

## NOTES ON LAMELLIBRANCHS IN THE INDIAN MUSEUM.

No. 8.—SPECIES OF THE GENUS *PISIDIUM* FROM WESTERN TIBET,  
YARKAND, PERSIA AND SYRIA.

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(Plate I.)

In his account of the Molluscs of the Second Yarkand Mission Nevill<sup>1</sup> included notes on four species of the genus *Pisidium* collected by Dr. F. Stoliczka and his colleagues. One of the species was identified as *P. obtusale* Pfeiffer, while the other three, though given manuscript names in the collection, were only referred to as new species in the published results. These three species were later recorded under the names *Yarkandense*, *Bourguignatum* and *appressum* by von Martens<sup>2</sup> with the remarks "Die Artnamen der 3 Pisidien aus Yarkand sind zwar in der gedruckten Arbeit von Nevill nicht gennant, sondern mir nur handschriftlich von demselben mitgetheilt werden; ich glube aber doch sie hier aufnehmen zu dürfen, da die Arten selbst in Nevill's Werk in derselben Reihenfolge so gut charackterisirt sind, als es in dieser Gattung ohne Abbildung überhaupt geht, Arten ohne Namen aber in Literatur unbequem sind und leicht wieder verloren gehen." In rearranging the Mollusc collections in the Indian Museum I found these specimens and discovered that the names of the species as printed by von Martens do not in all cases agree with Nevill's manuscript names. Further Nevill's notes on the species do not really bring out the specific characters of the species and his comparisons of the Yarkand forms with the previously described species are faulty. I have, therefore, thought it desirable to publish descriptions and figures of the four species collected by the Yarkand Mission.

Sometimes back I received a few specimens of a *Pisidium* from Rev. H. E. J. Biggs from Kerman, Persia, for identification. So far as I can judge from the published descriptions and the named material in the Indian Museum these specimens represent a new species, which is described below under the name *P. persicum*.

Notes are also added on a species from Damascus, Syria, in the collections of the Indian Museum.

In view of the greatly scattered literature on the species of the genus *Pisidium* from the areas referred to above it will be useful to preface my notes with a short review of the literature.

The first detailed account of the species from any of the areas under discussion was the description of four new species from Turkestan published by Clessin<sup>3</sup> in an addendum to von Martens' account of the

<sup>1</sup> Nevill, G.—*Scientific Results of the Second Yarkand Mission, etc., Mollusca*, pp. 12, 13 (Calcutta, 1878).

<sup>2</sup> von Martens, E.—*Mém. Acad. Imper. Sci. St.-Petersbourg*, (7) XXX, no. 11, pp. 50-52 (1882).

<sup>3</sup> Clessin, S.—In von Martens' account of Mollusca in *Fedtschenko Reise nach Turkestan*, pp. 36-38, pl. iii, figs. 31-34 (1874).

mollusca of Fedtschenko's collections. The four species described are *P. obliquatum*, *P. acuminatum*, *P. sphaeriiforme* and *P. turanicum*. These species were redescribed and figured in Clessin's monograph<sup>1</sup> in the Conchylien Cabinet in the following year.

These accounts were followed by Nevill's work, cited already, in which, in addition to the three species from Yarkand, a species was recorded under the name *P. obtusale* Pfeiffer from the Pangong Lake, Western Tibet. As noted already, von Martens in 1882 published the manuscript names of Nevill for his new species from the Yarkand area; these names were also mentioned by von Möllendorf<sup>2</sup> in his paper on the Land Molluscs of Western China and Central Asia, and he was of opinion that the shells from Kuko Nor in the collection before him were probably to be referred to one of Nevill's species.

In 1903 Clessin<sup>3</sup> in an appendix to Andreae's paper on the collection of land and freshwater shells from Central and Eastern Asia made by Futterer recorded *P. amnicum* (Müller), and described six new species *P. supinoides*, *P. ovale*, *P. Futtereri*, *P. kukuenerense*, *P. obliquatum*<sup>4</sup> and *P. lateumbonatum* from North-eastern Tibet and the Gobi Desert. The descriptions of the various species are unfortunately very poor and none of the species were figured. These species must, therefore, remain a stumbling block in the way of any future work on the Pisidia of the area.

In 1909 Preston<sup>5</sup> described a new species, *P. stewarti*, from Tibet, and in the following year *P. zugmayeri* was described from the Pangong Lake, Western Tibet, by Weber<sup>6</sup>; this latter species, as I am able to confirm from an examination of Weber's types and Nevill's specimens, is the same as that recorded as *P. obtusale* Pfeiffer in 1878.

