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ART. I.—*On the Chilopoda of North America, with a catalogue of all the specimens in the Collection of the Smithsonian Institution.\**

By HORATIO C. WOOD, Jr.

The body among the Chilopoda is composed of a variable number of segments, each of which is formed by the junction of two subsegments, one of them being very much atrophied and without appendages. Each subsegment is divisible into a dorsal and ventral portion; the former comprising the scutum or dorsal shield and the superior portion of the sides with the spiracles, the latter the sternum or ventral shield and the inferior portion of the sides with the legs. The scutum is originally formed by the conjunction of two central and two lateral pieces, the former we have called the primitive scuta, the latter are the episcuta of Newport. The sternum is in like man-

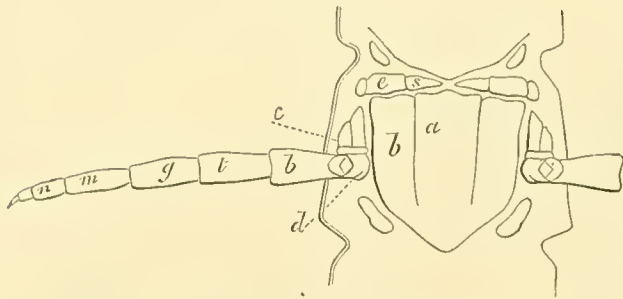
\* It will be seen that the principal portion of our material consists of the collection of the Smithsonian Institution, which was placed at our disposal, in accordance with the liberal constitution of that Institution. And we are especially indebted to Prof. Baird for many facilities afforded us by him. We would also acknowledge our obligation to Samuel H. Scudder, Esq., of Cambridge, for the trouble incurred in sending the specimens belonging to the Museum of Comparative Zoology, kindly loaned us by Prof. Agassiz.

We doubt not there are still unknown species scattered throughout the country, specimens of which we have been unable to obtain. We think that they will more especially be found among the Geophilidæ. And if Naturalists would send us suites from their own neighborhoods, we would be very happy to label and return them, retaining duplicate specimens of forms unknown to us.

The West Indies, of course, are not included in our domain. Mexico forms geographically a portion of N. America, but its fauna is much more closely allied to that of S. America.

ner formed from four pieces—the primitive sternum (fig. 1, *a*) and episternum, (fig. 1, *b*.)

Fig. 1.



Close to the spiracles, and belonging to the dorsal section, are two osseous points, the rudiments of the parapera, which attain to some importance among the Hexapoda. At the insertion of the legs are several small plates, the epimera (fig. 1, *c*.) They afford points of origin to the retrac-

tor muscles of the legs. The posterior of the two subsegments forms the mass of the segment; but the scutum of the anterior is represented by a raised band on the front of the main scutum. The ventral portions of it are, however, much more distinct. We will find a series of small plates anterior to the sternum representing two primitive sterna (fig. 1, *s*) and episterna (fig. 1, *e*) as well as epimeral plates.

The legs contain each a coxa (fig. 1, *d*) a femur, *b*, a tibia, *t*, a tarsus, *g*, and metatarsal joints, *m*, *n*. The coxæ are generally small, except those of the posterior pair of legs, which are often of immense size and are known as the lateral anal appendages. Among the Cermatiidæ and Lithobiidæ, however, they attain to a considerable size. The metatarsal joints vary very much; in the genus *Scolopendra* there are but two to each leg, whilst among the Cermatiidæ there are a great number.

The head in the Chilopoda is composed of eight subsegments consolidated into two or more segments, as was first shown by Mr. Newport. The first segment is styled the cephalic. It reaches its maximum size in the Cermatiidæ, in which it is the most prominent part of the body, supporting a pair of very large compound eyes and almost completely concealing the strikingly atrophied basilar segment. Traces of the division into the four subsegments, that existed during embryonic life, are occasionally met with, especially among the Lithobiidæ, but the embryological labors of Mr. Newport have shown conclusively that it is so formed; to whose invaluable papers, in the XIX. volume of the Linnæan Transactions, we would here acknowledge our indebtedness. The head in the Scolopendridæ has, in addition to the cephalic segment, another one of variable size; this is the basilar. It is also found well developed in all the other families except the Cermatiidæ. Near its anterior border there is often found a deep crescentic groove; the portion separated by this from the main body, is called the prebasilar fold or subsegment. In the genus *Mecistocephalus* this subsegment is entirely separated from the rest, its scutum existing as a small plate immediately posterior to the cephalic, and is here called the prebasilar. In the other genera of the Geophilidæ this is wanting, but there exists posteriorly another segment, answering to the posterior portion of the basilar of the Scolopendridæ. It is the subbasilar of Newport. The under surface of the head, comprising as it does the organs of

nutrition, is much more complicated than the upper, and, in order to show the relations of parts more clearly, we will first trace them out minutely in the genus *Scolopendra*, where perhaps their analogy is most easily discovered.

On examining the under side of the head of a specimen of the genus *Scolopendra*, we will find a band constituting the most anterior portion, with which the antennæ partially articulate; this band we take to be the anchylosed primitive sterna and episterna of the first cephalic subsegment, of which the antennæ are the appendages. Just posterior and inferior to the eyes, we will see what is apparently an inversion of the cephalic scutum, but closer examination shows it to consist of two small plates, the superior exterior, (fig. 2, *e*,) uniting with the scutum by suture, the inferior interior (fig. 2, *h*) approximating to the other plate; the first of these is the atrophied episternum, the other the primitive sternum of the second cephalic subsegment. United with this sternum by suture we will find posteriorly a larger plate (fig. 2, *d*) which articulate on its inner side with another obliquely transverse plate, (*b*,) which also is conjoined on its inner side by another, (*c*,) and that too by another, and finally in the centre there is a small tooth, as it were. These plates are respectively the coxa, femur, tibia, tarsus, and the rudimentary metatarsæ (the central tooth) of the atrophied and misplaced appendages of the second cephalic subsegment. The tibia and tarsus are generally anchylosed together, but we have seen them separate. Conjoined and posterior to the coxa of the second cephalic subsegment we will find a large plate (*a*) articulating with the cephalic scutum by suture; this we take to be the primitive sternum and episternum of the third cephalic subsegment atrophied and fused together; to it the true maxillæ are articulated. These consist each of, first an elongated crooked plate (the coxa) articulating with two plates, the exterior of which (the femur) is armed with a tubercle, as in the mandibles, posterior legs, &c.; the inner plate is the tibia; these two plates articulate at their distal end with a third, the tarsus and metatarsus coalescent, but with the line of their junction very apparent. The maxillæ we believe to be the appendages of the third cephalic subsegment. Just anterior to the primitive sternum of the first, and posterior to that of the third, are often found some small plates which we believe to be epimeral. But the largest of the latter is probably the episternum of the fourth cephalic subsegment, which is scarcely to be found elsewhere. Proceeding still posteriorly we come to the maxillary palpi, (fig. 3,) which are possessed each of a distinct femur, (*f*,) tibia, (*t*,) and tarso-metatarsal joint, (*m*,) They are the appendages of the fourth cephalic sub-

Fig. 2.

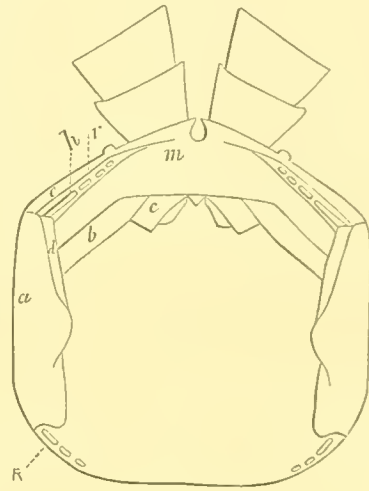
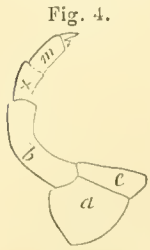


Fig. 3.



segment. Between them are two small plates—the lingua—(fig. 3, *l*) which we think are the primitive sterna, not episterna, (as Mr. Newport believed,) of the fourth cephalic subsegment. Posterior to the sterno-episternal plate of the third subsegment is a subtriangular plate, one of the episterna of the first basilar subsegment; interior



to this is a large irregularly four-sided one, forming a portion of the palpus, (fig. 4, *a*;) this is one of the primitive sterna of the first basilar subsegment; still within this is an elongated plate, (*e*,) the coxa of the palpus. With these two last the femur (*b*) of the palpus is articulated at its proximate end, while to its distal end is fitted the tibia (*x*) and to it the tarsus, (*m*.) The sterna and appendages of the second and third are very much coalesced and difficult to distinguish clearly; but we think that the dental lamina are probably the appendages of the second basilar subsegment, the anterior portion of the labium, which we have frequently seen separated by a suture, being composed of the episterna and primitive sterna of the same subsegment. The mandibles are probably the appendages of the third basilar subsegment, the posterior portion of the labium being composed of the sterna of the same subsegment. Two plates, which are bent round the sides of the posterior portion of the labium, we take to be the episterna. The sternal portions of the fourth basilar subsegment are similar to those of the segments of the body. Among the Lithobiidæ the structure of the under portion of the head is almost identical with that described above.

Among the Geophilidæ the parts of the mouth are so consolidated and confused that it is impossible to recognize in the adult the original plan of construction and development. On examining the under surface of the head of a *Mecistocephalus*, we will find the labium very large, as are also the mandibles, while the maxillæ are apparently wanting, but the maxillary palpi are recognizable. Among the Cermatiidæ the labium is moderate, cleft in the middle, the two lateral halves being moveable on one another, so as to form as it were an additional joint to the mandibles; otherwise enormously developed, especially as to length. The palpi are very long. The maxillæ and maxillary palpi well developed.

#### Fam. I. CERMATIIDÆ, *Leach*.

Scuta dorsalia 8. Segmenta 16. Sterna 15. Scutorum stomata mediana. Pedes antennæque multi-articulatæ.

In the Cermatiidæ the head is large, more or less truncate anteriorly, having its surface rough and uneven. The eyes are compound and very prominent. The palpi much elongate and spinous. The antennæ very long and composed of a multitude of joints. The mandibles are elongate and distant. The scuta (eight in number) are rounded and deeply emarginate posteriorly, where they are furnished with a longitudinal, slit-like orifice or stoma. Their surface is more or less roughened with minute

tubercles or spines. Their border is everted, and generally crenulate and spinous. The legs are very long and serrated by parallel rows of spinulae. They are also furnished with rings, of long slender spines, encircling the joints. The sides have nine pairs of spiracles,—the openings into the tracheal vessels. The anal segment in the female is elongate, and the external organs of generation are furnished with a pair of forceps, replaced in the male by a pair of styliform appendages. The sterna (fifteen in number) are small. It is very evident that the number of segments is fifteen, and that each scutum, except the last, is formed by the coalition of two neighboring ones. The pattern of coloration is peculiar to this family; it consists of longitudinal stripes on the body and annuli on the appendages. Green predominates. There has as yet only one genus been found in this family, among which so great a uniformity exists as to make the distinguishing of species a task of considerable difficulty.

The color is probably a good specific character, but is seldom, if ever, preserved. We have seen specimens of *S. forceps* changed almost immediately to green or blue, or, more commonly, bright purple, by alcohol.

All our descriptions of new species are drawn up from alcoholic specimens, and therefore proper allowance should be made in estimating their accuracy as regards coloration.

