

MONOGRAPH
OF THE
SPECIES OF THE GENUS PUPA
FOUND IN THE UNITED STATES.

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Having recently become interested in the examination of the American species of the genus PUPA, I have found very great confusion and uncertainty prevailing in regard to them. The objects themselves are minute and difficult to examine; the number of teeth, which is one of the most important specific characters, varies at different stages of maturity; and, what is still more unfortunate, Mr. Say, who gave names to all the species which have been hitherto described, gave us no figures in illustration of his descriptions. These are the sources of confusion, and hence I have received, from our best conchologists, a single species under four of the six names that Mr. Say applied to his different species.

It would be well, if, in writing descriptions, the teeth were arranged as primary and secondary, indicating by the *primary* those teeth which are always present when there are any, and by *secondary* those which are superadded in the progress of growth, or at maturity. Such a division would be applicable in regard to almost every species.

I have collected every specimen of PUPA which I could find in the cabinets of Boston, and have received numbers from Pennsylvania, Maryland, and Ohio, and I have carefully examined every individual. By means of a stationary microscope of moderate power, and by employing a convex lens in such a way as to bring the rays of the sun to a focus within the aperture of the shell, I have been enabled to obtain a fair view of the deeply seated teeth.

I have made out some of Mr. Say's species with certainty, and have become satisfied with regard to others in my possession, that they were unknown to him. Two or three of his species I have not yet seen, or have failed to identify them.

It is hoped that the accompanying figures may put an end to further doubts as to the species which they represent; and, by the aid of conchological friends, I may hereafter be enabled to present figures of the remaining un-illustrated species. I would especially request of those who have species not here described, that they would favor me with the loan of them, or send me descriptions or figures of them.

PUPA CORTICÀRIA.

Plate III. fig. 19.

P. testâ, albidâ, sub-cylindraceâ, obtusâ; anfractibus quinque; aperturâ sub-orbiculari; labio dente unico prope angulum externum, sub-dentato ad angulum internum; labro revolutò.

“*Odostòmia corticària*. Shell dextral, cylindrical, obtuse at the apex; whorls five, not perceptibly wrinkled or striate. Aperture sub-orbicular, lip reflected; a single tooth on the pillar lip, near the outer angle; inner angle with an angular projection resembling a second tooth, sometimes obsolete.

“Length about a tenth of an inch.

“Very common under the bark of trees near the earth, and resembles *Turbo muscòrum* of authors.” (SAY, in *Nicholson's Encyclop. (Amer. ed.) article Conchology*, pl. IV. fig. 5.)

The shell, when fresh, is transparent, and of a spermaceti-color; but it is usually found opaque and chalky. All the specimens I have seen were from Ohio. Mr. Earle, however, in his “Catalogue of Massachusetts Land Shells,” enumerates this as a native. The shell, which has hitherto borne this name in the Society's Cabinet, is PUPA *contracta*. Mr. Say compares it with *T. muscòrum*, of Montagu, not Linnæus, (*P. umbilicàta*, DRAP.) to which it does not bear a very strong resemblance. He states it to be very common under the bark of trees; but it certainly is very rare in collections.

PUPA EXÍGUA.

Plate III. fig. 20.

P. testá minutissimá, albidá, oblongo-ovatá, sub-acuminatá; anfractibus quinque convexis; labio per-obliquo, prope angulum internum dentato; columellá sub-dentatá; labro revolutó.

“Shell dextral, tapering, oblong, with minute grooved lines; apex obtuse; whorls five; suture deeply impressed; labium bidentate, superior tooth situate rather beneath the middle of the lip, inferior tooth small, placed on the columella; labrum mutic reflected, not flattened; umbilicus distinct.

“Length more than one twentieth of an inch.

“This is the smallest species I have seen. Its aperture resembles that of P. (Carychium) *corticària*, but the superior tooth of the labium of that shell is situate much nearer to the superior termination of the labrum than the corresponding tooth of this diminutive species. It is probably a CARYCHIMUM.” (SAY. *Journ. Acad. Nat. Sc.* II. 375.)

Mr. Say found it near Philadelphia. Professor Adams has obtained it near Middlebury, Vt., and it has been collected in various regions in Ohio, by Dr. Kirtland, Dr. Ward, and Mr. J. G. Anthony. A few specimens have been found under moist boards in Cambridge.

