A PALAEOCENE TEREDINID (MOLLUSCA) FROM IRAQ

by GRAHAM F. ELLIOTT

ABSTRACT. The teredinid mollusc *Bankia* (*Bankiella*) *kurdistanensis* sp. nov. is described from an association of tubes, valves, and pallets in the Palaeocene of Iraq.

WOOD bored by *Teredo* and allied genera is a common Tertiary fossil at various levels and localities, as in the London Clay of England. Current zoological classification of these highly modified molluscs is based neither on the valves nor on the conspicuous tubular shell-lined borings, but on the morphology of the little calcareous structures known as pallets, which in life are associated with the fleshy siphons. Such pallets are not commonly recorded as fossils. Although the Iraqi material described below was in solid preservation not permitting the isolation of pallets, numerous thin-sections show these and other structures excellently preserved.

The specimens, of petrified dicotyledonous wood showing well-preserved structure and riddled with calcite-filled teredinid burrows, were collected from the Kolosh Formation (van Bellen 1959). This is composed of sands and sandstones of detrital serpentine, chert, and radiolarite, with subordinate shales and limestones, and outcrops extensively in northern Iraq. It has yielded foraminiferal faunas and an algal microflora of Palaeocene–Lower Eocene age, as well as some molluscs and other macrofossils. The present material comes from three separate localities, but all the pallets seen in sections are of one distinctive type, suggesting that one species only is present.

In a revision and classification of the Teredinidae, Bartsch (1922) subdivided the genus *Bankia* Gray 1842, which comprises those forms whose pallets show cone-in-cone structure. Such pallets consist of a proximal rod-like portion or stem, from which a series of laterally flattened cones, opening distally, arise one within the other, together forming a blade-like structure. In the subgenus *Nausitora* the cones are fused on one flattened side and backed by a calcareous deposit ('thick periostracum' of Bartsch). In the three subgenera *Bankia* s.s., *Bankiella*, and *Neobankia* the cones are free and covered by a thin investing membrane; distally this membrane is fimbriated in *Bankia* s.s., entire in *Bankiella*, and denticulated in *Neobankia*.

Nausitora-pallets showing calcareous fusion might be expected to occur as fossils and have in fact been recorded from the Lower Eocene London Clay (Wrigley 1930). The Iraqi fossils now discussed show pallets with free cone-in-cone structure and entire margins. It would at first sight seem doubtful that the membrane permitting subgeneric differentiation would be preserved, and hence that *Bankia* s.l. would be the best allocation that could be made. However, Stinton (1957) described denticulated-margin pallets recognizable as *Neobankia* from the Upper Eocene Barton Clay. This preservation is probably inferior in fine detail to that of the material now examined. It seems likely, therefore, that the entire margins seen are original, and for this reason the fossil is referred to *Bankiella*.

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Genus BANKIA Gray 1842
Subgenus *Bankiella* Bartsch 1921
Bankia (*Bankiella*) *kurdistanensis* sp. nov.

Plates 51, 52

Diagnosis. Bankia with pallets of 4·3 mm. length or more, maximum diameter about 2·5 mm., of flattened cone-in-cone type, about fifteen cones with distal margins entire, free stem presumed relatively short. Valves incompletely known; tubes typically variable in length and diameter, incipiently septate in large examples.

Holotype. BM LL30332 (Pl. 51, fig. 1), Kolosh Formation (Palaeocene), Dohuk, Mosul Liwa, northern Iraq. *Paratypes.* BM LL30333–5 incl. (Pl. 51, figs. 2, 3; and Pl. 52, figs. 1, 2), Kolosh Formation (Palaeocene), Dohuk, Mosul Liwa, and Koi Sanjak, Erbil Liwa, northern Iraq.

Other material. Specimens from the Kolosh Formation (Palaeocene), of Shaqlawah and Koi Sanjak, Erbil Liwa, and Dohuk, Mosul Liwa, northern Iraq.