Any anatomical characters are very obscure; but Mr. Newport considers the proportionate lengths of the metatarsal joints as constant, and we have found them so, as far as our limited observations have gone.

The lengths of the antennae and posterior pair of legs, as compared with the body, are also probably good characters, but very liable to misinterpretation; for it is difficult, often impossible, to tell when the former are broken and when the latter are imperfect, reproduced, appendages. Mr. Templeton, who first suggested these points, also makes use of the size of the marginal spines of the scuta in his descriptions. The peculiarities of the surface of the scuta also appear to be good secondary characters.

#### Gen. 1. CERMATIA, Illiger.

Caput magnum. Oculi prominentes. Stomata dorsalia lateribus incrassata.

*Scutigera*, Lamarek, Anim. Sans. Vertb.

*Solista*, Rafinesque, Annals of Nature.

C. FORCEPS.—C. viridi-brunnea, fasciis tribus longitudinalibus saturate viridibus; capite dense minute punctato, antice breviter piloso, et linea depressa longitudinale mediana et ante oculum utrinque altera curvata, et altera transversa inter oculos, et postice depressione lata inculpto; antennis mandibulisque ferrugineis; scutis dense minute punctatis, spinulis numerosis asperatis, valde imbricatis, angulis retundatis, marginibus elevatis sed tenuibus et "spinis quam in Cerm. coleoprata evidentioribus;" lateribus plerumque rufescenti tinctis; femoribus singulo annulo unico saturate viridi; tibiis et tarsis biaunulatis; pedum pari postremo in mare corpore vix 1 longiore (in femina bis longiore;) articulo

metatarsali primo secundo fere quater longiore, sequentibus quinque conjunctis fere æquali; superficie ventrali flavescente; sternis medis canaliculatis.

*Scelista forceps*, Rafinesque, Annals of Nature, 1st No., 1820, p. 7.

*Cerm. coleoptrata*, Say, Journ. Acad. Nat. Sci., 1st series, ii.

“ “ Lucas.

“ “ var. *Floridensis*, Newp., Ann. and Mag. Nat. Hist. xiii. p. 95.

“ *Floridana*, Newp., Linn. Trans. xix. p. 353.

*Scutigera Floridana*, Gerv., Apt. iv. p. 225, et. Tabl. Myriap. (Exp. dans L’Ameriquedu Sud part. Sept.)

In specimens preserved for some time in alcohol, all traces of the original color are lost, the whole animal turning to a testaceous hue. The coloration of a very large fresh female before me is as follows:—

General tint is a very light olive-brown; median stripe is black, continuous, strongly defined, and extending from between the eyes to the posterior border of the penultimate scutum, where it abruptly terminates. Lateral stripes are black, strongly defined, interrupted, and extending from the eyes to the posterior border of the last scutum. The interruptions are so arranged that most of the scuta present three blotches on each side. Anterior portion of the head with two stripes converging anteriorly to the median line. In front of these there is a sub-round marking prolonged anteriorly. Most of the femora are provided with a very incomplete greenish black annulus, which is, however, complete on the last pair. Tibia and tarsi biannulated. Dorsal stomata bordered with brilliant white.

Authorities differ as to the validity of this species. We have never seen *C. coleoptrata*, and therefore cannot offer an opinion.

*Specimens belonging to the Smithsonian Institution.*

Catalogue number.	Number of Specimens.	Locality.	From whom received.	By whom collected.	Length.	Remarks.
72	1	St. Louis.	Dr. Engelmann.	*	Unc. 1	
206	7	Tamaulipas.	Lieut. L. Couch.		Unc. 1¼	
366	3	Washington, D.C.	?	?	Unc. 1	

There are in the collection of the Smithsonian Institution the following foreign specimens of this genus:—

C. CLUNIFERA, n. sp.—C. brunnea, robusta, maxima; capite breve, antice breve piloso, linea longitudinale mediana et utrinque altera indistincta curvata ante oculum, et inter oculos unica transversa obsoleta, insculpto, postice marginibus elevatis et depressione lata; mandibulis magnis, crassis; scutis (postremo excepto) valde carinatis et vix emarginatis, spinulis numerosis asperatis, postice tuberi magno, marginibus elevatis, undulatis, minute crenulatis; sento prostremo medio canaliculato, postice valde emarginato; pedibus robustis, articulorum spinis modice brevibus, robustis; metatarsis pubescentibus, articulo primo quinque sequentibus conjunctis fere æquale, his inter se fere æqualibus; sternis profunde canaliculatis.

Color of the specimen is at present brown, of an obscure olivaceous tint. When alive, it was probably more decidedly greenish. The tuberosities on the posterior

\*Where not stated the donor is believed to be the collector.



portions of the scuta are a very light brown. The scutal stomata are very large and look upward, but scarcely at all backward. But one of the antennæ is preserved; it appears to be one and a half times the length of the body. Distal portion of the legs a rather bright ferruginous. The distal metatarsi are scarcely one-half the length of the proximal. The rows of spines, that commonly serrate the legs in this genus, are obsolete, and the metatarsal joints have none. The ventral surface is a very light olive.

| 255 | 1 | Hong Koug. | North Pacific Expl. Exp. | Wm. Stimpson, M. D. | Une. 1 $\frac{2}{3}$ . | |

*C. STRABA*, n. sp.—*C. ferruginea*, fascia medianâ unica indistincta; capite lato, minute dense punctato appendicibusque sparse pilosis, depressione lato et linea longitudinale mediana et utriusque altera curvata ante oculum et altera transversa indistincta inter oculos inculpto; scutis spiuulis parvis asperatis, minute dense punctatis, vix imbricatis, postice emarginatis, marginibus valde elevatis et spinosis et crenulatis; pedibus ferrugineis, articulo metatarsali primo sequentibus septem conjunctis in longitudine æquali.

As our specimen has been preserved for some time in alcohol, the original color may have been lost. The very prominent eyes in this species contrast strangely with the almost livid hue of the animal. The median fascia is rather lighter than the remainder of the body, but is very indistinct. The posterior border of the scuta is furnished with two small approximate gibbosities, and is of a lighter shade than the remainder. The dorsal stomata look upwards and a little backwards. Spines of the genual articulations are long and slender: those of tibio-tarsal not so long; those surrounding metatarsal very small. Distal portion of the leg pubescent. The spines that serrate the numerous ridges on the legs are uncommonly large and of a red color. Sterna furnished with the usual central groove.

| 252 | 1 | Oahu. | N. Pacific Expl. Exp. | W. Stimpson, M. D. | Une. 1 $\frac{1}{4}$ . | |

*C. ———*, n. sp.?—*C. dilute viridis*, fascia media et altera utrinque saturatoribus; capite breve, antice sparse piloso, postice depressione lata, sulco medio longitudinale et altero transverso inter oculos, et utrinque altero longitudinale curvato ante oculum; mandibulis lutescentibus, spiuis armatis, antennis vix corpore longioribus?; scutis asperatis, vix subcarinalis, leviter imbricatis, postice emarginatis, minute dense punctatis, marginibus valde elevatis sed tenuibus et vix aut spinosis aut crenulatis; pedibus (anticeis exceptis) saturate viridibus annulatis, pubescentibus, articulo metatarsali primo sequentibus quatuor conjunctis longiore, secundo fere quater longiore; superficie ventrali brunnea; sternis mediis sulcatis, postice leviter emarginatis.

Head marked very similarly to *C. straba*. Legs with the usual complement of spines. The anterior apparently destitute of annuli, the posterior equalling if not exceeding the antennæ in length. Are the antennæ broken in our specimen? The femur is provided with one, rarely two, incomplete rings of dark green, the tibia and tarsus each with two complete annuli. The general color of the legs is a light yellowish green, their distal extremity inclining to rufous. The scuta have the median fascia better marked than the lateral, and are furnished posteriorly with two smooth

but densely and minutely punctate, closely approximate, gibbosities. The stomata are so placed as to look upwards and backwards.

Whether this is a new species or not we are unable to say. We certainly can discover scarcely any differences between it and similar alcoholic specimens of *C. forceps*. And where it does differ, it appears to approximate to *C. coleoprata*. We have given a description of it to aid any one who may be more fortunate than ourselves in his material.

| 253 | 1 | Japan. | N. Pacific Expl. Exp. | W. Stimpson, M. D. | unc.  $\frac{2}{3}$ . |

*C. TUBERCULATA*, n. sp.—*C. saturate viridis, obsoletissime trifasciata; capite brunneo, sicut in C. forceps notato, antice piloso; scutis tuberculis minutissimis asperatis, utrinque tuberis duobus obscuris, postice altero mediano dilute brunneo; marginibus postice rotundatis, minute crenulatis, rarissime spinosis; scuto postremo parvissimo, vix asperato, haud emarginato; pedibus saturate viridibus annulatis, spinis gracillimis curvatis; articulo metatarsali primo secundo fere quater longiore, et sequentibus quatuor conjunctis fere æquali.*

Eyes very prominent. Ventral surface a light, slightly greenish, brown. Legs with usual complement of spines, which are, however, more curved and slender than they are commonly found. Antennæ apparently not quite twice as long as the body. Femur with a single very dark complete annulus, tibia and tarsus with two each. Metatarsæ pubescent. Sterna with the usual median groove. The coloring of our specimen is essentially different from that of *C. forceps*, from which it further differs in the following particulars: Firstly, in the surface of the scuta; secondly, in the spines on the legs; thirdly, in the proportions of metatarsæ.

| 254 | 1 | Hong Kong. | North Pacific Expl. Exp. | W. Stimpson, M. D. | Unc.  $\frac{1}{2}$ . |

#### Fam. II. LITHOBIIDÆ, *Newp.*\*

Scuta dorsalia 15, inæqualia. Pedum posteriorum coxæ excavationibus in facie depressa. Antennæ elongatæ, setaceæ. Ocelli numerosi vel paucos.

The Lithobiidæ have the head large and well armed. The antennæ setaceous, elongate. The eyes stemmatous. In two of the genera, they are small and numerous, but in the third large and but two in number. The mandibular teeth are strong, very acute, and probably provided with a poison gland at their base, although it has never been anatomically demonstrated in this family, that we are aware of. The scuta are of two kinds,—a large one alternating with a small one. The females have the anal segment somewhat elongate inferiorly and provided with a pair of forceps on each side. In the males these are replaced by a pair of minute styliform appendages. The posterior coxæ have a plain depressed surface with indentations, or, as we have called them, excavations on it. We have never seen a specimen of the type of the

\* Linn. Traus. xix. p. 275.

genus *Lithobius*; but Mr. Newport says, that in all his specimens of the family the larger depressed surface is a deep elongate oval, whilst the smaller excavations are transverse, oval and furrow-like. We find, among the American species of the Lithobiidæ, a group in which the larger surface is scarcely depressed, with the smaller excavations round and almost punctiform. This we have indicated as a distinct genus, with the name of *Bothropolys*.

The specific characters of the Lithobiidæ are derived from the number of ocelli, the shape of the dental lamina with the number of teeth, the shape, color and structure of the scuta, &c. The number of the eyes in the adult is fixed within narrow limits for each species. But when the young Lithobiid emerges from the egg, it possesses but a single pair of eyes, besides wanting some of its segments. In the genus *Hemicops*, (not yet discovered in this country,) the single pair of ocelli remain as a permanent character; but in the other genera the number of eyes are gradually increased until adult life. Mr. Newport seems to think the number of labial teeth a good specific character, but we have found it to vary considerably.

