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PISIDIUM COLLECTED BY THE 1924 MOUNT EVEREST EXPEDITION, WITH DESCRIPTIONS OF TWO NEW SPECIES (BIVALVIA: SPHAERIIDAE)

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A contemporary account of the 1924 Mount Everest Expedition (NORTON, 1925: 286) stated that molluscs were common up to 15,000 feet in the Himalayas. Among the bivalves collected were several belonging to the genus *Pisidium*; two of the three species represented prove to be new to science.

The specimens were all taken alive in localities at high altitudes, as follows:

Kampa Dzong, Tibet, in a plateau stream at 14,500 feet, 28 iv 1924. *Pisidium* (*Odhneripisidium*) *stewarti* Preston. 1 specimen.

Yatung, Sikkim, northern India, under a stone in a stream at 10,000 feet, 3 iv 1924. *Pisidium* (*Odhneripisidium*) *kuiper* n. sp. 7 specimens. *Pisidium* (*Afropisidium*) *ellisi* n. sp. 1 specimen.

Pisidium (Odhneripisidium) stewarti Preston, 1909

The specimen of this species was sent to J. G. J. KUIPER of Paris for inclusion in a comprehensive report on the species, published recently (KUIPER, 1962b). KUIPER has shown that *P.* (*O.*) *stewarti* should be considered the living representative of *P.* (*O.*) *vincentianum* Woodward—a taxon previously employed for material from Pleistocene and Holocene deposits of western Europe—and that, for purposes of nomenclature, the latter becomes a junior subjective synonym of *P.* (*O.*) *stewarti*.† DANCE (1961) has shown that *P.* (*Neopisidium*) *prashadi* Odhner, described from specimens collected at 12,300 feet in Kham Province,

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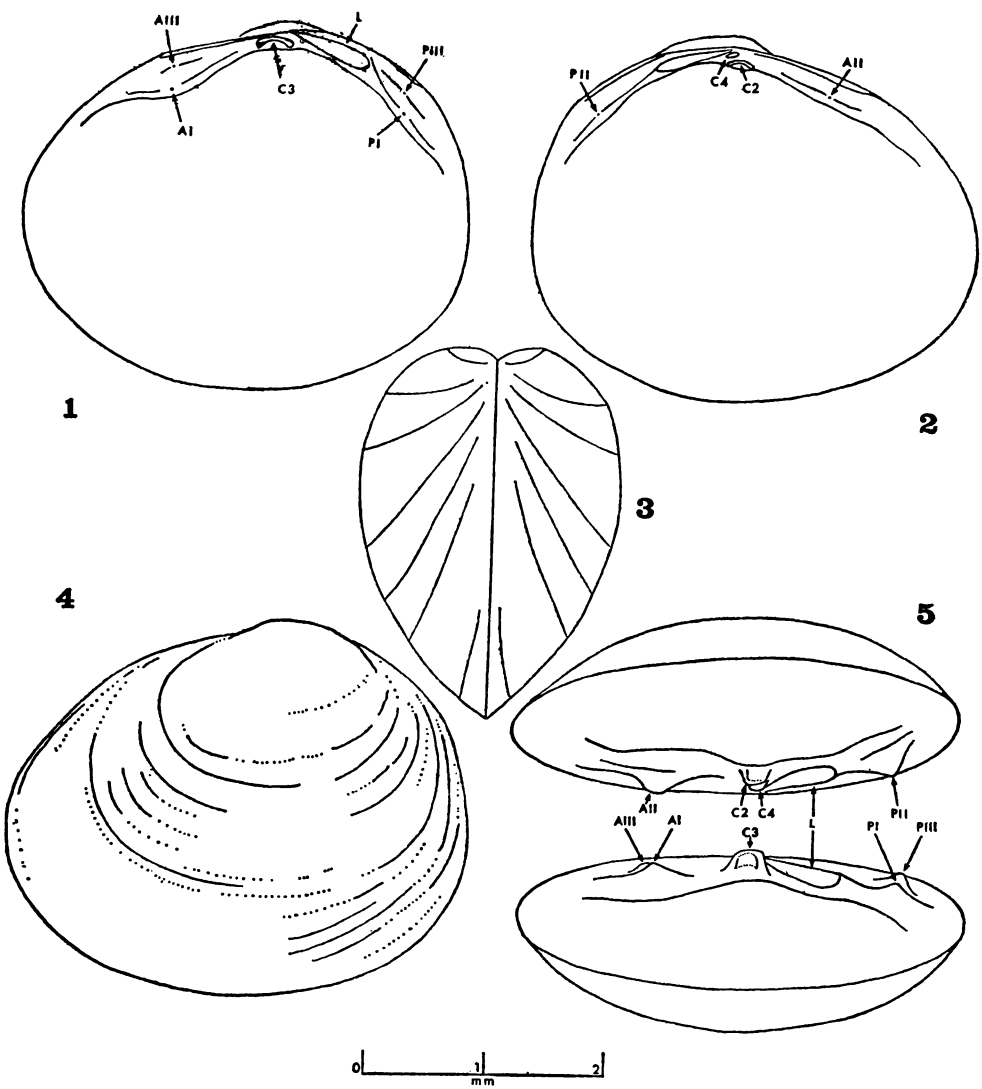
† In 1955 the name *vincentianum* was placed on the Official List of Specific Names in Zoology [ICZN Opinion 336]. It is arguable, therefore, that its senior synonym *stewarti* should not replace it on the basis of date priority alone; the nomenclatural issues involved, however, may have to be re-examined in the light of the more recent taxonomic findings.

