DESCRIPTIONS OF NEW FOSSIL SHELLS OF THE UPPER AMAZON.

BY T. A. CONRAD.

Mr. Gabb has described and figured in the fourth volume of the American Journal of Conchology a few species of fossil shells from a tributary of the Upper Amazon near Pebas. A larger number of species from the same group, collected by Mr. Hauxwell, has been sent to me by Professor James Orton, of Vassar College, to describe.

Prof. Orton remarks, "a very few of these shells were found where I first discovered the deposit, which was at Pebas, near the mouth of the Ambiyacu; but the rest, comprising nearly the whole collection, were obtained nearly 30 miles below Pebas, on the south side of the Marañon, at Pichua, just west of Cochaquinas. The locality is about 2200 miles up the Amazon, and the shells appear to be more abundant even than at Pebas. They occur in that peculiar formation of fine laminated colored clays which is spread over the entire valley of the great river, and which Prof. Agassiz had pronounced 'Drift.' Similar fossiliferous beds the natives say are to be seen at Omagua, and also up the Ambiyacu."

There are 7 species of the genus *Pachydon*, Gabb, which does not, so far as we know at present, have any living representative, and is very different from any known existing fresh water genus. In the collection are fragments of a singular bivalve, probably allied to *Mulleria*, one of which is pearly as a *Unio* and has a narrow elongated muscular impression, very different in size and outline from that of *Mulleria*. It seems to have been carried by a flood in some river of the time to its present position.

It is not possible to state without doubt what the relative stratigraphical position of this group may be, but if all the species are extinct it cannot be later than the Tertiary. The species being all new, or at least unknown in the books and cabinet of the Academy of Natural Sciences, the Pleistocene origin of the group is at least very doubtful. It may have lived either in fresh or brackish water, but it is certainly not of marine origin.

These fossils, judging from very small specimens of the stratum, were deposited on a clay bed in vast abundance, entire bivalves and univalves being mingled together among a multitude of fragments. It seems clear that they were not transported from a distance, but lived and died in the vicinity of the spot in which they are found, and near the shore of a large river or estuary, for the many fragments must have been washed from the shore among the living specimens. Most of these fossils, many of the small ones very delicate, are as perfect as when living, some specimens of *Neritina* and *Pachydon* retaining the epidermis, either whole or in part. When the valves of *Pachydon* are separated the shell is found to be filled with a drab colored sandy clay, holding minute scales of mica, and frequently ferruginous.

Gasteropoda.

ISÆA, Conrad.

Subulate; spire produced, apex slightly eroded; last whorl rounded, slightly umbilicated; aperture ovate, entire in front, peritome continuous, reflexed and prominent on the columella side.

This I presume to be a fresh water genus closely allied to *Tricula*, Benson. It differs only in the great prominence of the inner lip, which is nearly erect, and the more acute angle of the aperture. I should hardly have considered the fossil generically distinct from *Tricula* if it had been found in India, where the latter is living.

I. ORTONI, Gabb.—Pl. 10, fig. 10, 13.

Mesalia Ortoni, Gabb, Amer. Journ. Conch. vol. 4, p. 198.

Mr. Gabb has given a full description of this species, but his specimens were not perfect enough to show the peculiar character of the reflexed labium. The figure is of the natural size. Fig. 10 is an enlarged outline of what is supposed to be the young shell.

I. LINTEA, Conrad.—Pl. 10, fig. 6.

Turreted, rather widely subulate; whorls 6, regularly convex, with revolving raised lines, 6 or 7 on the penultimate, and about 8 on the last volution, with a minute intermediate line between some of the larger ones; the last whorl obtusely rounded at base; aperture oval.

LIRIS, Conrad.

Elongated, subcylindrical, with convex whorls and oblique lon-

gitudinal ribs; apex entire; aperture suboval, small, peristome continuous, labium reflexed and prominent.