It is remarkable for its minuteness, its tapering form, and its very oblique, oval aperture. The similarity between it and the *Turbo carychium*, of Montagu (*Test. Brit.* 339. *Suppl.* pl. XXII. fig. 2,) which is the *Carychium minimum* of Leach and Pfeiffer, is almost perfect.

PUPA CONTRÁCTA.

Plate III. fig. 22.

P. testá albá, ventricosá, obtusá; anfractibus quinque convexis; aperturá sub-triangulari, expansá; labio dente magno excavato; labro revolutó, sinuato; dente altero in faucibus profundo.

“Shell dextral, short, sub-ovate, white; apex obtuse; whorls five; umbilicus distinct; aperture irregularly orbicular, complete, the lamina of the labium being elevated above the

surface of the preceding whorl, and joining the extremities of the labia; labium with a large, elongated, prominent tooth, which is concave on the side towards the labrum; labrum bidentate; a large tooth or fold far within the throat, caused by the fold of the umbilicus; throat much contracted by the large tooth of the labrum into the form of a horse-shoe.

“Total length less than one tenth of an inch.

“This is a short, wide species, sufficiently distinct from others, and readily distinguished by the lamina of the labrum being much elevated, and by the magnitude of the tooth of the labium. This species probably belongs to the genus *CARY'CHIUM*.” (SAY. *Journ. Acad. Nat. Sc.*, II. 374.)

Mr. Say found it in Virginia. It has since proved to be a wide-spread species, and has been found in all the northern range of States, wherever it has been sought for. When fresh, it seems to be invested with a glutinous pubescence, by which particles of earth become entangled and partially conceal it.

PUPA ARMÍFERA.

Plate III. fig. 10.

P. testâ griseâ, cylindraceâ, obtusâ; anfractibus sex planulatis; aperturâ semi-ovali, dentibus quinque armatâ, quorum unus emarginatus labio, unus ad columellam affixus.

“Shell dextral, oblong-oval or somewhat obtusely-fusiform; suture distinct; whorls six, obsoletely wrinkled; aperture longitudinally sub-ovate; exterior lip reflected, but not flattened, interrupted above by the penultimate whorl, and with five teeth, of which the superior one and that which precedes the basal one are smallest; labrum with an undulated lamelliform tooth, its anterior extremity little elevated, but elongated, so as almost to join the superior extremity of the exterior lip.

“Length three twentieths of an inch.

“Very distinct from *P. corticâria*, in being a much larger and proportionally more dilated shell, and, with that species, seems to belong more properly to the genus *CARY'CHIUM* of Müller and Férussac.” (SAY. *Journ. Acad. Nat. Sc.*, II. 162.)

Mr. Say found it in upper Missouri. It is very abundant in Ohio, but I have not heard of any specimens found on this side of the Alleghanies.

He notices, that sometimes one and sometimes the two smallest teeth are wanting. Indeed I have found only one specimen in which the little basal tooth is present; while there is very frequently an additional tooth on the outer lip, posterior to the others. If we except *P. placida*, a somewhat doubtful species, it is the largest Pupa of the United States, and is not likely to be confounded with any other.

PUPA PROCERA.

Plate III. fig. 12.

P. testâ cylindraceâ, elongatâ, apice obtusâ; anfractibus sex, convexis, obliquè striatis; aperturâ semi-ovali, dentibus sex armatâ, quorum posterior emarginatus.

Shell elongated, ovate-cylindrical, obtuse at apex, of a brownish horn-color; whorls six, convex, the three anterior ones of nearly equal diameter, and the three posterior ones forming a very obtuse apex; suture deep; aperture semi-oval, rather longer than broad; lip brown, somewhat incumbent at the middle of the right side, unequally reflected, not flattened, and curving at an abrupt angle before it joins the preceding whorl; throat armed with five teeth; one on the middle of the transverse lip is compressed, stretching towards the junction of the outer lip, and emarginate at the middle, sometimes even bicuspid; a conical one on the pillar a little below its junction with the transverse lip, and sometimes there is a small denticle at the base of this; a smaller one at the anterior termination of the pillar; a small one, often wanting or inconspicuous without a large magnifier, about the middle of the outer lip; and the fifth, broad and considerably elevated, seen at the very depth of the cavity of the aperture as we look down into it, opposite to the tooth of the transverse lip; umbilicus small and open.

Length $\frac{1}{10}$ of an inch; breadth $\frac{1}{30}$ of an inch.