Tibet (ODHNER, 1937), is also a junior subjective synonym of *P.* (*O.*) *stewarti*. Together with the type-material of *P.* (*O.*) *stewarti*, collected at 14,500 feet in the Gyantse Valley, Tibet (PRESTON, 1909), the discovery of this specimen at Kampa Dzong constitutes the highest recorded altitude for a living bivalve mollusc.

Pisidium (Odhneripisidium) kuiperi n. sp.
(Figs. 1–5)



Description. Shell inequilateral, rather flattened, thin, semitransparent. Umbones broad, not prominent, almost central. Dorsal margin gently arched, with a steeper slope posteriorly; ventral margin almost straight; anterior produced and well rounded; posterior short and almost straight sided. Periostracum pale yellowish-brown, dull, with fine, irregularly-spaced, concentric striae. Hinge characters: hinge plate moderately solid, not conspicuously narrowed beneath the umbones; lateral teeth well developed, AI, AII, PI and PII long, narrow and pointed, proximal ends of PI and PII passing above the ligament pit; AIII and PIII short, narrow and pointed; C2 long, thin and curved; C4 half the length of C2 and less elevated; C3 slightly longer than C2, curved, thickened posteriorly; C3 nearer to AI and AIII than to PI and PIII, C2 and C4 nearer to AII than to PII; ligament pit long, about $\frac{1}{5}$ length of shell, cutting deeply into the hinge plate and passing under the proximal ends of PI and PII.

The holotype [Reg. No. 196294] and six paratypes [Reg. Nos. 196295/1–6] are deposited in the British Museum (Natural History). Their dimensions (in millimetres) are as follows:

	HOLOTYPE	PARATYPES					
Length	3·7	3·8	3·1	2·9	2·8	2·4	2·2
Height	3·1	3·2	2·5	2·3	2·3	1·9	1·8
Width	2·0	2·2	1·4	1·2	1·2	1·0	1·0