This may be only a subgenus of the former, but the shell has more general resemblance to *Pupa* and is without an umbilicus. The aperture is proportionally smaller.

L. LAQUEATA, Conrad.—Pl. 10, fig. 3.

Subcylindrical, whorls 8, rounded, with oblique, thick, rounded, longitudinal ribs, which on the last whorl extend to the line of the angle of the mouth. The first and second whorls from the apex entire.

The figure is intended merely to indicate the size and proportions of the shell.

These two shells probably belong to the family *Melaniidæ*.

EBORA, Conrad.

Turbinate, columella much arched; peristome continuous, thickened; aperture notched at base.

This small shell is solid, and four specimens umbilicated, but one, the largest, is closed. I presume this to be a fresh water genus, but have no means of proving it.

E. CRASSILABRA, Conrad.—Pl. 10, fig. 14.

Turbinate, spire short, consisting of 4 whorls, which are rounded and smooth; last whorl broad and rounded.

Subgenus NESIS, Conrad.

Turbinate, with prominent revolving ribs; umbilical channel wide, extending to the base; labrum not thickened, slightly reflexed.

E. BELLA, Conrad.—Pl. 10, fig. 17.

Last whorl with 7 prominent revolving ribs, the intermediate spaces concave; spire consisting of 4 volutions, flat towards the apex, and having two ribs on each except the apicial whorl and the adjacent one, which are smooth; the apicial whorl is well defined but minute.

HEMISINUS, Swainson.

H. SULCATUS, Conrad.—Pl. 10, fig. 2.

Subulately turbinated, solid, polished, whorls slightly convex, revolving grooves or impressed lines not closely arranged, about six on the penultimate whorl, and two minute lines, one towards each boundary; last whorl with about 23 lines, which reach the base.

An elegant species, closely allied to *H. tenellus*, Reeve, but it has a longer last whorl and a narrower aperture.

This shell is very interesting, as it indicates a decidedly fresh water genus in this fossil group; a genus living in South American rivers.

DYRIS, Conrad.

Subulate, with many volutions; aperture ovate; labium reflexed.

The mouth of this shell is similar to that in the genus *Melania*, but the form and sculpture of the shell are very different from those of *Melania*.

D. GRACILIS, Conrad.—Pl. 10, fig. 8.

Very slender and elongated; whorls 8, convex, revolving lines carinated, very regular, 4 on the penultimate and 5 on the last whorl; about the sutures there is a rather wide indented space, whorls minutely and obliquely striated.

The figure is a rough outline, merely indicating the natural size.

NERITINA, Lam.

N. ORTONI, Conrad.—Pl. 10, fig. 5, 11.

Thick, transversely suboval; spire very small, of 3 whorls, last whorl flattened on top; aperture expanded; margin of inner lip very slightly concave, acute, densely and minutely plicated; labrum summit nearly on a line with the apex, which is entire, colored markings generally zigzag brown longitudinal lines.

N. pupa, Gabb (not Lin.), Amer. Journ. Conch. vol. 4, p. 197, pl. 16.

This species is widely different in form and size from *N. pupa*. Mr. Gabb had only young shells to describe from, but in the present collection are 15 specimens of various ages, figure 11 representing the actual size of a full grown shell. Fig. 5 represents a variation in the pattern of colored markings.

N. pupa is probably about one-third the size, and has not the flattened form of the area of the spire.

BULIMUS, Scopoli.

B. LINTEUS, Conrad.—Pl. 10, fig. 9.

Acutely ovate, thin in substance, whorls 5, those of the spire slightly convex, suture impressed; last whorl slightly carinated at the suture, elongated; surface minutely reticulated with rugose lines; columella arched, not plicated; peristome not preserved.

This is the only land shell in the collection, and there can be little doubt that it belongs to some section or subgenus of Bulimus, probably *Plectostylus*, Beck. The sculpture is so minute that it requires a lens to make it visible.

Conchifera.

Family *CORBULIDÆ.*

PACHYDON, Gabb.