This very distinct species was sent to me by Professor E.

Foreman, of Baltimore, who seems to have found it plentifully. It comes nearer to *P. rupicola*, than to any of Mr. Say's species.

PUPA MÍLIUM.

Plate III. fig. 23.

P. testâ minutissimâ, ovali, castaneâ; anfractibus quatuor convexis, obliquè striatis; aperturâ cordatâ, dentibus sex, compressis armatâ, quorum duobus labio affixis.

Shell minute, of a globosely-oval form, color a light-chestnut; whorls four or somewhat more, obviously wrinkled obliquely, rather convex; apex bluntly rounded; suture deep; aperture half the width of the last whorl, heart-shaped, the apex being at the left posterior angle; the transverse margin is nearly direct; the outer lip is scolloped by an indentation of the lip; the remainder of the margin is regularly arcuated; lip white, slightly everted; throat with six teeth, two of which are on the transverse lip, equidistant; one, with a tubercle at its base, is on the middle of the columella, and nearly at right angles with the preceding, and is the largest; a fourth is on the indenture of the outer lip, directed between the two on the transverse lip; and two smaller ones, more retired within the shell, are equidistant between the two last-mentioned; umbilicus large and deep. Length less than $\frac{1}{30}$ of an inch; breadth $\frac{1}{40}$ of an inch.

This is the most minute species I have yet seen; even more so than *P. exigua*. In size and outline it may be compared with *P. vértigo*, DRAP., (*Vértigo pusilla* of other authors) of Europe; but that is a reversed shell. The teeth are all distinct, long, compressed, and very sharp. I first discovered it at Oak Island, Chelsea, on a warm, damp day, in November, 1839, crawling upon fallen leaves, in company with *Bulimus lubricus*. Professor Adams has since found it in Vermont. It, doubtless, has a wide range, but its minuteness renders it difficult to be detected.

PUPA SIMPLEX.

Plate III. fig. 21.

P. testâ minimă, cylindraceă, obtusă, lævi; anfractibus sex, subplanulatis; aperturâ orbiculari, edentulâ.

Shell minute, the two anterior thirds cylindrical, surmounted by a rapidly formed, blunt apex; light chestnut-colored. Whorls five, moderately convex, separated by a well-impressed suture, quite smooth; aperture circular, excepting a slight encroachment by the preceding whorl; lip simple, sharp, slightly everted on the left side, and partially hiding a small umbilicus. No trace of a tooth has been detected. Length $\frac{1}{15}$ of an inch; breadth $\frac{1}{30}$ of an inch.

The only locality where this has been found is a small grove, a little northward of Fresh Pond, in Cambridge. In this place numerous specimens have been found by myself and others, at every season from May to November. They live among the decaying leaves, in company with *HELIX lineata*, *labyrinthica*, *chêrsina*, and *indentata*. Having been gathered in spring and autumn, we may safely suppose some of them to have been adult; yet none of them exhibit any trace of a tooth. Its circular aperture readily distinguishes it from all our other species. It is nearly identical, however, with *P. edentula*, DRAP. (*Vértigo nitida*, FÉRUS.)

PUPA BADIA.

Plate III. fig. 18.

"P. testâ parvâ, rubro-fuscâ, cylindraceâ; apice perobtusâ, anfractibus septem, convexis; aperturâ orbiculari, unidentatâ; labro contracto, subreflexo."

"Shell small, reddish brown, cylindrical, very obtusely tapering in the two upper whorls; whorls seven, moderately convex, with a well impressed suture; aperture orbicular, its plane nearly parallel with the axis of the shell, less than one third of the length of the shell, with the margin slightly reflected, and the sub-margin contracted, with a single rather small tooth on the penultimate whorl; umbilicus moderate.

“Length, .14 inch; breadth, .07 inch; diameter of the aperture, .045 inch.” (ADAMS, *Bost. Journ. Nat. Hist.* III. 331)

This species was discovered at Crown Point, N. Y., by Professor G. W. Benedict, of the University of Vermont. I have also received it from the vicinity of Troy, N. Y. It is the largest of the North American species, except *P. armifera*, from which it is at once distinguished by its dark mahogany color.

It is almost precisely like *P. marginata*, DRAP., BRARD, &c. the *P. muscorum*, LAM. It belongs to the genus PUPILLA, Leach. See Turton's Manual, (Gray's edition,) 196, pl. VII. fig. 79. See also, Adams, Catalogue of Mollusca, in Thompson's History of Vermont.

