2-4 per 0.1 mm) especially visible between rings; there are fine longitudinal striae (7-10 per mm) which increase in number distally, as new striae arise by insertion between existing ones (Pl. 84, fig. 8); I estimate a total of thirty to forty striae for the circumference of the available specimens. No evidence of internal septa. Internal surface undulating to correspond with the external relief (Pl. 84, fig. 7), but lacking the fine ornament. Maximum shell length seen 5.2 mm (Pl. 84, fig. 10); maximum width seen 2.2 mm (Pl. 84, figs. 3, 8). Juvenile growth angle *c.* 30°; mature growth angle typically 20-25°. Most specimens show some distortion, usually shell collapse evinced by a sub-median longitudinal crack (Pl. 84, figs. 2, 3, 6).

EXPLANATION OF PLATE 84

- Figs. 1-14. *Nowakia brevis* sp. nov. All latex casts; 1-10, 13-14, × 10; 11, 12, × 5. 1, IGS GSM62652. 2, IGS RU3863. 3, IGS GSM12664. 4, IGS NIE1240. 5, IGS GSM12664. 6, IGS NID2088. 7, IGS NIE1199. 8, UM K4392. 9, IGS GSM62652. 10, IGS NIE1238, holotype. 11, IGS GSM12664, two specimens closely associated with the lectotype of *Monograptus sedgwickii* (Portlock). 12, UM K4390, a group showing no obvious orientation. 13, IGS GSM12664. 14, IGS NIE1199.
Fig. 15. *Guerichia?* sp., right valve, IGS GSM12664b, × 4.
Fig. 16. Atrypoid? gen. and sp. indet., latex cast of pedicle valve, IGS GSM104188, × 4.
Fig. 17. Lunulacardiid gen. and sp. indet., latex cast of right valve, IGS NIG592, × 4.
Fig. 18 *Mytilarca?* sp., left valve, UM K4236, × 2.

All specimens from the Limehill Beds, Llandoverly, *M. sedgwickii* Zone, Lime Hill, Pomeroy, Co. Tyrone, Ireland: IGR H 6945 7390.



TUNNICLIFF, *Nowakia* and associated fauna

Discussion. The more recently collected material allows the establishment of Portlock's manuscript name, *brevis*, with which he labelled some of his specimens although he chose not to publish it.

In all of its features this species conforms with the diagnosis of the genus *Nowakia*. Only in its growth angle does it differ from other described species of the genus, widening at almost twice (20–25°) the rate ascribed to most species (usually 10–13° in the mature portion; Fisher in Moore 1962, p. W115), and thus lacking the subcylindrical appearance in the mature portion of the shell seen in other species (Bouček 1964, pls. 1–15; Lardeaux 1969, pls. 30–36). This difference in growth angle alone is insufficient to exclude *brevis* from *Nowakia*.

The proximal end in *N. brevis* is not as globular in appearance as in some examples of *Nowakia* spp., for example some specimens of *N. acuaria* (Richter) figured by Lardeaux (1969, pl. 31, figs. 6, 7); however, the proximal end compares with specimens of *N. acuaria* figured by Bouček (1964, pl. 1, figs. 1, 6, 7; pl. 2, figs. 3, 6; pl. 3, fig. 2). There is a striking resemblance of form, sculpture, and preservation between *N. brevis* and examples of the type species *N. cancellata* (Richter), figured by Bouček (1964, especially pl. 9 and pl. 11, fig. 1), but in density of longitudinal striae *N. brevis* is closer to *N. barrandei* Bouček and Prantl (Bouček 1964, p. 75) and to *N. acuaria* (Richter) (Bouček 1964, p. 62).

The close association of *N. brevis* with *Monograptus* is noteworthy; both occur on slab IGS GSM12664, 62652 which bears the lectotype of *M. sedgwickii* (Portlock) (Pl. 84, fig. 11).

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