Description. (*a*) *Tubes.* The calcite- or matrix-filled shelly tubes show great variety both in size and degree of crowding. In diameter they vary from 1·5 to 12·0 mm. The larger examples may have reached a length of 20 cm. or more, though this cannot be proved from the pieces of bored wood collected. These specimens show all the usual varieties of wood penetrated by straight parallel tubes, small, crowded, and twisted tubes, &c. Some larger tubes show a regular, narrowly annular internal septation (Pl. 52, fig. 2); in an example of 5 mm. tube-diameter the septa are 2 mm. apart. This feature is developed in individuals of some Recent teredinid species. In one fossil tube the section shows two smaller, conjoined but complete tubes, associated with matrix. This is presumably the broken apertural end, out of position: such a constricted double apertural siphonal tube has been described from the London Clay by Sowerby (1815), Davis (1936), and Wrigley (1940); the last, by analogy with Recent species, did not regard it as of specific value. Only two examples have been seen in the Iraqi material (BM LL30331).

(*b*) *Valves.* The valves are known only from cross-sections of two paired examples (Pl. 51, fig. 2; Pl. 52, fig. 1). Presumably they were of the specialized pattern common to the family (Bartsch 1922, Stinton 1957), functioning as excavating tools. The distinctive

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EXPLANATION OF PLATE 51

Bankia (*Bankiella*) *kurdistanensis* sp. nov., thin-sections, ×15. Kolosh Formation, Palaeocene: Dohuk, Mosul Liwa (fig. 1); and Koi Sanjak, Erbil Liwa, northern Iraq (figs. 2, 3).

Fig. 1. Vertical section of pallet (in two pieces) at right angles to maximum width of the pallet blade. In calcite-filled burrow, in dicotyledonous wood. Holotype, BM LL30332.

Fig. 2. Oblique section through blade of pallet, showing stem, cones, and concave pallet-face; also the two valves. Post-mortem association in burrow. Paratype, BM LL30334.

Fig. 3. Oblique and transverse sections of two adjacent pallets in burrow. Not in position held during life. Paratype, BM LL30334.

EXPLANATION OF PLATE 52

Bankia (*Bankiella*) *kurdistanensis* sp. nov., thin-sections, ×15. Kolosh Formation, Palaeocene: Dohuk, Mosul (fig. 1); and Koi Sanjak, Erbil Liwa, northern Iraq (fig. 2).

Fig. 1. Approximately vertical section of two associated valves, one showing well the external ridges used for mechanical excavation. In burrow, in wood. Paratype, BM LL30333.

Fig. 2. Portion of longitudinal section of large burrow, showing spaced annular septa on inside of shelly lining to burrow (conspicuous calcite parting on one side). Paratype, BM LL30335.

fine concentric ridges ('dental ridges' of part of the outer valve surface) are seen in Plate 52, fig. 1.

(*c*) *Pallets.* Thin-sections reveal numerous pallets, single or paired, occurring usually at the inner, closed end of the burrows. This is not the position in life, when the pallets are adjacent to the siphons at the mouth of the burrow, but presumably most such fossil pallets did in fact belong to the individual inhabiting the burrow in which they now occur. In each of four random cuts the count of component cones is about fifteen; these structures are seen to be closely set, laterally flattened, with one face convex and the other slightly concave with median convexity over the stem. The only possible trace of accessory detail on the oblique cuts through the margins, which were entire, is seen at the lateral margins, which may have been produced into spines as in Recent species. The length of the free stem, proximal to the cones or blade of the pallet, is not known, but as it is infrequently seen in random cuts of different burrows, as compared with the blades, it is suggested that it was relatively short. There is great variation in the lengths of free stem to blade in the pallets of different Recent teredinid species.

A Recent *Bankiella* species with pallets of about the same size is *Bankia* (*Bankiella*) *edmondsi* (Balakrishnan Nair 1956), from the Madras coast, India. This agrees in the close-set cones (eleven in the type specimen) with entire margins except for lateral spines, but possesses a proportionally longer stem and a narrower blade.