Lindholm<sup>7</sup> in the results of the Pamir Expedition of 1928 recorded *P. casertanum* (Poli) from the Alai Mountain range.

Reference may also be included here to the record of *P. cedrorum* by Germain<sup>8</sup> from Syria; references to earlier literature on this Syrian species will be found in Germain's work (see also further p. 8), but it may be noted that this species was first described by Clessin (1875, *loc. cit.*, p. 42) from springs at Rhedan in Lebanon. Dautzenberg's<sup>9</sup> record of *P. obliquatum* Clessin is, as is shown later, to be referred to *P. cedrorum*.

### ***Pisidium zugmayeri* Weber.**

(Plate I, figs. 1, 2.)

1878. *Pisidium obtusale*, Nevill (*nec Pfeiffer non Jenyns*), *Sci. Res. Second Yarkand Mission, etc., Mollusca*, p. 13.

1910. *Pisidium (Fossarina) zugmayeri*, Weber, *Zool. Jahrb. (Syst., etc.)*, XXIX, p. 310.

<sup>1</sup> Clessin, S.—*Martini-Chemnitz Conch. Cab. (n. f.)*, IX (3), *Cycladeen*, pp. 43-46, pl. v, figs. 1-12 (1875).

<sup>2</sup> von Möllendorf, C.—*Ann. Mus. Zool. St.-Petersbourg*, VI, p. 401 (1902).

<sup>3</sup> Clessin, S.—In *K. Futterer Durch Asien*, III, *Zoologie*, pp. 81, 82 (Berlin, 1903).

<sup>4</sup> This species should not be confused with the species of the same name described by Clessin in 1874 in Fedtschenko's results from Turkestan.

<sup>5</sup> Preston, H. B.—*Rec. Ind. Mus.*, III, pp. 115, 116 (1909).

<sup>6</sup> Weber, A.—*Zool. Jahrb. (Syst. etc.)*, XXIX, pp. 310, 311 (1910).

<sup>7</sup> Lindholm, W.—*Abhandl. Pamir-Expedition, 1928, Mollusca*, p. 62 (1931).

<sup>8</sup> Germain, L.—*Moll. Terr. Fluv. de Syrie*, II, p. 89 (1922).

<sup>9</sup> Dautzenberg, Ph.—*Rev. Biol. Nord France*, VI, p. 354 (1894).

A number of examples of a species of the genus *Pisidium* from the Pangong Lake, Western Tibet, were recorded by Nevill under the name *P. obtusale* Pfeiffer. I have examined the specimens and am of opinion that they are conspecific with the species *P. zugmayeri*, which was described by Weber from the same lake in 1910. This opinion is confirmed by the fact that I was able to examine the types of Weber's species sometime back.

Weber's description of the species is fairly detailed, but it may be noted that his remark "auch die Ecke beim Übergang vom Oberrand zum Hinterrand deutlich bemerkbar ist" does not apply to full-grown specimens. I give a figure of the right valve of a full-grown specimen and figure the hinge-teeth.

The measurements of a full-grown specimen are as follows :—

Length 3·8 mm., height 3·4 mm., thickness 2·4 mm.

The shell of the species is comparatively thick with well developed concentric ridges and the hinge-teeth are very strongly developed.

Attention may also be directed to the fact that the locality of the species as given under the species "lacum Walar in Kaschmir" is, as I was informed by the late Dr. Alois Weber, incorrect; the correct locality is Pangong Lake as given in the concluding remarks on p. 311.

### ***Pisidium yarkandense*, sp. nov.**

(Plate I, figs. 3, 4.)

The shells of this species in the collection of the Indian Museum bear the manuscript name *P. yarkandense* in Nevill's handwriting, and the species has also been referred to under this name by von Martens; it is No. 28 of Nevill's list.

Nevill's description of this species is very inadequate; he compared the species with *P. pulchellum* Jenyns and Baudon's figures of *P. obtusale* (Lam.) and *P. limosum* Gassies (= *P. casertanum* of Poli), but neither of these comparisons are correct. I, therefore, give below a detailed description of the species and figure the right valve and the hinge-teeth.