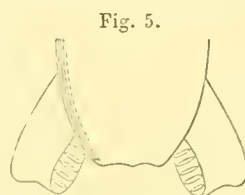


Fig. 5.

Gen. 1. LITHOBIUS, *Leach*.\*

Antennæ multiarticulatae. Caput latum, complanatum. Labium antice denticulatum, medium sulcatum, emarginatum. Coxæ excavationibus magnis, ovatis, serie unico in facie depressa dispositis. (Fig. 5.)

*L. MULTIDENTATUS*, Newp.—*L.* brunneus, segmento cephalico margine postico elevato; antennis elongatis, sparse pilosis, subsegmento impunctato; laminis dentalibus distinctis, margine antice fere recto, angulis externis anticis vix subproductis, denticulis 12—19 armatis; ocellis utrinque 32—37; scutorum anteriorum marginibus et posticis et lateralibus sed scutorum posteriorum lateralibus solum elevatis.

*L. multidentatus*, Newp., Linn. Trans. xix. p. 365; Catal. Brit. Mus. Myriapoda, p. 17.

*L. multidentatus*, P. Gervais, Apteres, iv. p. 236; et Tabl. des Myriap. (Exp. dans L'Amérique du Sud part. sept.) p. 29.

This species is very similar to *Bothropolys nobilis*. Indeed the only specific differences noticeable are that this species attains a rather larger size, and has the anterior margin of the dental lamina straighter, with the anterior external angle scarcely subproduced. The geographical distribution appears to be identical. Our Arkansas specimen differs slightly from the others, having the external anterior angle of the dental lamina slightly subproduced. The Texan individual has but twenty-six pairs of eyes, but is probably the young of the species.

*Specimens belonging to the Smithsonian Institution.*

345	10	South Illinois.	R. Kennicott.	Lin. 10—16
271	3	St. Louis, Missouri.	D. Geo. Engelmann.	" 10—12
282	2	Cook Co., Illinois.	R. Kennicott.	" 11—13
277	1	Ft. Towson, Red River, Ark.	Dr. L. A. Edwards, U. S. A.	" 12
275	1	En route from N. Orleans to Galveston.	E. B. Andrews.	" 9

\* Linn. Trans. xi. p. 381.

*L. AMERICANUS*, Newp.—“*L. ferrugineus*, capite magno subquadrato margine postico elevato; subsegmento antennali sparse profunde punctato, antennis pubescentibus, ocellis nigris utriusque 25—26, labio complanato, polito, margine fere recto: denticulis 10, parvis, nigris, subapproximatis, scutis dorsalibus lævibus, convexis, subquadratis postice rectis; segmento præanali piloso, pedibus validis flavis spinis validis armatis.”

*L. Americanus*, Newp., Linn. Trans. xix. p. 305; Catalogue of British Museum, (Myriapoda,) p. 17.

*L. Americanus*, P. Gervais, Apteres, iv. p. 236; et Tabl. des Myriap. (Exp. Amerique du Sud,) p. 29.

?*L. spinipes*, Say, Journ. A. N. S. 1st series, vol. ii. p. 108; et in Œuvr. Entom. Ed. M. A. Gory, 1, p. 21.

?*L. spinipes*, Lucas, Hist. Nat. Anim. Art. iv. p. 543.

In the Smithsonian individual that we refer to this species, the anterior scuta have the posterior margin raised with the angles rounded; whilst in the posterior scuta the lateral margins are alone thickened, and in the smaller scuta the angles are produced and acute. The sterna and head are punctate. The preanal segment is not hairy. A specimen from Massachusetts, belonging to the Museum of Comparative Zoology, agrees with the former very well, with the exception that the posterior margin of the posterior scuta is more curvilinear, thus differing more from Mr. Newport's description.

*Specimens belonging to the Smithsonian Institution.*

341 | 1 | Between Pike Lake and Ft. Union. | Gov. I. I. Stevens. | Lt. Grocer, U. S. A. | Lin. 11. |

*L. PAUCIDENS*, n. sp.—*L. ferrugineus*, pedibus flavis; segmento-cephalico polito, postice margine elevato; antennis elongatis, pilosis, subsegmento impunctato; lamina dentalibus indistinctis, singula denticulis duobus valde sejunctis armata; ocellorum paribus 17; scutis alternis majoribus politis, vix asperatis, margine postico fere recto; scutis alternis minoribus margine postico recto et angulis externis productis; coxæ excavationibus parvis, vix ovalis; segmento præanali haud piloso.

The color of the only adult specimen that we have seen approaches an orange. The mandibles are rather large. The dental lamina are almost wanting, their margin somewhat rounded and armed each with two acute widely separated teeth. The color of the three or four posterior sterna is darker than that of the rest of the body. The excavations of the posterior coxæ are small, few and nearly round. The feet are yellowish, hairy, and with well developed articular spines.

*Specimens belonging to the Smithsonian Institution.*

300 | 4 | Fort Tejon, Cal. | J. Xantus de Vesey. | | Lin. 6—13. |  
343 | 1 | ?St. Louis, Mo. | ?Dr. Geo. Engelmann. | | “ 12. | Locality probably incorrect.

*L. PLANUS*, Newp.—“*L. ferrugineo-variegatus*, capite magno subquadrato polito postice ad marginem elevato incrassato, antennis brevibus pubescentibus ocellis utrinque 23, labio, polito, pilis raris; lamina dentalibus lunatis angulis externis antice elongatis profunde emarginatis; denticulis 14 acutis, nigris, scutis dorsalibus complanatis rugosis marginis elevatis, pedibus nudis spinis articularibus parvis.”  
Species mihi ignota.

*L. planus*, Newp., Linn. Trans. xix. p. 366; Catalogue of British Museum, (Myriapoda,) p. 18.

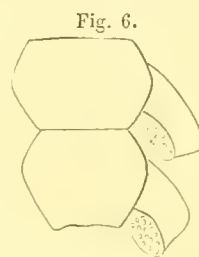
*L. planus*, P. Gervais, Apt. iv. p. 236; et Tabl. des Myriap. (Exp. Amer. du Sud, part. Sept.) p. 29.

## Gen. 2. BOTHROPOLYS,\* (n. g.)

Antennæ multiarticulatae. Caput latum. Ocelli numerosi. Labium antice denticulatum, medio sulcatum, emarginatum. Coxarum excavationes, parvi, fere rotandi punctiformesque, in seriebus 3—4 dispositæ. (Fig. 6.)

B. NOBILIS, n. sp.—B. brunneus, segmento cephalico postice margine elevato; antennis elongatis, sparse pilosis, subsegmento impunctato, articulis basalibus 4 longitudine fere æqualibus; laminis dentalibus distinctis, margine antice subrotundato, angulis anticis externis subproductis, denticulis 12—19; ocellis utrinque 32—37; scutorum anticorum marginibus et posticis et lateralibus elevatis sed scutorum posteriorum lateralibus solum.

The anterior scuta have their posterior margins almost straight and elevated. The labial teeth are generally large and acute, but rarely coadnate. The number of pairs of eyes appears to vary, even in the adult, from 32—37; perhaps 35 is the most common number. The feet are in most individuals of the same color as the body, but they are occasionally yellow. The posterior portions of the sterna are often furnished with stiff hairs. The articular spines are of moderate size. To show the variations in number of the labial teeth, we append the following list of the numbers in one lot from South Illinois:—



6 specimens with 14 teeth each.

3 “ “ 13 “ “

1 specimen “ 19 “ “

1 “ “ 15 “ “

The geographical range of this species is extensive. We have found it around Philadelphia; and it is in the Smithsonian collection, from Illinois and Missouri.

*Specimens belonging to Smithsonian Institution.*

265	12	South Illinois.	R. Kennicott.	Lin. 8—12.
344	1	St. Louis, Mo.	Dr. Engelmann.	“ 7—11.

B. XANTI, n. sp.—B. brunneus, segmento cephalico polito aurantiaco, margine postico elevato; antennis pilosis; ocellis utrinque 18; laminis dentalibus margine antice rotundato, denticulis 16—18, nigris, acutis; scutis valde asperatis, alternis majoribus postice valde emarginatis,—alternis minoribus margine postico fere recto sed angulis posticis acutis et valde productis.

The head is rather large, with a curved suture running transversely from one set of ocelli to the other, having its convexity directed posteriorly. The first scuta approximates the head in color, has its posterior margin strongly raised, and is only slightly roughened. The other large scuta are very rough, with (sometimes indistinct but generally well marked) rugæ, converging towards the median line anteriorly. The last scuta is, however, without rugæ, and but slightly roughened. It is much narrowed anteriorly and posteriorly, and somewhat elongate. Preanal sterna almost circular, with two lateral curved impressions and a central shorter straight one, which

\* βεθρος, fovea; πολυς, multus.

are probably the remains of the sutures between the plates of which it was composed during embryonic life. The articular spines are rather strong. The smallest specimen has only twelve pairs of eyes. It affords us great pleasure to dedicate this species to Mr. Xantus, through whose "exhaustive collections" the rich fauna, of what has been a veritable "terra incognita," is being rapidly developed. Owing to mutilation, it is impossible to say with certainty that our specimen from Oregon belongs to this species; but from the extensive geographical range of the species east of the Rocky Mountains, we should infer that it did.

*Specimens belonging to Smithsonian Institution.*

346	2	Ft. Tejon, Cal.	J. Xantus de Vesey.	Lin. 8—10.	A doubtful spec., owing to mutilation.
280	1	Oregon.	?		

*B. BIPUNCTATUS*, n. sp.—*B. brunneus*, segmento cephalico polito margine postico elevato; labio et sparse profunde et dense minute punctato; ocellis utrinque 18; antennis punctatis, sparse pilosis, laminis dentalibus brevibus, latis, denticulis nigris acutis 18 armatis, margine subrotundato; scutis alternis majoribus capite simillime punctatis, politis, vix asperatis, postice emarginatis, sentis alternis minoribus postice margine recto et angulis haud productis; sternis politis; pedibus punctatis, subrobustis.

The head is of moderate size, with the posterior margin slightly emarginate and not elevated in the centre. The larger scuta are not deeply emarginate, but somewhat roughened, with a suture on each side; the anterior portion of the latter is longitudinal, but the posterior transverse. The transverse suture, running from one set of eyes to the other, is not as well marked as in *Xanti*. Posterior scuta rather deeply emarginate behind. Preanal sterna not as circular as in *Xanti*, but with the same markings.

*Specimen belonging to Smithsonian Institution.*

67 | 1 | West of Rocky Mountains. | Gov. I. I. Stevens. | Dr. Geo. Suckley, U. S. A. | Lin. 10. |

Gen. 3. *HENICOPS*, *Newp.\**

"Caput latum, depressum, oculo magno utinque unico. Labium lamelliforme."

Not as yet found in North America.

Fam. III. *SCOLOPENDRELLIDÆ*, *Newp.†*

"Corpus pedesque breves, appendicibus styloformibus. Segmenta inæqualia; scutis dorsalibus imbricatis. Antennæ elongatæ, articulis ultra 16."

This family is not known to be represented in America, and we have never seen a member of it. The diagnosis above is that of Newport.

Gen. 1. *SCOLOPENDRELLA*, *Gervais.||*

"Antennæ moniliformes, pilosæ. Corpus e segmentis 14. Pedum paria 12. Caput depressum segmento basilari brevissimo."

\* Linn. Trans. xix. p. 372.

† Linn. Trans. xix. p. 275.