Pallets of *Nausitora*, *Neobankia*, and *Bankia* s.l. are all known from the English Eocene, as well as those of *Teredo* (*Psiloteredo*) and remains of the pallet-less *Teredina* (Wrigley 1930, Stinton 1957; see also Davis 1936, Moll 1942), so the present occurrence of *Bankiella* in the Iraqi Palaeocene is in keeping with an early Tertiary differentiation of the group.

Specimens in the collections of the Department of Palaeontology, British Museum (Natural History), which are referred to in the text have the prefix BM.

REFERENCES

BALAKRISHNAN NAIR, N. 1956. Shipworms from India. 1. Report on ten species of shipworms from the Madras coast. *Rec. Indian Mus.* **52,** 387–414.

BARTSCH, P. 1922. A monograph of the American shipworms. *Bull. U.S. nat. Mus.* **122,** 1–51.

DAVIS, A. G. 1936. The London Clay of Sheppey and the location of its fossils. *Proc. Geol. Ass., Lond.* **47,** 328–45.

MOLL, F. 1942. Die fossilen Terediniden und ihre Beziehung zu den rezenten Arten. *Palaeontographica,* **94A,** 134–53.

SOWERBY, J. 1815. *The Mineral Conchology of Great Britain,* **1** (1812–15), 234, pl. 102. London.

STINTON, F. C. 1957. On the occurrence of Teredinidae in the Upper Eocene of Barton, Hampshire. *Proc. malac. Soc. Lond.* **32,** 167–73.

VAN BELLEN, R. C. 1959. Tertiary. In *Lexique stratigraphique internat.* **3** (Asie), fasc. 10*a* (Iraq).

WRIGLEY, A. 1930. Notes on English boring Mollusca, with descriptions of new species. *Proc. Geol. Ass., Lond.* **40,** 376–83.

—— 1940. The faunal succession in the London Clay, illustrated in some new exposures near London. Ibid. **51,** 230–45.

GRAHAM F. ELLIOTT
Geological Department,
Iraq Petroleum Co. Ltd.,
214 Oxford Street,
London, W.1

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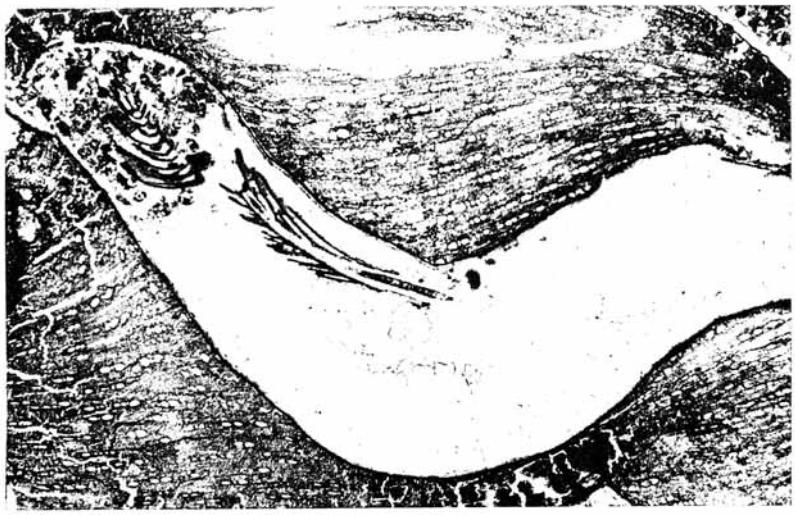