Shell of small size, rather thin, almost transparent, of a shining light brownish colour; orbiculate-ovate; not much swollen; regularly concentrically striate, some of the striae more strongly developed; umbones hardly prominent, slightly tumid, placed behind the middle, with very minute striae; anterior and posterior dorsal slopes regularly arched, anterior sloping much more rapidly; anterior margin narrowly rounded; posterior margin rather broader, rounded; ventral margin arched.

*Hinge*.—More than half the length of the shell, rather narrow but projecting well inwards, strong, greatly arched with two well-marked flexures in the right valve.

R. V. *a. I.*—More than  $\frac{1}{4}$  the length of the hinge-line, sharp, curving inwards and upwards; *base* moderately strong; *apex* distal to centre, hardly prominent, distally directed, obtuse; *ridges* slightly rounded, distal sloping slightly, umbonal sharply but gradually and lying at a higher level than the distal.

*a. III.*—More than  $\frac{1}{2}$  the length of *a. I.*, narrow, close to the shell-margin and running almost parallel to it; *apex* slightly distal to centre, hardly marked, broadly rounded; *ridges* rather sharp, subequal, sloping gradually.

- R. V. c. 3.—Slightly arched, not very thick or prominent, almost reaching the hinge-margin; part corresponding to *b* slightly swollen, *a* sharp, lamelliform.
- p. I.—Slightly shorter than *a. I.*, stout, not much curved inwards; *base* strong but not much swollen; *apex* slightly distal to centre, rather sharp, obtuse; *ridges* slightly rounded, umbonal somewhat shorter than distal, latter slightly concave.
- p. III.—About  $\frac{1}{2}$  the length of *p. I.*, stout, arching up towards the shell-margin; *apex* hardly marked, somewhat obtuse; *ridges* not very sharp, umbonal shorter than distal.
- L. V. a. II.—About  $\frac{1}{3}$  the length of the hinge-line, strong, stout, almost straight; *base* stout, swollen; *apex* subcentral, prominent, sharp, acuminate, directed upwards and inwards; *ridges* somewhat angularly sloping, distal more so than umbonal.
- c. 2.—Moderately prominent, subsquarish; *apex* directed upwards.
- c. 4.—Sharp, lamellar, slightly arched, projecting anteriorly over c. 2.
- p. II.—Somewhat smaller than *a. II.*, strong, not so sharply pointed; slightly curved; *apex* rounded, subcentral, pointing upwards and inwards; *ridges* rather sharp, distal more angulate than umbonal.

*Ligament Pit* about  $\frac{1}{2}$  the length of the umbo; deep, with its ventral margin markedly sloping.

*Measurements (in millimetres).*

	Holotype.	2	3
Length	2.5	2.4	2.2
Height	2	2	1.8
Thickness	2	1.8	1.7

Holotype No. M.  $\frac{14257}{2}$  in the collections of the Zoological Survey of India (Indian Museum), Calcutta.

*Locality*.—A number of specimens of this interesting species were collected by Stoliczka and his colleagues at Yarkand.

*Remarks*.—In general appearance *P. yarkandense* bears a certain resemblance to *P. lilljeborgi* Clessin,<sup>1</sup> but the hinge is quite different. The hinge-teeth are similar to those of *P. mitchelli* Prashad<sup>2</sup> from Manasbal Lake, Kashmir.

***Pisidium appressum*, sp. nov.**

(Plate I, figs. 5, 6.)

*Pisidium appressum* is No. 30 of Nevill's list, and the unique shell in the Indian Museum collection bears this name in Nevill's handwriting.

Nevill compared the species with *P. thermale* Dupuy,<sup>3</sup> which as Woodward (*loc. cit.*, p. 32) has shown is synonymous with *P. casertanum* (Poli). The species, however, as I have convinced myself by

<sup>1</sup> Clessin, S.—*Malak. Blätt.* (n. f.), VIII, p. 119 (1886); also see Woodward, B. B.—*Cat. Brit. Species Pisidium*, pp. 111-116, pls. ii, fig. 8, iv, fig. 2, xxiii, figs. 2, 18, xxviii, figs. 1, 9, 12, 13, 17-26 (1913).

<sup>2</sup> Prashad, B.—*Rec. Ind. Mus.*, XXVIII, pp. 419, 420, pls. vii, fig. 11 a, viii, fig. 10 (1925).

<sup>3</sup> Dupuy, D.—*Hist. Nat. Moll. France*, p. 682, pl. xxx, fig. 6 (1852).

comparison with European specimens of *P. casertanum*, is in no way related to it. It may be described as follows :—

Shell of small size, subtrigonal-ovate, thin, fragile, with well-marked thick, close-set striae all over; umbones prominent, somewhat tumid, placed well behind the middle; anterior and posterior dorsal slopes regularly arched, anterior less so than posterior; anterior margin more compressed than posterior; ventral margin regularly arched.