‡ Although this family, and various genera described elsewhere, are hardly entitled to a place in this paper, we have thought it best to give their diagnoses, in order that in case representatives of them shall be found in this country, the observer may, without difficulty, recognize to which genus his specimen belongs.

|| Comptes Rendus de l'Acad. des Sciences.

## Fam. IV. SCOLOPENDRIDÆ, Leach.\*

Segmenta podophora 21—23. Oculi paucos vel nulli. Pedes postremi incrassatæ plerumque spinosi.

In this family the principal generic characters are founded upon the number of segments of the body, the shape of the head, the number and form of the spiracles, the absence or presence of eyes, and the form of the terminal segment and its appendages. In some cases the number of joints of the antennæ seems to be a constant generic subcharacter. In the large genus *Scolopendra*—the Titans of the Myriapoda—the principal specific characters are founded upon, first, the number of segments to the antennæ; secondly, the number and arrangement of the labial teeth; thirdly, the peculiarities of the posterior feet; fourthly, the shape and comparative size of the head. We have no doubt that the number of joints to the antennæ is fixed for most species, but it serves more generally to distinguish groups than single species; yet it occasionally is the most reliable character separating closely allied forms. Unfortunately it must be used with great caution in the identification of individuals, for, owing to the ease with which portions of the antennæ are lost, the want of a certain number is a very indefinite negative character. After detaching a few of the distal joints, no trace of their former presence is left. For the same reason much caution is also necessary in assigning the number in a description. M. Saussure has found so much variation in this character that he considers it worthless. It is possible that it may vary in certain species; but the differences generally consist in there being too few joints, which, as we have shown above, is to be looked for, and reproduced antennæ probably have occasionally an abnormally great number of very small ones. The number and arrangement of the labial teeth are a good character, but there is often an agreement between distinct forms, and on examining large suites of individuals, we have found more variance in the same species than our reading would lead us to look for. The posterior legs furnish the best criteria in the distinguishing of species. Most species have peculiarities either in the shape or relative size of the joints, or in the number or arrangement of spines on them. In order to show the amount of constancy that these characters possess, we have drawn up a series of tables, which may aid in establishing their value. The color, we think, is not to be depended upon, although Mr. Newport seems to attach some importance to it. In the preservation of specimens it is very liable to be altered or destroyed; besides this fact, our studies of these animals, both in museums and, to a limited extent, in the Tropics, lead us to the opinion that the color varies exceedingly, even during life. Size is often a good distinguishing character of a species, although scarcely available for the identification of an individual.

If we consider a species as the expression of a preconceived idea, there must be, as it were, a type of every species around which the individuals cluster, restrained from departing beyond a certain limit from the central nucleus. We can see then how

\* Linn. Trans. xi.

there may be species perfectly distinct, but the individuals of which may so approximate that there may be difficulty in placing some of them. Does the mere difficulty or impossibility of placing an individual necessarily invalidate the claims of the species? The moss *Leucobryum glaucum*, Hampe, is acknowledged by all botanists (we believe) as distinct from *L. minus*, Hampe, the most tangible difference being that the former fruits in October, the latter in May. Now we have found fruiting specimens in April, which are undoubtedly referable to *L. glaucum*; but had they been found a month or two later, would any botanist have hesitated in labelling them *L. minus*? Indeed, one of the best American authorities told us, that had we so found our specimen, he would have pronounced it to be *L. minus*.

In the other genera of the Scolopendridæ the specific characters are pretty much the same as in the true Scolopendra. But some characters specific in the latter, elsewhere become generic subcharacters.

#### Subfam. I. SCOLOPENDRINÆ, Newp.\*

Spiracula valvularia in paribus 9.

#### Gen. 1. SCOLOPENDRA, Linn.

Segmentum cephalicum imbricatum. Oculi stemmatosi, utrinque 4. Antennæ attenuatæ. Pedum paria 21.

S. HEROS, Girard.—S. testacea, segmento cephalico subovato, minute punctato; antennis 25 articulatis; dente mandibulari producto, gracile; dentibus labialibus 8—10, duobus intimis utrinque plerumque coadunatis; pedibus plerumque luteolis; paris postremi articulo basali, intus 5—7 spinis, † subtus 7—10 spinis in serie triplici dispositis, processu angulari 3—10 spinis; appendicibus analibus lateralibus elongatis minute profunde punctatis, spinis apicalibus utrinque 5—7-et altero marginali.

*S. heros*, Girard, Marcy's Report of Explorations on the Red River, p. 272, pl. xviii.

Var. *Castaneiceps*, Wood, Proc. A. N. S. 1861, p. 11.

S. viridis, capite antennisque rubro-castaneis; pedibus plerumque luteolis interdum viridibus, paris postremi articulis basalibus saturate viridibus.

Prebasilar fold connate with the basilar segment, the suture generally, however, well marked, existing as a deep groove. Cephalic segment slightly emarginate between the antennæ. Labial teeth from 8—10 in number; there will sometimes be four on one side and five on the other, the external tooth apparently being the missing one. Antennæ 25-jointed. Out of nearly a hundred specimens that we have examined, only two or three had one or two supernumerary joints developed. Scuta polished, generally minutely and sparsely punctate, often obscurely bicarinate, the posterior with their lateral margins elevated. Last pair of legs rather robust, with the basal joint longer than the tibial. Scuto-episcutal sutures apparent, the sterno-episternal very well marked. We have seen a number of specimens from Alabama and Georgia in the cabinet of the Museum of Comparative Zoology.

\* Linn. Trans. vol. xix. p. 377.

† When giving the spines on the inner edge of a leg, we do not (as some do) include those on the terminal angular process, which are afterwards given separately.



Number of specimen.	Labial teeth.	Spines on inner side of basilar joint of last pair of legs.	Spines on under surface of basilar surface of last pair of legs.	Spines on terminal angular process.	Spines on anal appendages.		Number of specimen.	Labial teeth.	Spines on inner side of basilar joint of last pair of legs.	Spines on under surface of basilar surface of last pair of legs.	Spines on terminal angular process.	Spines on anal appendages.		
					Apical.	Marginal.						Apical.	Marginal.	
319	4	6	2 3 3	8	5	1	98	6	0	2 6 3	8	9	1	
	4	6	2 3 3	6	7	1		4	9	3 5 3	6	8	7	1
	4	8	2 3 3	7	6	0		3	7	3 4 3	8	8	7	1
197	4	8	2 3 3	6	6	1	98	3	7	2 4 3	7	8	0	
	5	leg wanting.			6	?		4	8	2 4 3	8	9	1	
	4	4	3 4 2	11	5	1		4	9	3 4 3	7	8	1	
322	4	6	2 3 3	6	6	0	98	4	6	3 4 3	6	10	1	
	4	6	2 2 2	6	5	0		4	7	2 3 3	6	6	1	
	4	6	2 2 2	7	6	1		4	9	3 4 3	3	6	1	
	5	6	2 4 3	7	6	1		4	8	3 4 4	3	5	1	
	5	6	2 4 3	7	6	1		4	7	2 4 4	8	7	1	
	5	6	2 4 3	7	6	1		4	8	2 4 4	6	0	1	
	5	6	3 4 3	6	6	1		4	6	2 4 3	8	8	1	
	5	7	3 4 3	6	5	1		4	7	3 4 3	6	6	1	
	6	6	1 3 3	6	6	1		5	5	3 3 3	5	8	1	
	6	6	2 3 2	6	6	1		4	8	? ? ?	?	?	1	
36	3	6	3 4 3	7	7	1	170	4	8	2 4 3	6	8	1	
	4	6	3 4 3	7	5	0		4	8	2 4 2	8	8	1	
	5	7	2 4 3	6	5	1		4	7	2 3 3	6	8	1	
180	4	6	2 3 3	7	5	1	Type of Castaneiceps.	4	5	2 5 3	6	7	1	
	4	6	3 3 3	7	6	1		4	5	2 5 3	8	7	1	
	4	6	2 4 3	7	7	0		5	5	2 4 3	5	5	0	
	4	6	2 3 3	5	6	2		4	5	2 4 3	5	7	1	
	4	6	2 3 3	4	6	3		5	6	3 3 3	6	6	1	
	4	7	1 2 3	11	8	1		5	6	2 4 3	5	8	1	
	4	7	2 3 2	7	7	1		4	7	3 3 3	6	8	1	
	4	6	2 3 3	6	5	1		4	6	3 3 3	5	5	0	
101	4	6	2 3 3	6	5	1	62	4	6	3 3 3	5	5	1	
	4	a reproduced leg.			5	1		4	6	3 4 3	7	6	2	
*313	4	5	3 2 2	2	4	0	130	4	7	3 3 4	8	6	1	
	4	a reproduced leg.			3	0		4	6	3 3 4	8	6	1	
107	4	††	6	about 30	8	1	290	4	6	4 1 4 2	4	5	1	
	4	5	2	about 25	9	1		4	6	2 4 3	6	6	1	
	4	6	2 3 3	6	8	?		4	6	2 4 3	6	8	1	
	3	6	2 4 3	7	8	1		4	6	2 4 3	9	5	1	
	4	6	2 4 3	8	8	1		4	7	2 4 3	8	5	2	
	4	7	2 4 3	7	8	1		5	7	2 3 1	7	8	1	
	5	8	3 4 3	6	9	1		4	7	2 4 3	0	6	1	
	4	a reproduced leg.			7	1		4	7	2 4 3	0	6	1	
	5	?	? ? ?	?	8	1		94	4	a reproduced leg.				
	4	9	2 3 2	9	8	1			4	6	3 3 3	6	5	1
†	?	? ? ?	?	8	1	4	6		3 3 3	6	5	1		
113	4	6	2 3 3	7	8	1	201	4	12	3 3 3	7	5	0	
	4	6	? ? ?	?	9	1		4	11	4 3 2 2	8	6	1	
	4	7	2 4 3	8	9	1		4	6	2 4 3	6	6	1	
	5	6	3 4 3	4	7	1		4	5	2 2 3	7	7	1	
	4	?	? ? ?	?	7	1		5	6	2 4 3	8	7	1	
	4	4	2 2 1	6	?	?		5	7	2 3 4	4	6	1	

\* This is probably a very young individual of this species.

† The last legs of this specimen are evidently a reproduced pair.

‡ Apparently a reproduced pair of dental lamina, as the teeth are not developed.

|| The spines on this individual are smaller than common. It is a curious variation.

