

APPENDIX.

NOTES on the MOLLUSCA collected by C. BARRINGTON BROWN, Esq., A.R.S.M., from the TERTIARY DEPOSITS of SOLIMÕES and JAVARY RIVERS, BRAZIL. By R. ETHERIDGE, Esq., F.R.S., V.P.G.S.

THE collection of Tertiary Mollusca made by C. B. Brown, Esq., to illustrate a portion of his investigation of the geological features of certain portions of the Upper Amazon, although few in species, is nevertheless of value on account of its showing a considerable extension of these later Tertiaries on the Solimões or Upper Amazon and Javary rivers in Brazil, ranging over an area 300 miles in length by 50 miles in breadth; again, the great extension westwards of the Atlantic, probably, as Mr. Brown believes, some 1500 miles west of the present shore-line and covering the area now the valley of the Amazon, is of sufficient interest to demand some notice of the Mollusca once occupying the now elevated sea-, estuarine, and fresh-water deposits.

Mr. T. A. Conrad* and Dr. H. Woodward† have both described certain species of Mollusca from these Tertiary deposits, many of them being the same as those collected by Mr. Brown, thus precluding other notice than reference to them in the volumes cited below. I am enabled to add and describe about fourteen new species or forms, or such as I cannot determine from the works of others.

PLANTÆ.

CHARA (seeds of).

The only remains of this freshwater plant are some eight or ten seeds, smaller than those of our British Charas; nothing whatever can be determined as to the specific characters of the plant through the seeds. It is a widely distributed genus, occurring in stagnant, fresh, and brackish water. The Upper Eocene beds (Hempstead series) of Britain contain three species, and three occur in the Post-Pliocene series; we should expect to find the remains of this plant in extensive marsh and shallow-lake districts. The habit of the plant tends to its preservation, owing to the amount of carbonate of lime secreted in the stems and nucleæ. About forty species are known, and about fourteen are British.

Loc. Canama, in the lignite bed.

MOLLUSCA.

LAMELLIBRANCHIATA.

DREISSENA ACUTA, Ether. (Pl. VII. fig. 1.)

I give this a provisional name, *first*, because it is the only specimen, and *secondly*, the *Dreissenæ* are so much alike that, without a

* Amer. Journ. of Conch. vol. vi. p. 192, t. 10, 11 (1871).

† Ann. & Mag. Nat. Hist. ser. 4, vol. vii. pp. 59, 101, t. 5 (1871).

proper series for comparison, it would be wrong to do more than give it a name for the purpose of recognition; the strong ridge, acute umbo, and longitudinal lines clearly determine it to be a *Dreissena*.

Dr. C. L. F. Sandberger, in his exhaustive work 'Die Land- und Süßwasser-Conchylien,' names many species of *Dreissena*; but none appear to agree with our form; the extremely acute and curved umbo and strong keel in our species distinctly separate it from the forms figured by Sandberger; his *D. claviformis* mostly resembles our specimen, but the ventral ridge is much more strongly marked than in his species.

Loc. Canama.

ANISOTHYRIS CARINATA, Conrad, *loc. cit.* p. 196, t. 10. f. 7; H. Woodward, *loc. cit.* p. 106, t. 5. f. 6.

This singular shell is without question the same as Conrad's *Pachydon carinatus*, which is so well described by Conrad and Woodward, *op. cit.*, that it needs no notice from myself. It evidently is an abundant shell in these Amazonian beds.

Loc. Canama.

ANISOTHYRIS TENUIS, Gabb (*Pachydon*), American Journal of Conchology, vol. vi. p. 196, t. 10. fig. 1.

Pachydon tenuis, Gabb, *ib.* vol. iv. p. 199, t. 16. fig. 6.

This shell is described and figured in the American Journal above quoted under the name *Pachydon*. Conrad suggested the name *Anisothyris* for this genus, the name "*Pachydon*" being preoccupied. Dr. Woodward adopts *Anisothyris* in his paper on the Tertiary shells of the Amazon valley, where the affinities and differences are also ably discussed.