In the preceding part of this paper I remarked, that there were two or three described species of the genus Pupa, which I had not then seen, or had failed to identify them with their descriptions. During the long interval which has since elapsed, through the kindness of my friends I have succeeded in obtaining all of them. These I shall now proceed to describe, and also to communicate such facts respecting the species previously noticed, as a more extended observation has disclosed.

PUPA OVATA.

Plate XVI. figs. 7, 8.

P. ovata, umbilicata, castanea; anfractibus quinque, convexis; apertura subcordata, dentibus 5 ad 9 lamellosis armata, quorum 1-3 posticè, duo ad columellam, 2-5 ad labium inflexum adnatis.

“Shell dextral, subovate, brown; apex obtuse; whorls five, glabrous; suture not very deeply impressed; body whorl indented near and upon the labrum; aperture semioval; labium five toothed, of which three are situate on the transverse portion of the lip, parallel to each other, equidistant, the superior and inferior ones being small, the latter sometimes obsolete, the intermediate one lamelliform, prominent, and the two

other ones situate on the columella, approximate, extending at right angles to the three preceding ones, the superior (inferior?) one oblique and smaller; labrum reflected but not flattened, bidentate, teeth lamelliform, prominent; umbilicus distinct.

Length less than $\frac{1}{10}$ inch, breadth nearly $\frac{1}{20}$ inch.

The smallest teeth of the labium are sometimes obsolete." (SAY, *Journ. Acad. Nat. Sc.* II. 375.) See also ADAMS, Catalogue of Mollusca, in *Thompson's Hist. of Vermont, and Siliman's Journ.* XL. p. 271.

An opportunity having been afforded for a careful examination of the authentic specimens of this species placed in the Cabinet of the Academy of Natural Sciences at Philadelphia by Mr. Say, and also of his *Pupa modesta*, the latter proves to be merely a specimen of *P. ovata*, with the lip somewhat fractured, by which the aperture has received a somewhat modified form (fig. 8); and this circumstance has been the source of no little embarrassment. Mr. Say's description is as follows:

P. modesta. "Shell suboval, minutely wrinkled; apex obtuse; whorls six; umbilicus distinct; aperture obliquely subovate; labrum with a prominent, compressed, semioval tooth, equidistant from the extremities of the labrum, and a somewhat conic one rather below the middle of the columella; labrum not inflected, joining the preceding whorl at its upper extremity with a curve, bidentate, lower tooth placed opposite to that of the middle of the labium, the other smaller and placed a little above. Length $\frac{3}{20}$ inch." (SAY, *Long's Second Expedition*, II. 260, pl. 15, fig. 5.) See also GOULD'S *Inverteb. of Massachusetts*, 188, fig. 119.

This species is constant in its external characters, but is somewhat variable in its aperture. It is seldom that three teeth are found on the transverse lip, the tooth on the left being almost always, and that on the right being frequently wanting. Sometimes there is a minute tooth at the base of the aperture, and sometimes a third tooth on the posterior part of the outer lip. It is more ventricose than any other

American species, and of a darker color. It is shining, but distinctly marked with longitudinal wrinkles. The inflection of the outer lip is such as to render the aperture heart-shaped, and the flexure extends to a considerable distance round towards the back of the shell. Its true dimensions are, length $\frac{1}{10}$ inch, breadth $\frac{1}{16}$ inch.

It lives in damp places, around the borders of ponds, or in rich, moist fields under fragments of board, sticks, &c. Mr. Say found his *ovata* in Pennsylvania and his *modesta* in the Northwest Territory. It is common about Boston, and I have received it from near Portsmouth, N. H., from Troy, N. Y., from Worcester County, Md., and from Jacksonsborough, S. C.; and Professor Adams found it near Middlebury, Vt., and Dr. J. W. Mighels near Portland, Me.

The animal is of a dark claret color above, lighter beneath; tentacles two, remarkably clavate or pestle-shaped; the front of the foot is trilobate, the central lobe being very small, and there is a constriction behind the two lateral ones.

PUPA GOULDII.

Pl. XVI. Fig. 9.

"Testâ minutâ, ovato-cylindricâ, sub-castaneâ; anfractibus pluribusquàm quatuor; apice obtuso; apertura subcordatâ, bilobatâ, dentibus quinque armatâ; labro subreflexo."