*Specimens belonging to the Smithsonian Institution.*

197	1	Brownsville, Texas, 1853.	Lieut. Couch, U. S. A.		Unc.	5 $\frac{1}{2}$	Labelled by Mr. Girard.
315	8	?	?		"	4—5 $\frac{1}{2}$	Var. <i>Castaneiceps</i> Wood.
317	1	?	?		"	6	Var. <i>Castaneiceps</i> "
36	2	Ringgold Barracks.		R. Schott.	"	4 $\frac{1}{4}$	Var. <i>Castaneiceps</i> "
103	1	Western Texas.	S. Hayes.		"	4 $\frac{3}{4}$	Var. <i>Castaneiceps</i> "
290	3	Northern Texas.			"	4 $\frac{1}{2}$ —4 $\frac{3}{4}$	Var. <i>Castaneiceps</i> "
101	1	Texas.	Dr. Jones.		"	4 $\frac{1}{2}$	Var. <i>Castaneiceps</i> "
180	3	Fort Bliss, New Mexico.	Dr. S. W. Crawford, U. S. A.		"	4 $\frac{1}{2}$ —6	
30	1	West of San Antonio.	R. G.		"	4 $\frac{1}{2}$	
150		New Weid, Texas.	Prof. Ervendberg.		"	5 $\frac{3}{4}$	
98	11				"	2 $\frac{1}{4}$ —5 $\frac{3}{4}$	
107	8	Fort McKavit, Texas,	Capt. Plummer.		"	3 $\frac{1}{4}$ —6 $\frac{1}{4}$	
66	1				"	4	
29	4	Red River, Ark.	Capt. Marcy.		"	3—4 $\frac{1}{2}$	Labelled by Mr. Girard.
318	2	Eagle Pass.	R. G. Schott.		"	3 $\frac{1}{4}$ —4	
319	2	Fort Chadbourne, Texas.	Dr. Swift.		"	4 $\frac{1}{2}$ —5 $\frac{1}{4}$	
201	3	Matamoras, Tamaulipas.	Lieut. Couch, U. S. A.		"	4—4 $\frac{1}{2}$	
142	3	Eagle Pass.	R. G. Schott.		"	3 $\frac{3}{4}$ —4 $\frac{3}{4}$	
233	1	Monterey, New Leon.	Lt. Couch, U. S. A.		"	5 $\frac{3}{4}$	
320	1	Sonora and Chibnahua.	Major W. H. Emory, U. S. A.	A. Schott.	"	4 $\frac{1}{4}$	
322	5	Fort Towson, Red River, Ark.	Dr. L. A. Edwards, U. S. A.		"	4—4 $\frac{3}{4}$	Not well marked Var. <i>Castaneiceps</i> .
324	4	New Orleans to Galveston.	E. B. Andrews.		"	1 $\frac{3}{4}$ —5 $\frac{1}{2}$	Var. <i>Castaneiceps</i> .
170	1	Hermes, Sonora.	Dr. T. H. Webb.		"	7 $\frac{1}{2}$	
42	3	Cbihuahua Trip.	Dr. T. H. Webb.		"	4—4 $\frac{1}{2}$	
38	1	Bet. San Antonio and El Paso.	T. D. Graham.		"	4 $\frac{3}{4}$	
62	1	New Brnnfels, Texas.	Mr. Lindheimer.		"	5 $\frac{1}{4}$	Labelled by Mr. Girard.
94	1	Fort Smith, Ark,	Mr. Shumard.		"	5	Var. <i>Castaneiceps</i> .
124	1	Red River, Ark.	Capt. Marcy.		"	4	Labelled by Mr. Girard.
234	1	Santa Fe.	Mr. Howard.		"	3 $\frac{1}{4}$	
325	5	Fort McKavit.	Dr. W. H. Anderson.		"	4 $\frac{3}{4}$ —5 $\frac{1}{4}$	
150	1	Southeastern Texas.			"	4 $\frac{3}{4}$	Var. <i>Castaneiceps</i> .
327	2	Fort Buchanan, Arizona.	Dr. Irvin.		"	5 $\frac{1}{2}$	
130	1	Near 38° L.	Lt. E. G. Beckwith, U. S. A.		"	3 $\frac{1}{2}$	
328	1	?Texas.			"	5 $\frac{3}{4}$	Var. <i>Castaneiceps</i> .
331	1	Fort Mason, Texas.	Major J. H. Thomas.		"	5	Var. <i>Castaneiceps</i> .
113	1	Calcasien Pass, La.	G. Wurdeman.		"	3 $\frac{1}{2}$ —5	
314	1	Ringgold Barracks.	R. G. Schott.		"	4 $\frac{1}{2}$	
315	1	En route from N. O. to Galveston.	E. B. Andrews.		"	1 $\frac{1}{4}$	

*S. POLYMORPHA*, Wood.—*S. olivaceo brunnea*, capite dilute castaneo; segmento cephalico subovato, postice subtruncato fere impunctato, antennis 30 articulatis; dente mandibulari tuberculo basali magno; dentibus labialibus 8 maximis, duobus intimis utrinque coaduuatis, externis sejunctis; scutis interdum margine posteriore nigro-viride, marginibus lateralibus plerumque liberis; pedibus postremis robustis, supra subcomplanatis; articulo basali, et medio subdepresso, intus 3—7 spinis, subtus 10—18 spinis in serie quadruplici (interdum inordinatim) dispositis, processu angulari aut bifido aut trifido aut quadrifido; appendicibus analibus lateralibus singula 4—8 spinis apicalibus et altera marginali.

*S. polymorpha*, Wood, Proc. A. N. S. 1861, p. 11.

The prebasilar fold is apparent but connate with the rather large basilar segment. The first segment of the body is very small; the scuto-episcutal suture barely traceable, but the sterno-episternal much more distinct. In a few individuals the labial teeth are small and coadnate. The color shades off from that given above to a testaceous chestnut. This species is closely allied to *S. heros*, and perhaps a differential diagnosis would not be amiss. The most important difference is in the number of joints to the antennae. Owing to the ease with which these animals lose portions of these organs, the want of the typical number is not to be relied on in the identification of individuals. Another character which also is often not available for individual identification, but which characterizes this species, is the small size attained to. The

spines of the lower surface, of basal articulations of last pair of legs, are more numerous than in *S. heros*, and arranged in four rows instead of three. The difference in arrangement is, perhaps, more apparent than real; the homologue of the first row of spines existing in some specimens of *S. heros*, but being placed a little higher up, they are thrown with those on the inner side of the limb. The angular process has fewer spines than in *S. heros*. Finally, a glance at the tables will show that, though the species exist on common ground, yet that *heros* is a more tropical and *polymorpha* a more boreal animal.

Table showing the variations in some of the more important specific characters.

Number of specimens.	Labial teeth.	Spines on inner side of basal joint of last pair of legs.	Spines on lower surface of basal joint of last pair of legs.	Spines on inter-nal angular process.	Spines on lateral anal appendages.		Number of specimens.	Labial teeth.	Spines on inner side of basal joint of last pair of legs.	Spines on lower surface of basal joint of last pair of legs.	Spines on inter-nal angular process.	Spines of lateral anal appendages.	
					Apical.	Marginal.						Apical.	Marginal.
Type specs. in Coll. of A. N. S.	4	4	2 2 4 1 4*	3	8	1	338	4	4	2 3 4 3 1	4	6	1
	4	5	2 3 1 4 3	3	7	1		4	3	2 1 3 3 1	3	6	1
	4	5	1 3 3 3	2	6	0		4	3	2 3 4 3	4	5	2
	4	5	2 3 3	2	6	0		4	5	2 3 3 3	3	6	0
	4	6	2 3 5 1 3	3	5	1		4	4	2 3 4 3	3	7	1
	4	5	3 3 4 3	4	8	1		4	5	3 3 4 3	4	7	0
	4	6	2 1 2 4 1	4	6	0		4	5	3 3 4 3	4	6	0
	3	5	2 1 2 3 3	4	3	2		4	5	3 3 5 3	5	6	1
	5	5	2 3 3 2 2	4	8	1		4	5	4 2 5 4	3	7	1
	4	4	2 3 3 2 2	5	7	1		4	5	4 3 5 1 4	5	7	1
	4	5	2 3 4 1 2	5	5	0		4	4	2 2 2 4 2	6	6	1
	4	5	2 3 5 1 3	4	6	2		4	6	4 2 2 4 3	4	6	1
	3	5	3 2 4 3	4	6	0		4	6	2 4 4 4	4	7	1
	2	5	2 3 3 1 3	4	5	1		4	6	? ? ? ?	?	7	1
210	4	5	2 1 3 5 3	3	7	1	339	4	5	3 2 4 4 4	5	6	1
	4	5	2 4 5 3	3	5	1		4	5	3 5 5 3	4	5	1
337†	5	11	2 3 1 3 2	3	0	1	4	6	3 1 5 4 4	4	6	1	
	4	?	? ? ?	?	0	1	4	5	3 4 5 4	4	6	1	
242	4	1	2 2 1	4	7	1	4	6	3 3 5 4	4	7	1	
	4	3	4 3 4 3	3	7	1	4	7	2 3 1 4 3	2	8	1	
135	4	6	2 2 4 3	4	6	1	4	5	3 3 5 4	4	8	1	
	4	5	2 3 5 5	4	4	1	4	10	3 4 3 3	6	7	1	
334	4	6	2 4 2 4 4	4	7	1	4	5	3 2 3 4 3	2	6	1	
	4	5	1 3 5 4 4	4	6	1	4	5	5 3 5 3	2	8	1	
334	4	7	3 2 3 2 1	4	6	1	4	7	3 3 5 5	4	8	0	
	4	5	4 3 4 3	4	5	1	4	4	3 4 4 4	4	7	0	

Specimens belonging to the Smithsonian Institution.

135	2	Aripe Trip.	Dr. T. H. Webb.	Unc. 2 $\frac{3}{4}$ —3 $\frac{1}{4}$
326	5	Sonora.	Dr. Graham.	" 2 $\frac{3}{4}$ —3 $\frac{3}{4}$
210	1	Fort Riley, Kansas.	Mr. Bravat.	" 4—3 $\frac{1}{2}$
334	1	?Texas.		" 3 $\frac{1}{2}$
227	4	Fort Buchanan, Arizona.	Dr. Irvin.	" 1 $\frac{1}{2}$ —3 $\frac{3}{4}$
242	1	Fort Riley, Kansas.	H. Brandt.	" 3 $\frac{1}{2}$
337	1	Fort McKavit, Texas.	Capt. Plummer.	" 3 $\frac{1}{4}$
339	2	Sonora and Chihuahua.	Major W. H. Emory.	" 3
342	2	?	?	" 3 $\frac{1}{2}$ —3 $\frac{3}{4}$
338		Fort Buchanan, Arizona.	Dr. Irvin.	
324	1	Santa Fe	Mr. Howard.	" 4
211	5	?Santa Cruz.	Dr. Webb.	" 2 $\frac{1}{2}$ Locality undoubtedly mistaken.

\* The typical number of rows is four. The variations from this are caused by some of the spines being a fraction of a line from their normal position; they generally may be placed in four crooked rows.

† Are the hind legs with the anal appendages the original ones, or are they reproduced?

*S. VIRIDIS*, Say.—*S. viridi-brunnea*; segmento cephalico late ovato, sparse leviter punctato; pedibus flavis; antennis 23 articulatis, plerumque haud pubescentibus; dentibus labialibus 8, duobus intimis utrinque arete coadunatis, externo acuto, sejuncto; laminis dentalibus elongatis; pedibus prostremis subcylindricis, modice robustis; articulo basali tibiali longiore, supra subconvexo, margine haud elevato, intus 2—5 spinis, subtus 7—12 spinis in serie vel triplici vel quadruplici dispositis, processu angulari 1—2 spinis; appendicibus analibus lateralibus profunde denseque punctatis, interdum elongatis, singula spinis apicalibus 2—5, et interdum altero marginale armata.

*S. viridis*, Say, Proc. A. N. S. 1821, p. 110; Œuvr. Entom. Ed. Lequien t. i. p. 23.

*S. punctiventris*, Newp., Ann. and Mag. Nat. Hist. xiii. p. 100; Linn. Trans. xix. p. 386; Catal. Brit. Mus. Myriap. p. 33.

*S. punctiventris*, P. Gervais, Apteres t. iv. p. 277.

*S. viridis*, P. Gervais, Apteres t. iv. p. 277; et Tabl. des Myriap. (Exp. Amer. du Sud, part. sept.) p. 30.