*Hinge*.—About  $\frac{2}{3}$  the length of the shell, fairly broad, projecting, with the teeth curving upwards, more so in the left than in the right valve; arched with two distinct flexures in the right valve.

- R. V. *a. I.*—More than  $\frac{1}{3}$  the length of the hinge-line, strong, curving inwards and upwards; *base* strong, somewhat swollen; *apex* subcentral, obtuse; *ridges* slightly rounded, sloping about equally.
- a. III.*—More than  $\frac{1}{3}$  the length of *a. I.*, strong, opposed to the shell-margin; *apex* central, pointed; *ridges* sharp, equally sloping.
- c. 3.*—Arcuate, very thin, lamelliform; portion corresponding to *b* hardly swollen; portion corresponding to *a* running at a slight angle to hinge-margin.
- p. I.*—Shorter than but about as broad as *a. I.*, strong, curving upwards; *base* strong, markedly thickened; *apex* slightly distal to centre, obtusely rounded; *ridges* rather sharp, umbonal longer than distal and sloping about equally.
- p. III.*—Much shorter than *p. I.*, narrow, curved upwards; *apex* subcentral, acutely pointed; *ridges* sharp, subequal and sloping sharply.
- L. V. *a. II.*—More than  $\frac{1}{3}$  the length of the hinge-line, stout, strongly curving upwards; *base* strong; *apex* distal to centre, obtusely rounded; *ridges* sharp, umbonal sloping suddenly and then running in almost a straight line, less slanting than the distal.
- c. 2.*—Prominent, obtusely triangular; *apex* directed outwards; *base* almost merging into shell-margin.
- c. 4.*—Prominent, rather thick, lamellar, arising from near the shell-margin and running to almost the margin of the hinge-plate.
- p. II.*—About the same size and shape as *a. II.*; *apex* more broadly rounded; distal ridge shorter than umbonal and more steep.

*Ligament Pit* is less than half the length of the umbo. It arises about the middle of the umbo and extends to less than half of the middle of the hinge-plate.

The measurements of the *holotype* are :—

Length 2.8 mm., height 2.2 mm., thickness *ca.* 1 mm.

Holotype No. M.  $\frac{14258}{2}$  in the collections of the Zoological Survey of India (Indian Museum), Calcutta.

*Locality*.—The unique holotype was collected at Yarkand.

*Remarks*.—*P. appressum* is allied to *P. yarkandense* described above, but the shells are more elongate, not so ovate and with the umbones more prominent; the hinge is markedly different.

### ***Pisidium stoliczkanum*, sp. nov.**

(Plate I, figs. 7, 8.)

This species is referred under the manuscript name *Bourguignatum* in von Martens' list, but bears the name *stoliczkanum* in the Indian Museum collection. In memory of Dr. F. Stoliczka, the leader of the Second Yarkand Expedition, I propose associating this species with his name; it is No. 29 of Nevill's list.

Shell of small size, subcircular to ovate, subequilateral, somewhat tumid, thin; of a light brownish or horny colour; striae fine, strong, concentric; umbones slightly swollen, prominent, subcentral; dorsal margins sloping almost equally; ventral margin greatly arcuate; rounded anteriorly and posteriorly.

*Hinge*.—About  $\frac{3}{4}$  the length of the shell, rather narrow and not greatly projecting, moderately arched, much more so in the right than in the left valve.

- R. V. *a. I.*—More than  $\frac{1}{3}$  the length of the hinge-line, moderately strong and thick, curving inwards; *apex* prominent, centrally situated, anteriorly directed, obtuse; *ridges* rounded, distal somewhat more sloping than umbonal.
- a. III.*—More than  $\frac{1}{3}$  the length of *a. I.*, narrow, opposed to shell-margin and running almost parallel to it; *apex* subcentral, somewhat pointed; *ridges* sharp, subequal.
- c. 3.*—Somewhat arched, comma-shaped, lower part corresponding to *b* not much swollen.
- p. I.*—Longer than *a. I.*, stronger and stouter; *base* strong but not much swollen; *apex* proximal to centre, obtusely rounded; *ridges* not very sharp, distal longer than umbonal and more sloping.
- p. III.*—Shorter than *a. III.*, feeble, sharply pointed; *apex* distal to centre, pointed; *ridges* sharp, umbonal slightly longer than distal.
- L. V. *a. II.*—Longer than *a. I.*, fairly strong, stout, greatly curved; *base* very stout, thickened; *apex* proximal to centre, sharp; *ridges* moderately sharp, umbonal shorter and not so arched as distal.
- c. 2.*—Subquadrate, slightly arched, its upper margin lying almost parallel to *c. 4.*
- c. 4.*—Lamellar, a little more than  $\frac{1}{2}$  the length of *c. 2.*
- p. II.*—A little shorter than *a. II.*, and not so strongly developed; *base* moderately swollen; *apex* distal to centre, pointed; *ridges* sharp, umbonal greatly arched, distal sloping suddenly to base and running almost parallel to it.