The hinge of this genus is very similar to that of *Corbula*, much more so than to that of *Azara*, but the spiral beaks are in marked contrast to those of *Corbula*. When the left valve of *Corbula idonea*, Conrad, is compared with a corresponding one of *Pachydon tenuis*, they seem to be opposite valves, so widely different is their outline.

The pallial line is entire, not slightly sinuated, as Mr. Gabb has defined it. The nympha is minutely rugose.

The name *Pachydon* is objectionable, in consequence of its derivation being the same as *Pachyodon*, and I have been requested to substitute another. If naturalists object to Mr. Gabb's name, I would suggest *Anisothyris* (unequal valves) to take its place. Mr. Gabb referred this genus to the family *Isocardiidæ*, but, except in the turn of the beaks, there is nothing to suggest such an arrangement.

P. TENUIS, Gabb.—Pl. 10, fig. 1.

Subtriangular, very oblique, substance thick in adult specimens; right valve profoundly ventricose; umbonal slope slightly angulated, nearly terminal; posterior extremity truncated; cardinal tooth broad and thick, erect, curved, with an acutely angular margin; this tooth is overlapped in front by a carinated and sulcated projection; lunular depression profound, very large and broad.

P. tenua, Gabb, Amer. Journ. of Conch. vol. 4, p. 199, pl. 16, fig. 6.

This shell has a very thin, light brown polished epidermis.

P. CARINATUS, Conrad.—Pl. 10, fig. 7.

Triangular, very inequivalved, right valve profoundly ventricose, but flattened on the disk; posterior slope flattened, having an indistinct ridge in the middle, and forming nearly a right angle with the umbonal slope, which is slightly carinated; posterior extremity acutely angular; left valve prominently angular on the umbonal slope, concave anterior to it, and depressed on the

posterior slope, with a fine raised line in the middle of the slope; posterior ventral margin nearly rectilinear.

This shell is covered with a very thin, pale shining epidermis, and varies greatly from the typical species, *P. tenuis*. It is in perfect preservation, the 4 specimens in the collection having the valves connected as when living, and not the least abrasion visible.

P. OBLIQUIS, Gabb.—Pl. 10, fig. 15.

As Mr. Gabb has fully described this shell, I have only introduced it to show the two valves in connection, of the actual size of the largest specimen.

P. ERECTUM, Conrad.—Pl. 10, fig. 16.

Triangular; both valves ventricose, not oblique; anterior end oblique, truncated; posterior side produced, cuneiform, flexuous, extremity angular; ventral margin rounded; summits very prominent; cardinal tooth comparatively small.

There is only one specimen of this graceful species, the largest of the genus known. The valves are much less unequal than in the preceding species, and the erect beaks give it a very different contour from the other species. The character *oblique* should be omitted from the generic diagnosis.

P. CUNEATUS, Conrad.—Pl. 10, fig. 12.

Triangular, oblique, ventricose, solid, subequivalved; beaks terminal, summit very prominent and oblique; anterior end abrupt; posterior end subtruncated; disk somewhat flattened medially; umbonal slope rounded, undefined, nearly marginal; ventral margin nearly straight posteriorly; cardinal tooth oblique.

P. OVATUS, Conrad.—Pl. 10, fig. 4.

Ovate, slightly ventricose, disk of right valve regularly curved, of the opposite valve slightly flexuous towards the posterior end; beaks situated about one-fourth the shell's length from the end margin; summits narrow, prominent, oblique, anterior end angulated, the margin beneath obliquely truncated; ventral margin rounded; cardinal tooth directed slightly posteriorly, very erect.

This shell is somewhat similar in outline to *Cytherea convexa*, Say. It is white, polished and nearly equivalved, and is very unlike the other species in form.