*S. parva*, Wood, Proc. A. N. S. 1861, p. 10.

The antennæ are generally, but not invariably, without pubescence. The first segment of the body is the smallest, the third the next. The sutures between the true sterna and episterna are well marked, those between scuta and episcuta barely traceable. The cephalic segment is slightly depressed. The dental lamina have their margins rounded in some specimens. The scuta are frequently bordered with very dark green posteriorly. The dorsum in some individuals has a dark central stripe, vanishing posteriorly. This is, without doubt, the species intended to be indicated by Mr. Say, although his description is exceedingly indefinite and scarcely agreeing with the facts. We have, however, seen one specimen with its posterior feet tipped with blue, and another in which the posterior margination was yellowish. Neither have we any doubt in referring Mr. Newport's *S. punctiventris* to this species, although the number and arrangement of the spines on the posterior feet differ somewhat from those given by that author. One specimen (No. 329) approximates to his description. Besides the specimens of the Smithsonian Museum, we have the types of *S. parva* in the collection of the Academy, brought from the mountains of Georgia by Dr. Le Conte.

Table showing variations in specific characters.

Number of specimen.	Labial teeth.	Spines on inner surface of basal joint of posterior pair of legs.	Spines on inferior surface of basal joint of posterior pair of legs.	Spines on terminal angular process.	Spines on lateral anal appendages.		
					Marginal.	Apical.	
116	{	4	5	2 2 2 2	2	3	
		4	6	2 3 2	2	3	
		4	4	2 1 2 2	2	4	1
		4	?	? ? ?	?	5	1
		?	5	2 2 3 2	2	3	0
336	{	4	4	2 1 2 2	2	3	1
		4	5	3 2 4 3	2	3	1
		4	5	3 2 3 3	2	5	1
332	{	4	?	? ? ? ?	?	3	0
		4	5	2 3 3 2	2	3	0
		5*	5	2 2 2 3 2	2	3	1
170	{	7		a reproduced leg.		4	1
		4	5	3 2 2 2	2	3	1
329	{	4		a reproduced leg.		5	1
		4	5	2 2 2	1	3	0
		4	?	? ? ?		2	0

\* The labial teeth in this specimen are very small and much coadunate.

*Specimens belonging to the Smithsonian Institution.*

329	1	Florida.	G. Wurdeman.*	Unc.	2
170	1	Florida.	G. Wurdeman.	"	2 $\frac{1}{4}$
336	1	Garden Key, Tortugas.	Dr. D. D. Whitehouse.	"	2 $\frac{1}{4}$
116	3	Pensacola.	Dr. Hammond, U.S.A.	"	2 $\frac{1}{4}$ —2 $\frac{1}{2}$
332	2	Palatka, East Florida.	F. Glover.	"	2 $\frac{1}{2}$

*S. MORSITANS*, Linn.—*S. flavescens*, scutis plerumque postice viridi marginatis; segmento cephalico postice subtruncato, basali magno; antennis 20 articulatis; laminis dentalibus, margine antico leviter rotundato; dentibus 8—10 brevibus, obtusis; pedibus compressis; pedibus postremis brevibus, robustis, supra complanatis, subtus valde convexis; articulis basali et tibiali marginibus superioribus elevatis et fere rectangulis; articulo basali intus 5 spinis, subtus spinis 7—9 triseriatis alternantibus, processu angulari valde elongato, spinis 3—5; appendicibus analibus lateralibus, dense punctatis, apice breve, spinis 3—4; squama preanali longitudine latiori.

" *Scol. morsitans*, Linn., Syst. Nat. i. p. 1063; Newp. Linn. Trans. xix. p. 378.

*Scol. marginata*, Say, in Journ. Acad. Nat. Sci. Philad. 1821, p. 9; et in Œuvr. Entom. Ed. Gory livr. i. p. 22.

*Scol. Brandtiana*, Gervais, in Ann. Sc. Nat. Jouv. 1837, p. 50; et Apt. iv. p. 280.

*Scol. platypus*, Brandt., Recueil, p. 61; Newp. in Ann. and Mag. Nat. Hist. xiii. p. 98."

*S. otomita*, Saussure, Mem. Soc. Phys. de Genev. 1860, xv. p. 383, f. 42.

"This species closely resembles *S. cingulata* in its general appearance. The spinulæ on the inferior surface of the posterior legs are arranged in three series which alternate with one another, so that, as remarked by Mr. Brandt, who first correctly described this species, they form with each other a succession of triangles. The pre-anal scale is very short, somewhat quadrate, with the posterior margin very slightly rounded. The lateral appendages also are short, with a slightly produced apex bifid."

Notwithstanding the labor devoted by different naturalists to this species, we think it possible that it will be hereafter found that its history as now accepted is incorrect. The geographical range, as given by Mr. Newport, extends over those portions of South, Central and North America which lie in or near the tropics, as well as over the whole of the West Indies and an unknown extent of China. Verily, it must be the cosmopolite of the Scolopendridæ. We have an individual from Japan which we believe to be the var.  $\beta$  of Newport. It very closely resembles the North American specimens, but a suite may show that it is distinct. We have quite a number of Scolopendræ from Georgia and East Florida, but there is not a specimen of *S. morsitans* amongst them. We suspect that *S. marginata* and *S. viridis* of Say are identical species, and that *S. morsitans* is not an inhabitant of the United States. Say's descriptions are absolutely no guides to the species intended. P. Gervais adopts Say's species as good, and gives the following synonymy. (See Apteris, t. iv. p. 276; et Tabl. des Myriap. Americ. (Exp. Amer. Sud, sept. part.) p. 30.)

" *S. marginata*, Say, Journ. Acad. Nat. Sci., t. ii. p. 100, &c.

*S. morsitans*, partem, Newp., Trans. Linn. Soc. London, t. xix. p. 379."

\* Where it is not stated differently, the donor is believed to be the collector.

We have a specimen from Mexico, which perfectly agrees with Saussure's description of his *S. otomita*, and also with our other specimens of *S. morsitans*.

*Specimens belonging to the Smithsonian Institution.*

360	1	?Halifax, N. S.	Dr. J. B. Gilpin.		Unc. 2½	Probably incorrectly labelled.
352	1	La Union.	Capt. Dow.		" 3½	<i>S. otomita</i> , Saussure.
333	1	Minititlan.	?		" 4	

*Var. β.*—*S. luteo-castanea*, gracillis, pedibus flavis compressis; capite læve, impunctato, segmento-cephalico elongato, ovato, subsegmento prebasali nullo, segmento basali magno; labio mandibulisque sparse minute punctatis; scutis (postremo excepto) plerumque postice truncatis et margine postico saturate viridi; antennis 22? articulatis, flavis; laminis dentalibus margine antico rotundato; dentibus 19 parvis, utrinque tribus intimis aretissime coadunatis, externo sejuncto; pedibus postremis magnis, robustis, supra complanatis, subtus valde convexis, articulo basali marginibus superioribus acutis sed haud elevatis, intus 4—5 spinis, subtus 8—9 spinis in serie triplici dispositis, processu angulari elongato 3—4 spinis; articulo tibiali marginibus superioribus subelevatis; appendicibus analibus lateralibus profunde punctatis, brevibus, singula spinis 3—4 apicalibus et altero marginale.

Length of cephalic segment rather great in proportion to its width. Basilar segment large. Lateral margins of most of the scuta straight; only those of the last five or six elevated. Throughout the whole length of the body there is a tendency to the alternation of a larger with a smaller scutum. Preterminal scutum large, with its lateral margins strongly arched, but its posterior straight. Terminal scutum large, marked with a median line; its breadth one-third greater than its length, equalling that of the basal joint of the last pair of legs. Sterno, episternal and scuto episternal sutures well marked. Inferior surface of basal joint of posterior pair of legs with from 8—9 spines in three rows, the external of which (in our specimen) is composed of two spines. Mr. Newport was at a loss to decide whether this was a distinct species, or merely a variety of *S. morsitans*. We are disposed to believe it different but have not seen enough specimens to decide. The principal differences between our specimen and those from this continent are, firstly, the margins of the basal joints are not elevated; secondly, the labial teeth are much smaller.

*Specimens belonging to the Smithsonian Institution.*

250 | 1 | Simoda, Japan. | North Pacific Expl. Exp. | W. Stimpson, M. D. | Unc. 2½ |

*S. INÆQUIDENS*, Gervais.—*S. viridi-brunnea*; segmento-cephalico punctato, parvo, basali magno postice subtruncato; antennis interdum viridibus, pubescentibus, 17 articulatis; labio mandibulisque sparse subprofunde punctatis; laminis dentalibus elongatis; dentibus 6—8, utrinque intimis duobus arete coadunatis, duobus externis sejunctis, acutis; scutis interdum postice saturate viridi aut cæruleo marginatis; pedibus luteolis, gracilibus, longis; postremis robustis, articulo basali supra subconvexo, intus 3—8, subtus 7—10 spinis; processu angulari 2—6 spinis; appendicibus analibus lateralibus dense profundeque punctatis, elongatis, spinis apicalibus 3—5.

*S. inæquidens*, Gerv., Apt. iv. p. 277.

The cephalic segment is small, truncate posteriorly, and has its sides remarkably straight. The basal segment is very large, fully half again as broad as the cephalic.

The antennæ are sometimes green or blue, and in all of our specimens pubescent on their distal portion. Their joints are short and almost globose. The scuto-episcutal sutures are well marked, but not so strongly as the sterno-episternal. The legs are slightly compressed. The basal joint has all of its margins well defined, so that it is scarcely subcylindrical, but rather subparallelopipedal. The spines are arranged in rows on elevated bases, so as to give the appearance of being on an interrupted crest or raised line. The apices of the lateral anal appendages are much prolonged, slightly curved upwards, impunctate and almost diaphanous. This species is separated from its southern representative, by the more rectangular and smaller cephalic segment and the larger basilar, by the more moniliform and fewer jointed antennæ, as well as by the differences in the structure of the lateral teeth and posterior pair of feet. We were at first disposed to consider our specimen as representing a species distinct from *M. Gervais'*, but further examination has convinced us that that naturalist had a specimen with reproduced hind feet; yet we think it worth while to append his description, so that the correctness or incorrectness of our opinion may be more easily shown.\* Besides the Smithsonian specimens, we have an individual from Massachusetts belonging to the collection of the Museum of Comparative Zoology.

Table showing variations in specific characters.

Number of specimen.	Labial teeth.	Spines on inner surface of basal articulation of posterior pair of legs.	Spines on lower surface of basal articulation of posterior pair of legs.	Spines on terminal angular process.	Spines on lateral anal appendages.
267	A reprod. lam.	3	10	2	3
		5	8	2	3
		4	8	1	3
		4	8	2	3
		4	7	2	4
268		4	?	?	5
		4	7	6	4
		4	9	6	4
		4			

## Specimens belonging to the Smithsonian Institution.

267	3	Illinois.	R. Kennicott.	Unc. 2
268	2	"	"	" 2½

\* "*S. INEQUIDENTU* (*S. INÆQUIDENS*).—"Tête subcordiforme un peu élargie; doubles stries dorsales parallèles continues en dessus, assez peu marquées; bord postérieur du dernier segment triangulaire obtus; stries inférieurs faiblement divergentes; plaques des segments subarrondies à leur bord postérieur; plaque préanale quadrilatère étroite à bord postérieur plus étroit que l'antérieur, droit; angles subarrondies; pièces latérales terminées en épine multifide très-finement ponctuées; antennes longues nues; salives dentifères finement ponctuées, à trois dent inégales, l'interne large, à bord libre rectiligne, la moyenne peu distincte, subarrondie, l'externe séparée par un espace plus grand; pieds de derrière assez longs, forts, subarrondis, épineux en dessous et à la face interne; 6 épines environs en dessous; et à peu près 14 au bord interne, la dernière multifide, à sept petites pointes inégales en couronne. Couleur ferrugineuse un peu nuancée de verdâtre; antennes pâles; tête, segment forcipulaire et partie postérieure plus ferrugineuse. Longueur de corps, 0.190; plus grande largeur, 0.022. Antennes, 0.035; pieds de derrière, 0.035."