"Animal with two tentacles only, black above; foot gray, short posteriorly. Shell light chestnut, cylindrical ovate; whorls between four and five, rather ventricose, the last occupying nearly half the length of the axis; apex obtuse; aperture lateral, composed of two unequal curves, meeting in the centre of the outer lip, with five prominent white teeth, viz.: one upon the transverse margin, two upon the umbilical margin, and two upon the labial margin; lip thickened, not reflected; umbilicus a little open." (BINNEY, in *Proceedings of the Boston Soc. Nat. History*, p. 105, March 15, 1843.)

This very distinct species is unusually constant in its characters. Its shape may be more properly called elliptical. In size it is intermediate between *P. ovata* and *P. milium*, ap-

proaching more nearly to the latter in form and color. In adult specimens I have never found any variation in the number or situation of the teeth. At a little distance back of the outer lip, and answering to the two teeth within, are seen two indentations, showing that the parts within are folds rather than teeth; and this is very plainly seen to be the case in young specimens. Its length is about $\frac{1}{14}$ inch, breadth $\frac{1}{26}$ inch.

It was first sent to me by Dr. W. Newcomb, of Troy, N. Y., and subsequently by Prof. E. Foreman, from Baltimore and Worcester County, Md. Since then I have found it, in August, upon sticks and about the roots of trees in the woods in Cambridge and Roxbury. It seems to be abundant.

PUPA PENTODON.

Plate XVI. fig. 10. 11.

P. ovato-oblonga, albidâ, umbilicatâ; anfractibus quinque, convexis, apice subacuta; aperturâ obliquè semiovatâ, dentibus 5-8 instructâ, quorum 1-2 posticè, 2 ad columellam, 2-5 ad labrum positâ; labro expanso.

“Shell dextral, subovate, whitish horn-color; apex obtuse; whorls five, glabrous, convex; suture not very deeply impressed; aperture semioval; labrum two-toothed, of which a single very prominent one is on the middle of the transverse labium, and the other remote, much smaller, and placed on the basal angle of the columella; labrum regularly arcuated, tridentate, tooth nearest the base very small and placed near the smaller tooth of the columella; the two others larger, subequal; umbilicus distinct. Length less than $\frac{1}{10}$ inch.

Lower tooth of the labrum sometimes obsolete.

Animal, foot white, head and neck, as far as the mantle, black.” (SAY, *Journ. Acad. Nat. Sc.* II. 376.)

This is the most variable of all our species. While there is no doubt as to this being the shell intended by Mr. Say as his *péntodon*, it is unfortunate that he should have selected so inappropriate a name, inasmuch as the shell is never found with five teeth except in an immature state, when the number is even reduced to four. It is nevertheless true that five of the teeth are constant, viz.: one upon the transverse lip, two

on the columella and two on the outer lip. Then there is sometimes an additional small one on the transverse lip, to the left of the constant one; and the teeth on the outer lip vary in many ways, as may be best exhibited by the following table of varieties which I have observed, intended to represent the teeth in succession as they occur, beginning at the outer posterior angle and going round to the left.

1	1	1	1	0	1	0	1	0	1	0
1	1	1	1	0	0	0	1	0	1	0
1	1	1	1	0	1	0	1	0	1	1
1	0	1	1	1	1	1	1	0	1	0
1	0	1	1	0	1	0	1	1	1	1
1	0	1	1	0	1	0	1	0	1	0
1	0	1	1	0	0	0	1	0	1	0

By this table it appears that there may be as many as even eleven teeth, though I have never seen more than eight on one individual. Of the two teeth which are shown by this table to be constant on the outer lip, the largest is situated nearly opposite the tooth on the transverse lip, and the other less than half the distance between it and the posterior angle. Such remarkable deviations have led to the proposal of two new species which may with propriety be noticed, and may be considered as the two extremes of the varieties, viz.:

P. Tappaniàna, ADAMS, a name adopted by him from the manuscripts of the late Dr. Ward of Roscoe, Ohio, and described in a supplementary sheet to the 40th volume of Silliman's Journal, and afterwards in Thompson's History of Vermont. The finest examples of the species come under this variety. They are such as occur in Ohio, of a very light color, quite translucent, without epidermis, and with the lip distinct and white. It is $\frac{3}{40}$ inch in length, and about half as broad, fig. 10.