*Ligament Pit* about  $\frac{1}{2}$  the length of the umbo; deep, with its ventral margin sloping.

*Measurements (in millimetres).*

	Holotype.	2	3
Length .	2.3	2.2	2
Height	2	1.9	1.7
Thickness	1.5	1.5	1.3

Holotype No. M.  $\frac{13825}{2}$  in the collections of the Zoological Survey of India (Indian Museum), Calcutta.

*Locality*.—About a dozen examples of this species were collected at Yarkand.

*Remarks*.—*C. stoliczkanum* is allied to *C. yarkandense* described above, but the shell is more equilateral and more tumid, the umbones more prominent and centrally situated, and the hinge is more strongly developed.

***Pisidium persicum*, sp. nov.**

(Plate I, figs. 9, 10.)

So far as I can find from the literature on the subject no species of the genus *Pisidium* has so far been recorded from Persia—noneis

mentioned by Issel,<sup>1</sup> Mousson,<sup>2</sup> von Martens<sup>3</sup> or Clessin.<sup>4</sup> In the old collections of the Indian Museum there are a few shells from Shiraz labelled *Pisidium* sp. nov., labelled by the talented curator of the Mollusc collection, Mr. G. Nevill, while I recently received from Rev. H. E. J. Biggs some shells of the same species collected at Kerman.

This new species may be described as follows :—

Species of a moderate size, elongate-ovate, subrostrate anteriorly, subrotundate posteriorly, moderately ventricose, thick-shelled; anterior dorsal slope more sloping than posterior; regularly concentrically striate, some of the striae more strongly developed; umbones hardly prominent, situated behind the middle; ventral margin regularly arched; of a horny colour.

*Hinge.*—Almost  $\frac{3}{4}$  the length of the shell, strong, projecting well inwards, moderately arched with two distinct flexures in the right valve.

- R. V. *a. I.*—Less than  $\frac{1}{2}$  the length of the hinge-line, very strong, inclined inwards; *base* very strong, thick; *apex* subcentral, prominent, obtusely rounded, pointing backwards and upwards; *ridges* rounded, distal steep, umbonal slightly arched and descending to a lower level than the distal.
- a. III.*—More than  $\frac{1}{3}$  the length of *a. I.*, straight, narrow, erect, lying parallel to hinge-margin; *apex* central, pointed, prominent; *ridges* somewhat sharp, sloping about equally.
- c. 3.*—Prominent, arcuate, inverted comma-shaped; part corresponding to *b* greatly swollen, *a* thin, curving diagonally across the hinge-plate.
- p. I.*—Shorter than *a. I.*, strong, compressed; *base* thickened, almost straight; *apex* distal to centre, slightly marked, obtuse; *ridges* rounded, sloping steeply, distal more so than umbonal.
- p. III.*—Slightly shorter than *p. I.*, straight, erect; *apex* distal to centre, hardly marked; *ridges* compressed, distal sloping more steeply than umbonal.
- L. V. *a. II.*—Slightly longer than *a. I.*, narrow, greatly curved in its umbonal end; *base* strong, more swollen than that of *a. I.*, *apex* distal of centre, projecting upwards, sharp, acuminate; *ridges* rather sharp, umbonal sloping gradually at first and then suddenly curving upwards to the umbo, distal very steep.
- c. 2.*—Prominent, arcuate, with the outer limb running diagonally across hinge-plate.
- c. 4.*—Sharp, lamelliform, running at an angle to the outer limb of *c. 2.*
- p. II.*—About  $\frac{2}{3}$  the length of *a. II.*, narrow, strong; *base* strong, but not so thickened as of *a. II.*; *apex* near distal end, sharp, acuminate; *ridges* sharp, umbonal longer and descending more steeply than distal.