Loc. Canama.

ANISOTHYRIS HAUXWELLI, H. Woodward, *loc. cit.* p. 105, t. 5. f. 7.

There is no doubt this is the shell referred to in Dr. Woodward's paper, closely as it resembles *A. tenuis*.

Loc. Canama.

ANISOTHYRIS (PACHYDON) TUMIDA, Ether. (Pl. VII. fig. 2.)

Shell thick, tumid, obtusely triangular, equivalve, inequilateral, delicately wrinkled, with a shining epidermis; posterior area slightly flattened; anterior region nearly vertical or obtusely rounded; ventral margin much rounded; umbonal region thick; umbones incurved, contiguous; lunular area deep. Cardinal tooth deltoid, acute at the apex, and slightly erect; hinge-pit deep; lateral tooth thick, elongated; pallial impression simple; oral and anal sears placed very far forward and backward.

The umbonal region differs from that of *Corbula* in the spiral arrangement of the umbones, which are much incurved, and by the

interlocking of the tooth in the left valve at the uppermost part of the lunule into that of the right valve*.

CORBULA CANAMAENSIS, Ether. (Pl. VII. figs. 3, 3a.)

I have no means of determining whether this be a new species or not; the forms are so similar, and specific differences amongst them too slight to be observed from figures, unless specimens for comparison are before us. I give it a local geographical name, and figure the shell in case other specimens are collected from the same wide area; probably this form is estuarine. *Corbula* (*Potamomya*) *labiata* (*Azara*, D'Orb.), from the La Plata, and also from the Pampas and other places in the Argentine Republic, may be this species or a variety. Although this shell resembles *Anisothyris erecta*, Conr., and the figure by Dr. Böttger, Jahrb. k.-k. geol. Reichsanst. 1878, t. 14. f. 12, I still believe it to be quite distinct.

Loc. Canama.

THRACIA ?

One valve (left) only of this genus occurs. Although probably a mature shell, it is a small species; no name can be given to it.

Loc. Canama.

LUTRARIA ?

Like the above (*Thracia*); only one valve of some small species occurs. Both appear to be marine genera; but we know not under what condition they were deposited or became associated with the estuarine and freshwater fossils. I name them with doubt.

Loc. Canama.

ANODON, sp.

Two fragments only testify to the freshwater condition of the strata in which they occur. The shell of this species must have been thick and large.

Loc. Cliffs a few miles below Canama.

UNIO.

We have the anterior portion only of an elongated species. Umbo very anterior, eroded, having one large elongated tooth and slightly rugose posterior markings; one long posterior hinge-tooth occupies more than half the length of the shell. Shell thick.

Loc. Cliffs a few miles below Canama.

* Dr. H. Woodward, in his paper upon the Tertiary Shells of the Amazon valley, under the genus *Pachydon*, notices many affinities and differences between the above genus and certain allied forms, such as *Corbula*, *Azara*, *Neæra*, &c.

GASTROPODA.

PSEUDOLACUNA*, Böttger, 1878, Jahrbuch kaiserlich-königlichen geologischen Reichsanstalt, Wien, 1878.

PSEUDOLACUNA MACROPTERA, Böttg. *loc. cit.* (Pl. VII. fig. 12.)

Shell small, smooth, composed of six whorls; spire conical; the body-whorl greatly enlarged; left or columellar lip thick, reflected, possessing a single central tooth on the sigmoidal columella, and a smaller callosity on the upper portion; aperture elongated, somewhat trigonal and expanded, and acute or angular centrally, pointed at both extremities, emarginate at the base, or the anterior canal slightly recurved; outer or right lip thick.

This shell resembles in outline the genus *Alycaeus* of Gray, but the columellar tooth, elongated aperture, thickened peristome, and reflected callosity on the columella remove it from that genus.