P. ALTUS, Conrad. Plate 11, fig. 1.

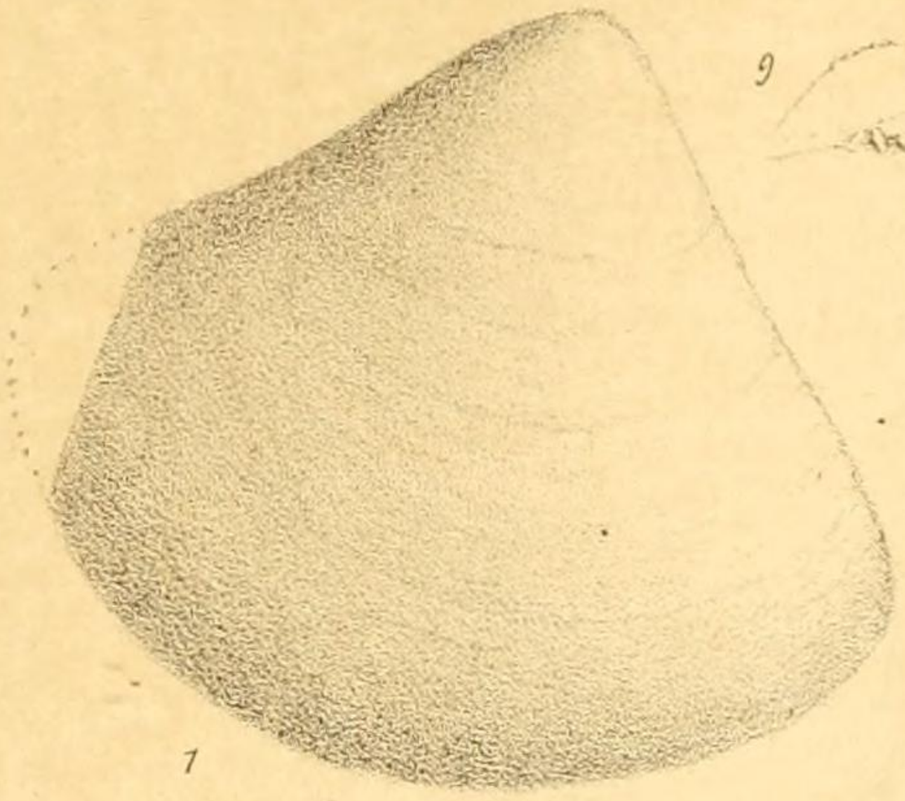
Description. Cordate, inflated, nearly equivalve; summits prominent, angulated on the anterior margin; anterior submargin very oblique, slightly concave in outline, angulated,

terminal; area slightly depressed below the submargins, excavated beneath the beaks and umbones; posterior side subcuneiform; disk convex in the middle, posteriorly sloping in a nearly straight line to the end margin; extremity rounded, situated nearer to the summit than to the ventral margin.

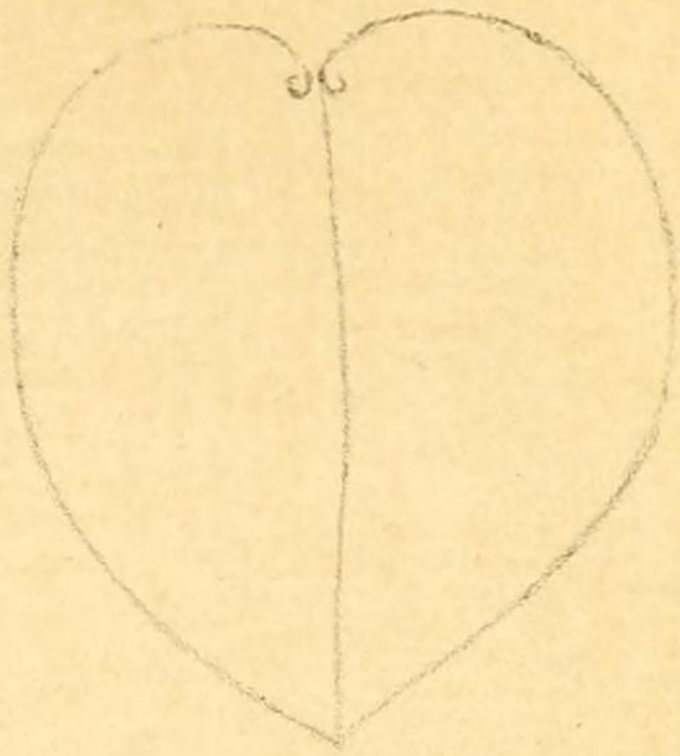
This is the largest and most ventricose species, remarkable for having the shell silicified. The internal mould is of indurated ferruginous clay.