P. curvidens, GOULD, (*Inverteb. of Massachusetts*, 189, fig. 120) is about one seventh smaller, has a very thin, greenish epidermis, and generally eight teeth, and the large one on the transverse lip decidedly curved to the left, (fig. 11.) Such are specimens usually found in Massachusetts; and though in

size, exterior, and armature they are so different from the Ohio specimens, yet as I have seen so many intervening varieties, I think this form should be abandoned as a species.

Notwithstanding all these discrepancies, there is a certain aspect about the shell which enables one to distinguish it without much difficulty. Its ovate form, its very small aperture, with the transverse portion so oblique that the inner lip is very short in proportion to the outer one, will serve to determine the species with a very small magnifying power.

Mr. Say found his specimens in Pennsylvania ; it is not infrequent in the vicinity of Boston, under fallen leaves in shady woods ; Professor Adams found it near Middlebury, Vt. ; Dr. Newcomb found it near Troy, N. Y. ; it is one of the most common species in Ohio, and has been sent me by Dr. Foreman from near Baltimore, and from Jacksonborough, S. C. Thus, with the exception of *P. contrácta* it has been observed over a wider region than any other species.

PUPA RUPICOLA.

Plate XVI. fig. 13.

P. ovato-conica, glabra, albida, umbilicata ; apice subacutá ; anfractibus sex convexis : aperturá obliquá, semi-ellipticá, dentibus quinque lamellosis armatá, quorum unus posticé, duo ad columellam, duo ad labium expansum dispositi.

“Shell dextral, attenuated to an acute apex, white ; suture deeply impressed ; labrum bidentate, superior tooth lamellar, emarginate in the middle, and at the anterior tip uniting with the superior termination of the labrum ; inferior tooth placed on the columella, and extending nearly at a right angle with the preceding ; labrum tridentate, teeth placed somewhat alternately with those of the labium ; inferior tooth situated at the base and immediately beneath the inferior tooth of the labium. Length $\frac{1}{10}$ inch.”

About the size of *P. corticària*, and considerably resembles that species, but is sufficiently distinguished by the circumstance of its gradually decreasing in diameter from the body whorl to its tip, and in the character of the mouth it is widely distinct. (SAY, *Journ. Acad. Nat. Sc.* II. 163.)

Found by Mr. Say in Florida, and sent to me by Dr. Ravenel from Charleston, S. C., and by Dr. Foreman from Jacksonborough and Manchester, S. C., and from Savannah and Whitmarsh's Island, Georgia. It seems to be a southern species; and although I have very often received shells from Ohio under this name, yet no one of them has actually proved to be this species.

I have met with little or no variety in this species, and the above description can scarcely be amended, except to say that the teeth are compressed, and protracted for a considerable distance within the aperture. The place of the two teeth or folds on the outer lip is marked externally by two prolonged indentations. The distinctive marks between this species and *P. corticaria* are clearly given; but it has a much closer resemblance, in its armature especially, to *P. prócera*. It is, however, distinguished by its less cylindrical form, its lighter color, its smoother surface, its white instead of brown lip; the tooth on the transverse lip is less twisted, and that which is at the base is not so remote or so transverse in position. Its spire is also at least half a whorl shorter.

PUPA SERVILIS.

Plate XVI. fig. 14.

Testa ovato-elongatâ, glabra, rufescens, umbilicatâ; anfractibus quinque convexis; apertura semi-elliptica, dentibus quinque armata, quorum unus contortus posticè, unus ad basin, duo ad labium affixi; labro reflexo.

Shell elongated; tapering to a somewhat acute apex, of a pale chestnut or horn color; whorls five and sometimes somewhat more, very delicately wrinkled; suture well defined. Aperture semi-oval, nearly in the axis of the shell, the transverse portion slightly oblique, and the two extremities of the lip very nearly meeting behind. Revolving under the middle of the transverse lip is a contorted, lamellar tooth which arises near the junction of the outer lip; on the middle of the columella is a large conical tooth; at the base is a small tooth, then a third large tooth, placed so as to form a regular tripod with the other two, and above this is a fifth inconspicuous tooth. Lip slightly everted, not flattened, sometimes a little inflected at the right, umbilicus small. Length, $\frac{1}{10}$ breadth $\frac{1}{20}$ inch.

At first sight this species would be referred either to *P. rupicola* or *P. prócera*. But a closer examination shows that while it has the pale brown lip of the latter, it is a shorter and much more ventricose shell; and while the number and arrangement of the teeth are as in *rupicola*, the latter has a much more slender form, the aperture is more oblique and less elongated, the apex is obtuse, and the lip is white.