Loc. Canama.

NATICA — ?

Three specimens which appear to belong to this genus are amongst the shells collected. They are thick and heavy for so small a species, and appear to me to be somewhat abnormal forms of *Natica*.

Shell thick, smooth, glazed, and dense; whorls five, ventricose; sutures deep; body-whorl large; aperture elongated; left or columellar lip thick; near posterior canal much thickened; right lip slightly waved; umbilicus (?) small.

Loc. Canama.

NERITINA PUNCTA, Ether. (Pl. VII. fig. 9.)

Shell small, semiglobose, thick; outer lip of peristome much expanded; surface of shell covered by dark, nearly equal-sized, spots, which appear to be epidermal or cuticular (they disappear with the removal or destruction of the outer shelly covering); columella vertical, with six or seven obscure teeth along its edge; the pigment-dots are arranged in lines springing from the apex, as in *Neritina ziczac*, and follow the lines of shell-growth. Although the markings may have no specific value, I nevertheless refer to them as a means of recognizing the shell in the same deposits.

Loc. Canama (in yellow clay).

NERITINA ZICZAC, Ether. (Pl. VII. figs. 10, 10 a.)

Shell semiglobose, broader than high; aperture lunate; outer lip expanded, thin, or acute; columella broad, flat, and straight, having

* I had proposed the name *Alycaodontia* for this shell, naming the species after Mr. B. Brown. I find, however, that Dr. Oskar Böttger, of Frankfort, has already described it, giving it the above name (*Pseudolacuna macroptera*). There can be no doubt it is Dr. Böttger's genus. We both apparently gave a new generic name to this shell; but priority must be given to Dr. Böttger, on account of date of publication, as, since my notice of the shell, the description by Dr. Böttger has appeared, which necessitates my withdrawal of the name *Alycaodontia*.

numerous small denticulations along its vertical edge; columellar side of body-whorl covered by a glossy expanded fold, nearly equaling in size or expansion the aperture-opening; outer surface of shell glossy, and covered with wavy, subangular, or zigzag lines, all emanating from the apex of the shell and ranging vertically down the expanded body-whorl.

Loc. Canama.

ODOSTOMIA, sp.

Three specimens of this genus occur. They are not in a condition to be named specifically.

Loc. Canama.

HYDROBIA DUBIA, Ethcr. (? PALUDESTRINA). (Pl. VII. fig. 11.)

We have forms of this genus, or one strongly resembling it; they do not appear to have been noticed by Gabb or Conrad. Whorls five, smooth, rounded; outer lip thin, the inner slightly reflected over the umbilicus; body-whorl large; sutural constrictions deep. I can hardly detect any difference between this and our *Hydrobia pupa*, and, as may be expected, many *Rissoæ* may be mistaken for it also. There are only two specimens, not well preserved, and I name them *with much doubt*.

Loc. Canama.

ISÆA?, Conrad.

Isæa, sp., allied to *I. Ortoni*, Gabb.

Mesalia, sp., Amer. Journ. Conch. vol. iv. p. 198.

Isæa, Conrad, Amer. Journ. Conch. vol. vi. p. 193, t. 10. f. 10-13 (1870-71).

Two small shells seem to me to belong to the above species. Mr. Gabb's specimens were too imperfect to show some characters; ours are little better, and fail to show the mouth.

Loc. Canama.

DYRIS, Conrad.

D. gracilis, Amer. Journ. Conch. vol. vi. p. 195, t. 10. f. 8.

Conrad figures and describes a slender shell, to which I refer our four specimens. The figure is of little value; but the short description agrees with our forms.

Loc. Canama.

ASSIMINEA, Leach.

A. crassa, Ether.

Shell thick, composed of five ventricose whorls; sutures deep; body-whorl large, somewhat subangular in outline; inner or columellar lip thick and reflexed over the columella.