*Ligament Pit.*—It starts from about the middle of the umbo and extends to a little behind its posterior limit.

The measurements of the *holotype* are :—

Length 5.2 mm., height 4.1 mm., thickness 3.2 mm.

Holotype No. M.  $\frac{14259}{2}$  in the collections of the Zoological Survey of India (Indian Museum), Calcutta.

<sup>1</sup> Issel, A.—*Die Moll. della missione Italiana in Persia* (Turin, 1865).

<sup>2</sup> Mousson, A.—*Journ. Conchyliol.*, XXII, pp. 1-60 (1874).

<sup>3</sup> von Martens, E.—*Ueber vorderasiatische Conchylien*, p. 69 (Cassel, 1874).

<sup>4</sup> Clessin, S.—*Martini-Chemnitz Conch. Cab. (n. f.)*, IX (3), *Cycladeen*, pp. 1-74 (1874-77).

*Locality.*—A number of specimens from Shiraz, Persia, were found amongst the old collections of the Indian Museum, while a few young shells were, as noted above, recently received from Kerman.

*Remarks.*—*P. persicum* appears to be allied to *P. casertanum* (Poli), but the form, texture and sculpture are different. The hinge of the two species also differs materially.

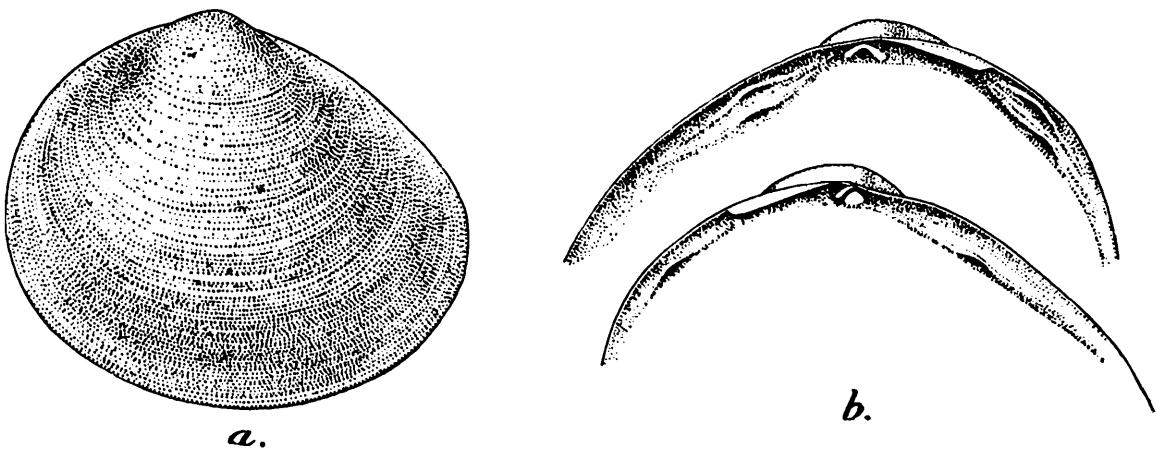
### ***Pisidium cedrorum*, Clessin.**

1875. *Pisidium cedrorum*, Clessin, *Martini-Chemn. Conch. Cab. (n. f.)*, IX (3), *Cycladeen*, p. 42, pl. iv, figs. 22, 23.

1922. *Pisidium (Fossarina) cedrorum*, Germain, *Moll. Terr. Fluv. de Syrie*, II, p. 89.

In view of the fairly detailed descriptions of this species by Clessin and Germain it is not necessary to redescribe the species, I, however, for comparison figure the right valve and the hinge of the species.

Attention may also be directed to the fact that Germain in his account has confused the anterior and posterior sides of the valves for he says "région antérieure courte, tronquée, région postérieure allongée, deux fois aussi développée que l'antérieure."



*Pisidium cedrorum*, Clessin.

*a*, right valve of a specimen from Damascus, Syria; *b*, hinge-teeth of the two valves.

I have also little doubt that the species recorded as *Pisidium (Fossarina) obliquatum* Clessin by Dautzenberg<sup>1</sup> from various localities in the same area is probably *P. cedrorum*.

In the Indian Museum this species is represented by a number of specimens from Damascus.

<sup>1</sup> Dautzenberg, Ph.—*Rev. Biol. Nord. France*, VI, p. 354 (1894).