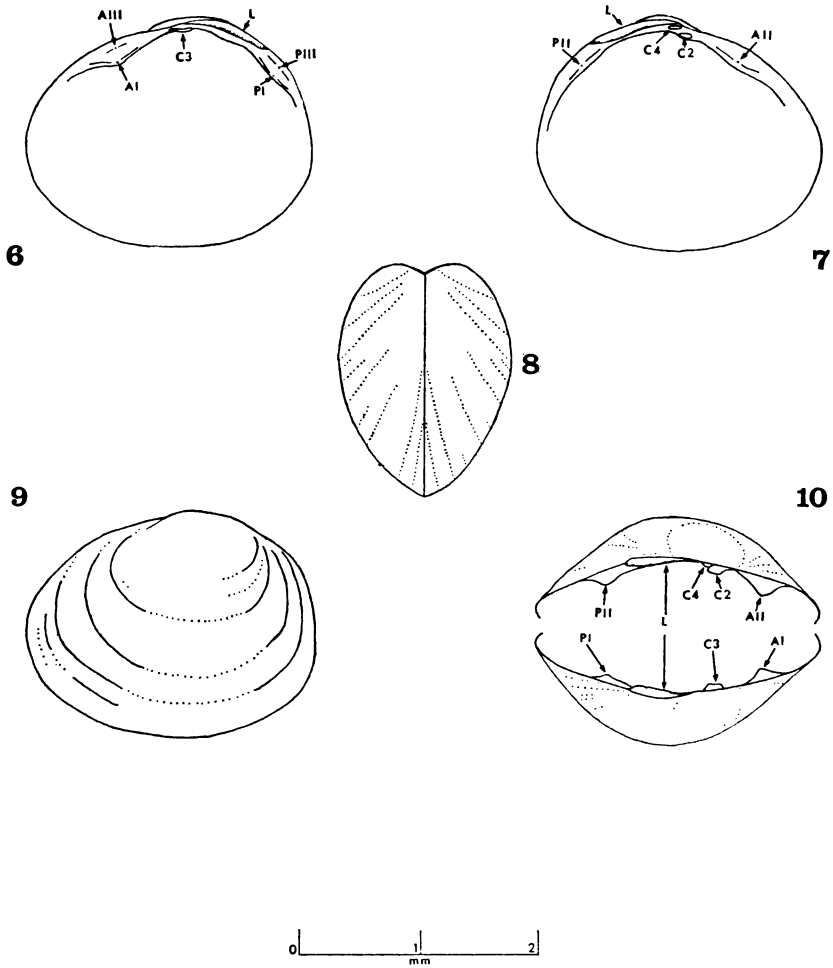
Type-locality. Yatung, Himalaya Mountains, Sikkim, northern India. Found under a stone in a stream at 10,000 feet, 3 iv 1924, Mount Everest Expedition. In association with *Pisidium* (*Afropisidium*) *ellisi* n. sp.

Remarks. The internal ligament pit places this species in the subgenus *Odhneripisidium* (KUIPER, 1962a), but it differs from all the described members of that subgenus by possessing a hinge plate which is not conspicuously narrowed under the ligamental region and by the relatively greater length of the ligament pit ($\frac{1}{5}$ total shell length); and no other member has the proximal ends of PI and PII passing above the ligament pit. It has a less oblique outline than *P.* (*O.*) *stewarti* and *P.* (*O.*) *dancei* Kuiper (KUIPER, 1962b); *P.* (*O.*) *annandalei* Prashad is smaller, more rounded in outline and is regularly striate (PRASHAD, 1925). A shell illustrated by PRASHAD (1925: pl. 7, figs. 9, 9a) as *P. atkinsonianum* Theobald, from Gangtok, Sikkim, is certainly not that species and may be *P.* (*O.*) *kuiperi*.

I dedicate this species to J. G. J. KUIPER of Paris, whose extensive knowledge of the genus *Pisidium* has been made available to me at all times.

Figures 1–5. *Pisidium* (*Odhneripisidium*) *kuiperi* n. sp.
1. Holotype, right valve. 2. Holotype, left valve. 3. Paratype [Reg. No. 196295/1], anterior view. 4. Holotype, left valve, exterior. 5. Holotype, ventral view of both valves, showing relative positions of hinge teeth and ligament pit (left valve uppermost).