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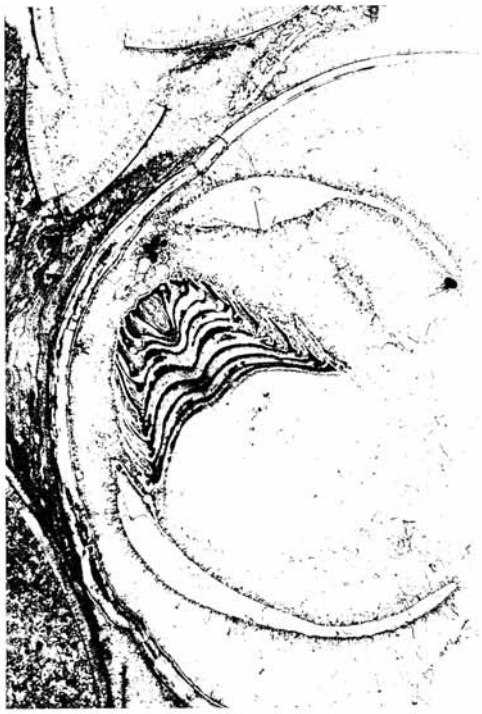

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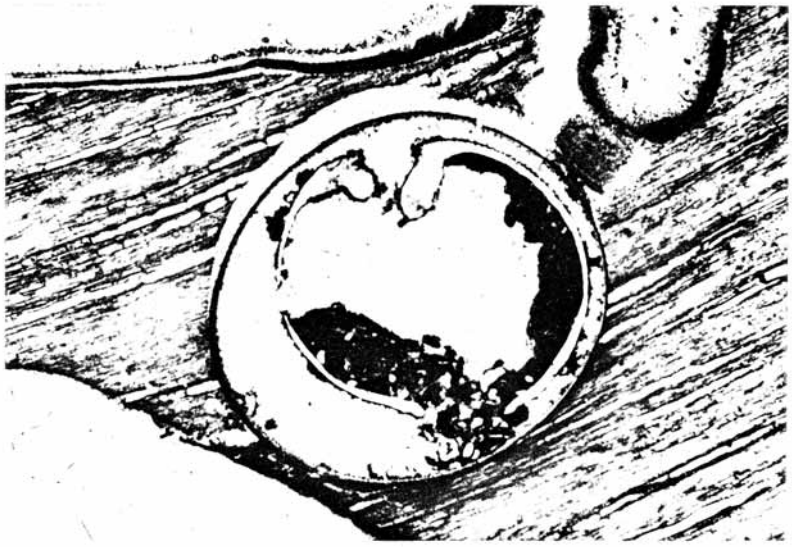

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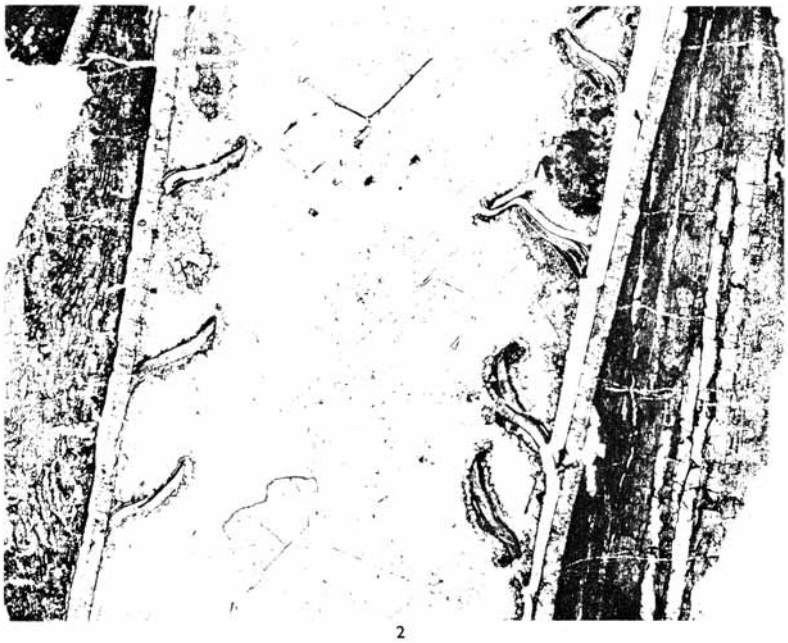

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