Plate 11, fig. 7. Outline of *Dysis gracilis*, enlarged.

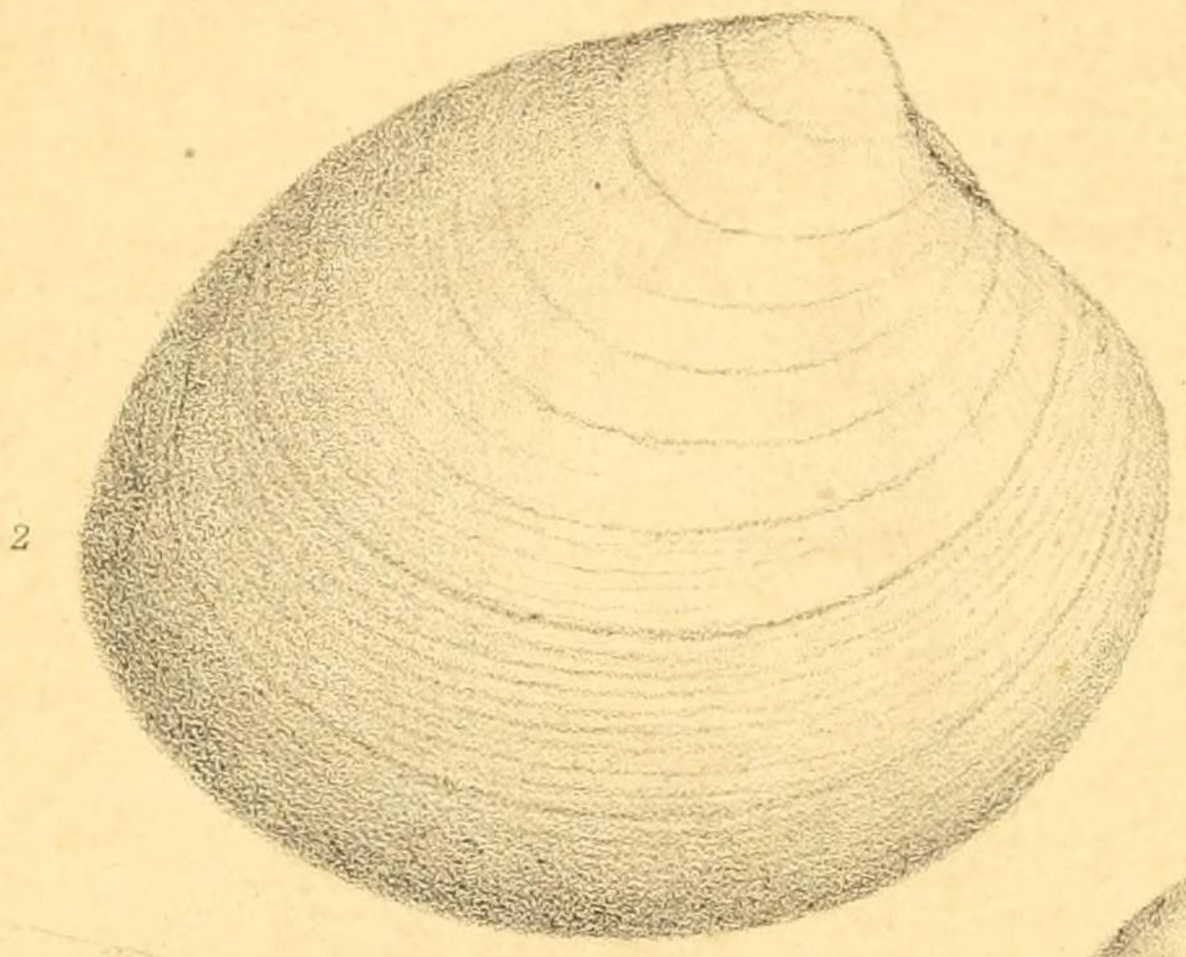
Plate 11, fig. 8. Outline of *Isæa Ortoni*, enlarged.