Pisidium (Afropisidium) ellisi n. sp.
(Figs. 6–10)



Figures 6–10. *Pisidium* (*Afropisidium*) *ellisi* n. sp., holotype.
6. Right valve. **7.** Left valve. **8.** Anterior view. **9.** Exterior. **10.** Dorsal view of both valves, showing relative positions of hinge teeth and ligament pit (left valve uppermost).

Description. Shell inequilateral, moderately inflated, thin, semitransparent. Umbones broad, scarcely visible above inner edge of each open valve. Dorsal margin gently arched, with a slightly steeper slope posteriorly; ventral margin gently curved; anterior slightly more produced and more rounded than the posterior. Periostracum yellowish-brown, glossy, with fine, irregularly-spaced, concentric striae. Hinge characters: hinge plate narrow, especially below the cardinal teeth; lateral teeth moderately well developed, AI, AII, PII long, narrow and pointed; PI, PIII and AIII short and blunt; C2 and C4 thin and

straight; C3 twice the length of C2, thin but thickened posteriorly, faintly curved; ligament pit long, about ⅓ length of shell, broad but tapered at both ends, occupying nearly the whole width of the hinge plate at its broadest, bounded below by a slight ridge or fold.

The holotype [Reg. No. 196293] is deposited in the British Museum (Natural History); its dimensions (in millimetres) are as follows:

Length 2·3 Height 1·9 Width 1·2

Type-locality. Yatung, Himalaya Mountains, Sikkim, northern India. Found under a stone in a stream at 10,000 feet, 3 iv 1924, Mount Everest Expedition. In association with *Pisidium* (*Odhneripisidium*) *kuiperi* n. sp.

Remarks. Unfortunately the ligament of the single shell had been lost before my examination, so that its appearance is conjectural. The formation of the ligament pit, however, indicates that the species must be placed in the subgenus *Afropisidium* (KUIPER, 1962a), which was proposed for species having a predominantly external ligament. Viewed from above the dorsal margin (Fig. 10) the position of the ligament pit shows that the ligament must have been clearly visible externally. The slight ridge bounding the ventral edge of the ligament pit is also characteristic of *Afropisidium* as exemplified by its type-species, *P.* (*A.*) *lepus* Kuiper (= *pirothi* Jickeli); and this feature is well seen in *P.* (*A.*) *clarkeanum* Nevill & Nevill, a species widely distributed over the Indian subcontinent. The latter species resembles *P.* (*A.*) *ellisi* superficially, but its lateral teeth are almost equidistant from its cardinals, whereas in *P.* (*A.*) *ellisi* the anterior laterals are much closer to the cardinal teeth than are the posterior laterals [C2 is 0·5 mm from AII, 0·9 mm from PII]. This relationship of cardinal and lateral teeth in *P.* (*A.*) *ellisi* also distinguishes it from the African members of the subgenus, such as *P.* (*A.*) *pirothi*, *P.* (*A.*) *giraudi* Bourguignat, and *P.* (*A.*) *fistulosum* Mandahl-Barth; from the Javanese *P.* (*A.*) *javanum* Jutting; from the South American *P.* (*A.*) *sterkianum* Pilsbry; and from the New Zealand *P.* (*A.*) *hodgkini* (Suter).

This species is dedicated to A. E. ELLIS, formerly of Epsom College, Surrey.

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I am indebted to Mr J. G. J. KUIPER of Paris for his critical comments on the material reported here; without his co-operation I should have been unable to present the results of my own study in a satisfactory manner. I am grateful to the Trustees of the British Museum (Natural History) for permission to publish this paper.

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Abbreviations used in Figs. 1, 2, 5, 6, 7 and 10

A I, A III	anterior lateral teeth of right valve
A II	anterior lateral tooth of left valve
P I, P III	posterior lateral teeth of right valve
P II	posterior lateral tooth of left valve
C 3	cardinal tooth of right valve
C 2, C 4	cardinal teeth of left valve
L	ligament pit