"Des Etats Unis, à New-York, par M. Milbert, (Museum de Paris, 1824.)"

*S. inæquidens*, Gervais, Tableau des Myriapods Américains, (Exp. dans L'Amérique du Sud, sept. part.) p. 30.

*S. LONGIPES*, n. sp.—*S. castanea*, robusta; capite castaneo, magno, segmento cephalico ovato, sparse minute punctato, segmento basali maximo; antennis 17 articulatis; mandibulorum dente tuberculoque magnis; laminis dentalibus margine antico fere recto; dentibus 6, nigris, magnis, utrinque duobus intimis coadunatis, externo sejuncto, conico; scutis interdum postice viridi marginatis; spiraculis anticis maximis; pedibus luteolis, longis, compressis, paris penultimi articulo basali spinis 5 in processu angulari terminali alterisque 1—2 armato; pari postremo valde elongato, subcylindrico, haud compresso, articulo basali tibiali multo longiore, 30—45 spinis longitudinaliter seriatis armato, processu angulari magno, spinis 6—8; appendicibus analibus lateralibus dense punctatis, elongatis, singula spinis apicalibus 8—12 et interdum alteris marginalibus 1—4.

This species is closely allied to *S. alternans*, Leach, but differs from the characters given by Mr. Newport; first, in the mandibular tubercle (mandibular tooth of Newp.) being very large and having the lesser tubercle near to its base; secondly, in the number of spines on the basal joint of last pair of legs being from 30—45 instead of from 45—60, and finally by the roughness of the lateral anal appendages. Besides, our specimens agree in possessing important characters not mentioned by Mr. Newport, and which it is fair to conclude do not exist in his species.

The head and its appendages are very large and stout. The antennæ are generally lighter in color than the body. The first scuta is much the smallest. The lateral margins of anterior scuta are straighter than those of the posterior, which are elevated. The posterior margin of the terminal scutum is very strongly arcuate. The scuto-episcutal sutures are traceable, but not so well marked as the sterno-episternal. The femur of the nineteenth pair of legs is furnished with two small spines on its distal extremity; that of the twentieth with one or two on its upper surface, and a well marked terminal angular process supporting five small spines. The femur of the last pair is rather depressed than compressed, and armed with 30—45 small spines, irregularly arranged in rows on its upper, inner and lower surfaces. Preanal scale somewhat elongate, narrowed posteriorly. The specimen from "Halifax (?)" is probably incorrectly labelled; possibly it may have been carried there in a cargo of timber.

*Specimens belonging to the Smithsonian Institution.*

330	1	Ft. Jefferson, Garden Key, Tortugas.	Dr. D. D. Whitehouse.	Unc. $4\frac{1}{2}$	
209	2	Florida.	Mr. Wurdeman.	" $3\frac{3}{4}$ —4	
194	2	Halifax, N. S.	Dr. J. B. Gilpin.	" 5	Probably incorrectly labelled as to locality.

*S. BYSSINA*, Wood.—*S. sautrata* viridis aut brunnea, capite dilute castaneo, et labio mandibulisque sparse punctatis; segmento cephalico late ovato, antice leviter emarginato, segmento prebasali nullo; antennis luteolis, 18 articulatis, pubescentibus; dente mandibulari gracile; laminis dentalibus latis; dentibus labialibus 10, parvis, nigris, utrinque tribus intimis coadunatis; pedibus gracilibus, luteolis, modice compressis; pari postremo supra complanato, subtus valde convexo, marginibus superioribus et externo et interno acutis; articulo basali tibiali longiore et intus et subtus bi vel tri spinoso, processu angulari



bifido vel trifido; superficie ventrali brunneo-olivacea; appendicibus analibus lateralibus profunde dense punctatis, modice elongatis, singula spinis apicalibus 2—3, apicibus haud incurvatis.

*S. byssina*, Wood, Proc. Acad. Nat. Sci. 1861, p. 10.

The head is of moderate size. The dental lamina are rather broad, their teeth small, almost tuberculiform. The scuto-episcutal sutures are traceable, but not so distinct as the sterno-episternal. The first scutum is very short, the penultimate very large, with its sides strongly arched. The legs are slightly compressed. Our brown specimen has some of its scuta margined posteriorly with green. We formerly described this species as doubtfully coming from Florida; we now believe it to be a native of California. This species differs from *subspinipes* in the shape of hind pair of legs, which are parallelopipedal, and have the margins much more acute, as well as in the proportionate length of the basal and tibial joints.

*Specimen belonging to the Smithsonian Institution.*

333 | 1 | California. | ? | | Unc. 2½ |

S. COPEIANA, n. sp.—S. luteolo-castanea prasino sparsa; capite sparse minute punctato, segmento cephalico parvo, subrotundo, convexo, basali magno; antennis 25 articulatis; labio rubri-castaneo; laminis dentalibus subelongatis, margine antico fere recto; dentibus 8, nigris, utrinque duobus intimis coadunatis, extimis duobus majoribus, conicis, sejunctis; pedibus luteolis modice compressis; pari postremo robusto, articulo basali tibiali vix longiore, supra complanato, intus 4—6 spinis, infra 9—17 spinis in serie quadruplici (interdum inordinatim) dispositis, processu angulari spinis 2—5; appendicibus analibus lateralibus dense profundeque punctatis, singula spinis apicalibus 3—5, et marginalibus 1—3; superficie ventrali sordide luteola.

The head is somewhat peculiar; it is not so broad as the posterior portion of the body. The cephalic segment is convex, subround, sometimes somewhat truncate posteriorly. Its breadth is just about equal to its length, but owing to the convexity appears less. The basilar segment is much larger than the cephalic, and has the prebasilar fold well marked. The posterior portion of the scuta are often margined with green, and, in some specimens, the anterior part of the body is mottled with this color. In one individual the antennæ are of a pea-green tint, generally they correspond in color with the feet. The preterminal scutum is large, with its lateral margins strongly arched. The terminal scutum is medianly slightly subcarinate. The sterno-episternal sutures are better marked than the scuto-episcutal, which are, however, quite evident. It is noticeable that the terminal scutum has a single median, instead of two lateral sutures. Preanal scale rather large, much narrowed and very slightly emarginate posteriorly. Where the marginal spines of the lateral anal appendages exceed two in number, some of them are generally very small and situated at or near the base of the terminal process. I have named this species in honor of Edward D. Cope, Esq., with whom it has been my good fortune to have been associated since the earliest dawn of our tastes for natural history.

Table showing variations in specific characters.

Number of specimen.	Labial teeth.	Spines on inner side of basal joint of last pair of legs.	Spines on lower surface of basal joint of last pair of legs.	Spines on angular process.	Spines on anal appendages.	
					Apical.	Marginal.
39	4	4	2 2 3 2	2	4	2
	4	5	2 2 2 4	3	4	2
309	4	6	4 4 5 4	5	5	2
	4	6	3 3 4 3	5	3	1
	4	4	2 3 5 3	2	4	1
	4	4	2 3 5 3	2	5	3
	4	6	3 3 1 5 3	4	5	3
	4	5	1 3 2 3 3	4	5	3
	4	6	3 2 3 3	3	6	1
	4	6	2 2 3 4	2	4	2
	4	5	2 3 4 3	3	3	1
	4	5	2 3 3 3	3	4	1
	4	5	1 2 4 3	3	4	1
	4	5	2 2 3 3	3	3	2

39	1	California.	?	?	Unc.	3½
309	3	California.	?	?	"	2—2½
361	4				"	3—4¼

*S. BISPINIPES*, n. sp.—*S. olivacea*, *polita*; capite olivaceo-castaneo, cum mandibulis magnis et labio, minute punctato; segmento cephalico late ovato, antice leviter emarginato, basali magno, prebasali nullo; antennis 19 articulatis, antice pubescentibus; labio leviter convexo sine suturis; laminis dentalibus, latis, brevibus, marginibus anticis rectis, angulis posticis externis productis; denticulis 10, conicis, parvis sed acutibus et distinctis, utrinque intimis tribus arcu coadunatis, duobus externis sejunctis; suturis scuto-episternalibus inconspicuis, sed sterno-episternalibus modice conspicuis; pedibus luteolis, leviter compressis; pari postremo gracile, articulo basali supra complanatis, subtus valde convexo et sine spina, intus bispinoso, margine superiore externo acuto, processu angulari valde elongato, simplice vel bifido; articulo tibiali basali fere æquale, sed subcylindrico et graciliore; appendicibus analibus lateralibus longis, dense minute profunde punctatis, utrinque spinis apicalibus 1—3.

The length of cephalic segment is equal to its breadth. The mandibles are thick. Breadth of the dental lamina much exceeds their length. The teeth are small, but very distinct. The penultimate scutum is large, with its lateral margins strongly arched; the terminal large, with its lateral margins arched, very strongly elevated, and its posterior very arcuate. The preanal scale is not canaliculate, but much narrowed posteriorly, with its margins very nearly straight. The spines on the basal articulation of the last pair of feet are very large; the anterior is situated above the other. This species is closely allied to *S. Newportii*, Lucas, (originally described by Mr. Newport as *S. Gervaisii*). Mr. Newport, in his latin diagnosis, both in the Linnæan Transactions and the Catalogue of the British Museum, says "*dentibus conspicuis*," but in the former work he says, "The most marked character of this species is the *indistinctness* of the labial teeth, which in some specimens are *entirely wanting*!" What does he mean? Our species also is allied to *S. ornata*, Newp. That author states, "pedum paris postremi articulo basali *spinis tribus acutis*," but does not state the form of the head. Afterwards he says, "This is a very beautiful species, very distinct in

every respect of form, size and shape of the head from *S. subspinipes*, but *precisely similar* as regards the shape and *armature* of posterior pair of legs," &c. Now, *S. subspinipes* is furnished with *five spines* on its posterior pair of legs! The specimens before us may belong to *S. ornata*, but their heads do not differ from those of *S. subspinipes*, and we cannot understand what the armature of *S. ornata* really consists of. We have seen two specimens from San Francisco, belonging to the Museum of Comparative Zoology.

Besides the North American Species, the collection of the Smithsonian Institution contains the following:

*S. VIRIDICORNIS*, Newp., Ann. and Mag. N. H., p. 97, sp. 12; et Linn. Trans. xix. p. 397, pl. 3, f. 1, 3, 4, 5, et pl. 40, f. 5, 6; et Catal. Brit. Mus., Myriapoda, p. 45.

*S. Hopei*, Newp., MSS.

*S. viridicornis*, P. Gervais, Apteres, iv. p. 287.

169 | 1 | Paraguay. | Capt. T. J. Page, U. S. N. | | Unc. 6 |

*S. AZTECA*, Saussure, Mem. Societ. Phys. Genev. 1860, xv. p. 382, f. 41.