Notwithstanding the distinctions mentioned above, perhaps most observers, on ordinary inspection, would maintain that these three were merely local varieties of the same species. I will add, therefore, that by means of an excellent microscope, to which a camera lucida is attached, I have made accurate figures three inches in length, which render the differences in form unequivocal.

Found at Santa Cruz by Dr. R. E. Griffiths, and near Matanzas by John Bartlett, Esq.

I have inserted this species here, although it cannot strictly be considered as belonging to the United States, because of its proximity to the States, and more especially because it helps to illustrate two of our species.

PUPA FALLAX.

Plate XVI. fig. 15.

P. turrita, glabra, pallidè castaneà, umbilicata; anfractibus sex convexis; apertura obliqua, subrotundata, edentula; labro albo, valdè reflexo, striato.

“*Cyclostoma marginata*. Shell turreted, pale horn color or dusky, obsoletely wrinkled across; suture rather deeply impressed; volutions six; aperture suboval, truncate transversely above by the penultimate whorl, nearly one third the length of the shell; labium nearly transverse, color of the exterior part of the shell; labrum equally and widely reflected, thick, white; umbilicus distinct. Length $\frac{1}{2}$ inch.” (SAY, *Journ. Acad. Nat. Sc.* II. 172.)

This shell is clearly not a *Cyclostoma*, and on that account, as Mr. Say suggests, the specific name must be changed. As the shell afterwards described by him under the name of *Pupa fallax* (*Journ. Acad. Nat. Sc.* V. 121.) is only a finely devel-

oped shell of this species, that name may well be retained for the species. It was therefore adopted in the Report on the Invertebrata of Massachusetts, p. 192, fig. 123. Professor Adams also applied to it the specific term *albilabris*, in Silliman's Journal, XL. 271, and in his Catalogue of the Mollusca of Vermont in Thompson's History, a name suggested by the late Dr. Ward. Some doubt still remains as to whether it belongs to the genus *Pupa*, or to *Bulimus*, as the animal has not been described.

This shell is so well known as to require no more particular illustration. The lip, however, is not often equally reflected, but is much narrowed near the junction of the outer portion with the body whorl. There are also two or three deeply cut lines running parallel and near to its margin.

Mr. Say found his specimens in the North-West Territory, and it is not uncommon in Massachusetts, Vermont, New York, Maryland and South Carolina.

Its foreign analogue is *P. umbilicata*, Drap.

Having recently had an opportunity, by means of one of Chevalier's large microscopes, of tracing off greatly enlarged figures of these minute shells, with great accuracy, I will now review the species described in the former part of this paper, and notice those points which were inaccurately stated, or which need further illustration, and add such further information as I may have since obtained respecting them.

P. CORTICARIA. The single tooth which Mr. Say describes as being on the pillar lip, should read on the transverse lip, to correspond with his subsequent descriptions of species. In the figure (Vol. III. pl. 3, fig. 19,) the body whorl is represented too long. I have received it from Worcester county, Maryland.

P. EXIGUA. In the figure of this shell (Vol. III. pl. 3, fig. 20,) the body whorl is represented proportionally too large. Its length is .08 inch. The only additional locality from which I have received it is Troy, N. Y.

The animal is colorless, and has only two tentaculæ devel-

oped, which are stout, hyaline, about one third as long as the foot. See *Rep. on the Invertebrata of Mass.*, 191, fig. 122.

P. CONTRACTA. The aperture, in Vol. III. fig. 22, should be placed much farther to the right. It is probably common in all the States, as I have received specimens from the Island of Cuba. Found about rotten stumps or under stones in moist pastures. See *Invertebrata of Mass.* 186, fig. 117, and ADAMS, in *Thompson's Hist. of Vermont*.

P. MILIUM. The teeth on the outer lip are more properly folds, as indicated by the two elongated indentations on the exterior of the shell corresponding to them. I have a specimen from Mr. Anthony which he received from Louisiana. See GOULD, *Invertebrata of Mass.* 187, fig. 118. ADAMS, in *Silliman's Journ.* Vol. XL. 270, and *Thompson's Hist. of Vermont*.

P. PROCERA. Both the description and figure of this species are so incorrect that I reproduce an accurate figure, (fig. 12.) Its peculiar characters have been noticed under *P. rupicola*. It has not yet been sent me from any other locality than the vicinity of Baltimore.