The shell-structure in these *Assimineæ* is thicker than usual,

which may be due to their habit of life. To refer them to any British species would lead to error, for the want of better evidence and knowledge of the animal.

Loc. Canama.

FENELLA, Adams.

Only one specimen of this genus (fam. Rissoidæ) appears amongst the small shells in the collection; no specific name can be appended.

Shell small, elongated, composed of seven whorls, those of the spire having *two* concentric lines near the base of each whorl, the body-whorl possessing three or four; aperture elongated; columella thick. Length $\frac{3}{16}$ inch.

Loc. Canama.

CERITHIUM CORONATUM, Ether. (Pl. VII. fig. 5.)

Shell elongated; whorls ten, the first six or seven smooth, or nearly so, the remaining whorls ornamented with tubercles and coarse lines; tubercles arranged in a single row along the shoulder of each whorl below the sutural line; outer lip notched close to the shoulder of the whorl and suture in a line with the line of nodes or tubercles; inner or columellar lip reflected; base of the body-whorl with four or five strongly marked concentric lines and a few fainter ones near the anterior canal, and crossed by fine lines of growth.

Loc. Canama.

MELANOPSIS? BROWNII, Ether. (Pl. VII. fig. 4.)

There are some eight or ten specimens of this species; but I have nothing to compare them with. The genus is represented by a large number of species distributed world-wide; it apparently, with the other molluscan remains of the Amazon valley, was estuarine in habit.

Spec. char.—Shell turreted, elongated; whorls five, sides vertical; sulcus or suture at junction of the whorls depressed, the sutural edge elevated; upper whorls doubly earinated; body-whorl concentrically banded by nearly equidistant lines, slightly rugose at the base, here and there possessing a varice; anterior canal slightly notched; outer lip toothed; columellar lip slightly reflected and thick.

This shell much resembles a *Melania*, and but for the siphonal notch might be referred to that genus or its subgenus *Plotia*.

Loc. Canama.

MELANIA TRICARINATA, Ether. (Pl. VII. fig. 6.)

Shell small, elongated; whorls nine, ventricose, bevelled, and deeply constricted on the upper part or shoulder of each whorl; three carinæ, or distinct lines, occur on all the whorls except the last or body-whorl, which possesses four; aperture ovate; anterior canal short, very slightly notched. Length $\frac{1}{4}$ inch.

Loc. Canama.

MELANIA SCALARIOIDES, Ether. (Pl. VII. fig. 8.)

Shell small, turreted, ribbed, or strongly costated; whorls seven, ventricose; sutural constrictions deep; the varices, or costæ, are nodular about the middle of each varice, producing on each whorl a kind of median keel or projection; aperture oblique or ovate. Length $\frac{3}{16}$ inch.

This shell resembles *Prososthenia Schwartzi* (Neumayr), Sandberger, 'Land- und Süßwasser-Conchylien,' p. 673, t. 32. f. 2. I may almost say it is the same species, if we may trust the figure in Sandberger's plate. I have doubts, however, about its even being a *Melania*. Nevertheless I name it *M. scalarioides*, at the same time referring to the above work for comparison.

Loc. Canama.

MELANIA BICARINATA, Ether. (Pl. VII. fig. 7.)

Shell small, elongated; whorls seven; two carinæ occur on all except the body-whorl, which has three; considerable space occurs between the double lines, and this is occupied by a smooth area, which apparently has no markings; aperture elongated; columella obtusely carinated and thickened. Length $\frac{1}{4}$ inch.

Loc. Canama.

MYLIOBATIS, sp., or ZYGOBATIS. (Pl. VII. fig. 13.)