1



9



2

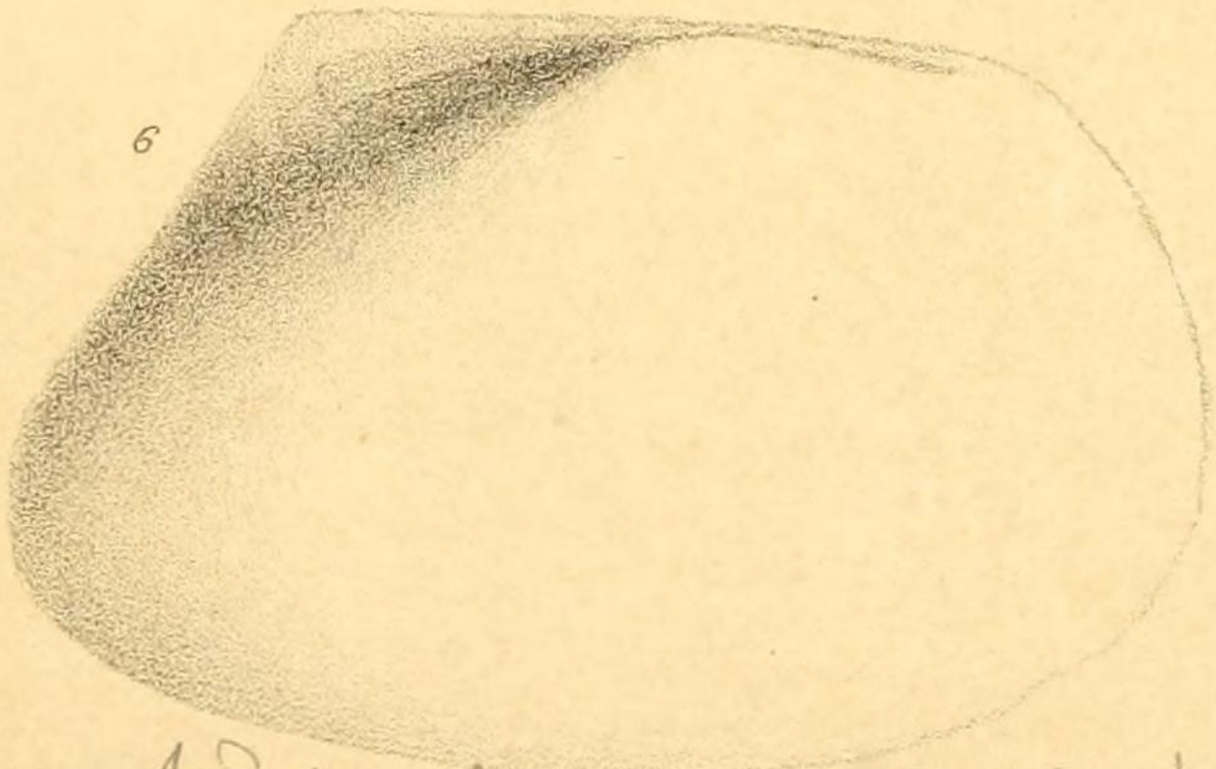
4

3

5

7

8



6

Anod. decurvata, Con. Colorado - p. 200

Conrad, Fossil Mollusca