On the cover of the Society's Journal, Vol. IV. No. 1, I indicated a species by the name of *P. carinata* which I supposed to be new. But the examination of another specimen has satisfied me that it was merely an immature or a fractured specimen of *P. procera*.

P. ARMIFERA. Professor Adams has found this species plentifully at Crown Point, and some other places near Lake Champlain. I have also received it from Maryland. See also ADAMS, *Catalogue of Mollusca in Thompson's Hist. of Vermont*.

P. SIMPLEX. Very few of these shells have as yet been found, and none, that I know of, in any other except the original locality. They are enough, however, to establish the validity of the species.

P. PLACIDA, Say, proves to be a specimen of *Bulimus obscurus*, Müll. (*B. hordeaceus*, Brug.)

Thus there are at present known, in the United States, thirteen species of this genus. They are remarkable, as compared with those found in other countries, for their minuteness; the two largest species, *armifera* and *badia*, scarcely exceeding in size the smallest of the European species. It is also singular that no species of the allied genus *Clausilia*, so abundant in Europe and Asia, should have been found, as yet, on the North American continent; and indeed I am not aware that any shell possessing a true *clausium* has been found in any part of America.

The following shell, being figured on the same plate with the preceding, the description of it may be desirable here.

PUPA LYRATA.

Pl. XVI. fig. 16.

Testá parva, plerumque sinistrorsa, castaneá, latè umbilicatá; anfr. 5 convexis, costulis flexuosis ad 20 concinnè clathratis; apertura sub-orbiculari, campanulata, postice dentibus duobus lamellosis, in faucibus duobus alteris, armata.

Shell minute, generally reversed, ovate, of a chestnut color; whorls five, convex, crossed by about twenty delicate, rounded, flexuous ribs, which give the surface an elegant appearance. Spaces between not striated. Aperture somewhat orbicular, the peristome having an inflection posteriorly, against which is a lamellar tooth winding under the transverse lip, and another still larger between it and the umbilical region. There is also a thickening at the middle of the outer lip from whence arises a compressed fold which revolves within the aperture, directed between the two teeth on the transverse lip; and another parallel to this, stretching between the outer anterior and inner posterior angles of the aperture. Umbilicus large and deep.

Length $\frac{22}{200}$, breadth $\frac{13}{200}$ inch.

Found at the island of Maui, one of the Sandwich islands. Like most other land shells found there, the volutions seem to be directed right or left indifferently. It is a beautiful shell, and cannot well be confounded with any described species.



1	ANCULOTUS	<i>costatus</i>	ANTHONY	9	TORNATELLA	<i>puncto-striata</i>	ADAMS	17	ANCYLUS	<i>fuscus</i>	ADAMS
2	HELIX	<i>striatella</i>	"	10	PUPA	<i>armitera</i>	SAY	18	PUPA	<i>badia</i>	"
3	FALUDINA	<i>Cincinnatiensis</i>	"	11	CYCLAS	<i>elegans</i>	ADAMS	19		<i>certicaria</i>	SAY
4	ANCULOTUS	<i>Kirtlandianus</i>	"	12	PUPA	<i>proce</i>	GOULD	20		<i>exigua</i>	"
5		<i>carinatus</i>	"	15	LYMNEA	<i>palta</i>	ADAMS	21		<i>simplex</i>	GOULD
6	PLEUROTOMA	<i>plicata</i>	ADAMS	14		<i>umbilicata</i>	"	22		<i>contracta</i>	SAY
7	CERITHIUM	<i>cerebrale</i>	"	15	PLANORBIS	<i>elevatus</i>	"	25		<i>milium</i>	GOULD
8	JAMINIA	<i>producta</i>	"	16		<i>sirens</i>	"				



1. <i>L. ampla.</i>	5. <i>M. minutissima.</i>	10. 11. <i>P. pentodon.</i>	15. <i>P. fallax.</i>
2. <i>A. portlandica.</i>	6. <i>D. coarctata.</i>	12. . <i>proera.</i>	16. . <i>lyrata.</i>
3. <i>B. portonius.</i>	7. 8. <i>P. costis.</i>	13. . <i>rupicola.</i>	17. <i>H. demissa.</i>
4. <i>P. sulcosa.</i>	9. . <i>Gouldii.</i>	14. . <i>servili.</i>	