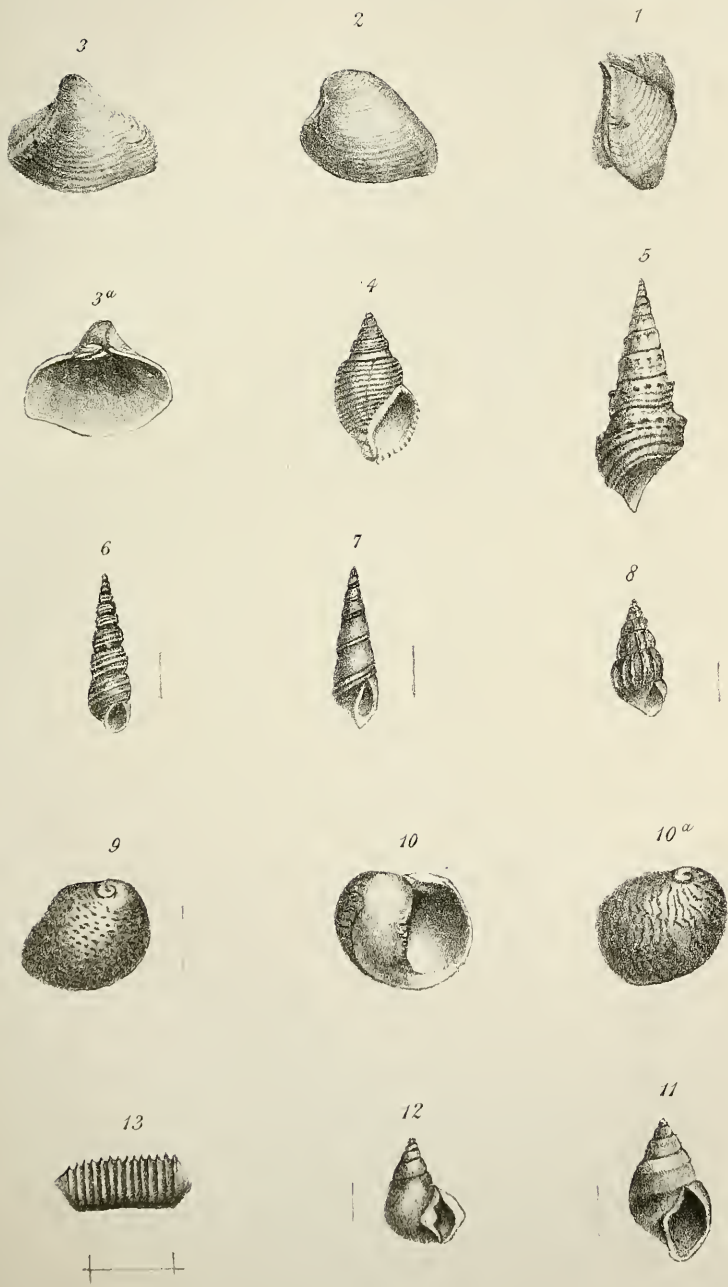
A single plate only (median or lateral) of a palatal tooth; how it came into the freshwater beds of Canama is doubtful, although the "rays" are said to occur high up in the Amazon river. It may, however, have been derived from some Eocene beds within the area.

Loc. Canama (from the lignite bed).

EXPLANATION OF PLATE VII.

- Fig. 1. *Dreissena acuta*, Ether.
 2. *Anisothyris (Pachydon) tumida*, Ether.
 3. *Corbula canamaensis*, Ether.
 4. *Melanopsis? Brownii*, Ether.
 5. *Cerithium coronatum*, Ether.
 6. *Melania tricarinata*, Ether.
 7. *Melania bicarinata*, Ether.
 8. *Melania scalarioides*, Ether.
 9. *Neritina puncta*, Ether.
 10. *Neritina ziczac*, Ether.
 11. *Hydrobia dubia*, Ether.
 12. *Pseudolacuna macroptera*, Böttg.
 13. *Myliobatis* or *Zygobatis*, sp. (plate of a palatal tooth).

The short lines appended to some of the figures indicate the size of the specimens; the rest are of the natural size.



G. Sharman ad nat. del. et lith.

Hanhart imp

AMAZONIAN TERTIARY FOSSILS.