We think that *S. maya* is probably the young of this species, although we have never seen a specimen of it. We would also call attention to the close relationship (if they are not identical) between *S. azteca* and *S. varia*, Newp.

306 | 2 | La Union. | Capt. Dow. | | Unc. 3 |

*S. MODESTA*, n. sp.—*S. brunnea*; capite modico, læve, segmento-cephalico postice subtruncato, magno, prebasali nullo, basali magno; antennis 21 articulatis; labio impunctato; laminis dentalibus antice angustatis; dentibus labialibus 8—10, utrinque duobus aut tribus intimis leviter coadunatis, uno aut duobus extimis sejunctis; pedibus compressis; pedibus postremis subrobustis, elongatis, supra complanatis, subtus valde convexis; articulo basali, marginibus superioris et externo et interno subacutis sed haud elevatis, intus 4—6 spinis in serie duplici, subtus spinis 8—9 in serie triplici, processu angulari quadridido; articulo tibiali basali fere æquali, marginibus superioribus interdum subelevatis; appendicibus analibus lateralibus brevibus, punctatis, singula spinulis apicalibus 2—3 et interdum marginale altero.

That part of the cephalic segment which is anterior to the eyes is generally of a lighter color than the remainder. The internal labial tooth on each side is sometimes obsolete. The scuto-episeutal and sterno-episternal sutures are well marked. The anterior scuta have the lateral margins straight and not elevated, whilst the posterior five or six have them arched and elevated. Most of the scuta are abruptly truncate posteriorly. The penultimate is very large and broad, and, like the corresponding sterna, has a circular shape, but is truncate anteriorly and posteriorly. The breadth posteriorly of the terminal scuta is nearly twice its length. The preanal scale is subquadrate and very much narrowed. This species is closely allied to *S. varia*, Newp., but differs from Mr. Newport's description, in not having the cephalic segment small, in the labial teeth not being minute, in the color, in the size, and, finally, in the

arrangement of spines on the inner superior margin. If a comparison of specimens were practicable, other differences would doubtless be detected.

249 | 3 | Porto Praya, Cape de Verde Isl. | N. Pacific Expl. Exp. | Wm. Stimpson, M. D. | Unc. 2½ |

?*S. SUBSPINIPES*, Leach —*S. castanea*; scutorum marginibus lateralibus posterioribusque viridibus, pedibus flavis; capite punctato; segmento-cephalico ovato, haud cordato, prebasali nullo, basali magno, lato; antennis 18 articulatis; labio convexo, leviter punctato, medio canaliculato; laminis dentalibus brevibus, latis, margine antico subrotundato; denticulis 10, parvis, indistinctis, valde coadunatis; pedibus postremis gracilibus, subcomplanatis; articulo basali intus subtusque bispinoso, processu angulari elongato, curvato, bispinoso; articulo tibiali basali fere æquali; appendicibus analibus lateralibus modice brevibus, valde punctatis, apice excurvato, lævi, bispinoso; squama preanali subquadrata, media canaliculata, margine posteriore rotundato.

*S. subspinipes*, Leach, Linn. Trans. xi. p. 383; Zool. Misc. iii. p. 41; Enc. Brit. Suppl. p. 440.

*S. subspinipes*, Newp., Linn. Trans. xix. p. 389.

Not *S. subspinipes* of Gervais, Ann. Soc. Entom., 2d series, vol. ii. part 2d, p. 21, nor *S. subspinipes* of Gervais, Apteres, iv. p. 262, which are probably different species, neither, apparently, agreeing with *S. subspinipes* of Gervais, Ann. Sci. Nat. 1837, p. 50, which also is not *S. subspinipes* of Leach, but is *S. Gervaisii*, Newp., Linn. Trans. xix. p. 390, which is *S. Newportii*, Lucas, Alger. p. 343, (note;) Gervais, Apteres, iv. p. 281; Newp. Catal. British Museum, (Myriapoda,) p. 36.

Not *S. subspinipes*, Brandt, Mem. Ins. Myriap. p. 59; Lucas, Hist. Nat. Anim. art. iv. p. 544, sp. 5, which is *S. Newportii*, Lucas.\*

We refer our individual to *S. subspinipes*, Leach with great doubt. On comparing it with the description of Newport, we find it differs in the following particulars:—The head is not at all cordate; the labium is punctate and furnished with ten teeth; the lateral anal appendages have their apices somewhat everted; the preanal scale is not triangular. Our diagnosis is not one of *S. subspinipes* of Leach, but of the individual before us, drawn up to aid some future naturalist in identifying or separating the species. We have never seen an undoubted specimen of *S. subspinipes*, Leach.

286 | 1 | Aspinwall. | Mr. Rivell. | | | Unc. 4 |

?*S. SANDWICHIANA*, Gervais, Apt. iv. p. 276.

Owing to the meagreness of M. Gervais' description, we refer this animal to his species with very many doubts. It seems to us that the practice of describing species in any department of natural history, in two or three lines ought to be reprobated, but especially so, in those branches where the various characters have not as yet received their proper specific interpretation. In this, as in other cases, we have had to depend to a considerable extent on the locality in the identification. It would have been well if succeeding authors had availed themselves more fully of the light thrown on this class of animals by Mr. Newport, whose descriptions much exceed those of any

\* For authority of much of the synonymy given, see note in Explor. Scient. de L'Algerie, p. 343. A slight comparison of M. Gervais' descriptions shows that they differ inter se.

antecedent or subsequent naturalist. If this should prove a new species, we would propose the name *nesuphila*. We subjoin the following description:—

*S. brunnea*, robusta; capite magno, sparse minute punctato, segmento basali maximo; mandibulis magnis, punctatis, singulo dente magno et tubereulo minimo; labio lato, valde convexo, punctato; laminis dentalibus longitudine fere bislterioribus, singula dentibus 5, obtusis, coadunatis armata; antennis antice pubescentibus; pedibus robustis; pedibus postremis gracilibus, supra complanatis, articulo basali tibiali vix longiore, margine interiore superiore spina 1, superficiebus interiore et inferiore singula spinis duobus, processu angulari, elongato, spinis duobus armato; appendicibus analibus lateralibus dense rude punctatis, obtusis, apice decurvato aliquando spina obtusa; squama preanali media leviter canaliculata; sternis punctatis.

As our specimen has been preserved for some years in alcohol, the color may differ materially from that of the living animal. The antennæ both being broken, we are unable to give the number of joints composing them. The scuto-episcutal sutures are distinct, as are also the sterno-episternal. The lateral margins of the scuta are much thickened; the posterior angles of some of the hinder ones rounded. The last pair of feet are very slender when compared with the body. The lateral anal appendages have a corroded appearance and are very dark colored. Their apices are very obtuse and strongly curved downwards, one of them being armed with a small and very blunt spine, which is indeed more of a tubercle than a spine. The preanal scale is somewhat elongate, narrowed, and with its angles rounded posteriorly.

164 | 1 | Oahu or Maui. | U. S. Explor. Exped. | C. P. | Unc. 7 |

*S. COMPRESSIPES*, n. sp.—*S. olivacea*; capite magno, minutissime sparse punctato, segmento cephalico elongato, ovato, prebasali nullo, basali maximo; antennis 20 articulatis; laminis dentalibus latis, margine antice rotundato; dentibus 10, magnis, conicis, acutis, utrinque tribus intimis coadunatis, duobus externis sejunctis; pedibus valde compressis; pari postremo luteolo, robusto, supra complanato, subtus valde convexo, articulis basali tibialique supra marginibus elevatis subacutis; basali margine interno superiore quinque-spinoso, superficie inferiore spinis 8—10 triseriatis alternantibus; processu angulari elongato, spinis 4; articulo tarsali supra complanato, marginibus superioribus subacutis sed haud elevatis; appendicibus analibus lateralibus brevibus, apicibus acutis, singulo spinis 4—6; squama preanali breve.

The scuta have apparently been bordered posteriorly with green and the antennæ light yellow, but long preservation in spirits has rendered the color indefinite. Scuto-episcutal sutures traceable, divergent posteriorly; sterno-episternal very well marked. Terminal scutum large, its posterior margin slightly arched, its breadth nearly twice its length. Preanal scale short, much narrowed posteriorly, and with its posterior angles slightly rounded. This may be *S. Tongana*, Gervais, Apt. iv. 276, but we cannot decide from M. Gervais' description.

161 | 1 | Feejee Islands. | U. S. Expl. Exp. | | Unc. 3 |

*S. REPENS*, n. sp.—*S. brunnea*; capite modico, sparse minute punctato, segmento cephalico ovato, lato; antennis 19? articulatis; dente mandibulari modico; laminis dentalibus longitudine bis lterioribus, et labio sparse punctatis; dentibus labialibus 10, distinctis, utrinque tribus intimis coadunatis, duobus

extimis sejunctis; pedibus compressis; pari postremo subcylindrico, gracili; articulo basali tibiali longiore, supra subcomplanato, intus subtusque bis vel trispinoso, processu angulari elongato, curvato, quadrispinoso, articulis tibiali et tarsali fere æqualibus; appendicibus analibus rude punctatis, apicibus elongatis, acutis, bispinosis; squama preanali elongata, fere subtriangulari, medio canaliculato.

Scuto-episcutal sutures traceable, sterno-episternal well marked. This species differs from the preceding in the head not being so large; the mandibles and their teeth are also smaller, whilst the labial teeth are larger and more distinct. The lateral anal appendages are likewise very different, their apices being prolonged, acute and scarcely curved downward at all. The three spines on the inferior aspect of basal joint of posterior legs are arranged in a single row on its exterior portion. It is barely possible that a suite of specimens would show that we have confounded two species.

179	1	Sandwich Islands.	U. S. Expl. Exp.	Unc. 4
176	3	Oahu, or Kaiu.	" " "	" 3½

*S. DINODON*, Wood, Proc. Acad. Nat. Sc. 1861, p. 12.

185	1	Singapore.	U. S. Expl. Exped.	Unc. 5½
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*S. INSIGNIS*, Gervais, Ann. Soc. Entom. 1844, p. 29; Apteres, iv. p. 298, pl. 43, f. 4; Tabl. des Myriap.

(Exp. Amer. de l'Sud sept. part.) p. 32, pl. v. fig. 1.

*S. insignis*, Newp., Catal. British Mus. Myriap. p. 50.

*S. epileptica*, Wood, Proc. Acad. Nat. Sc. 1861, p. 11.

151	1	?	?	?	?	Unc. 10
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*S. SEPTEMSPINOSA*, Brandt, Recueil p. 60; Newp., Linn. Trans. xix. p. 391; Gervais, Apter. iv. p. 269.

*S. sexspinosa*, Newp. in Ann. and Mag. Nat. Hist. xiii. p. 96; Linn. Trans. xix. p. 392; Gervais, Apteres iv. p. 287.

*S. parvidens*, Wood, Proc. Acad. Nat. Sci. 1861, p. 13.

We think that there is scarcely a doubt that *S. septemspinosa* and *S. sexspinosa* are identical species. To show our reasons as fully and briefly as possible, we throw the principal specific characters of our specimens into a tabular form, followed by a table of the characters of the two species as given by Mr. Newport.

No. of labial teeth.	No. of spines on supero-internal margin.	No. of spines on internal surface.	No. of spines on inferior surface.	Spines on angular process.	Spines on lateral anal appendages.	Remarks.
5	1	1	2	2	3	Type specimens of <i>S. parvidens</i> .
5	1	2	2	2	3	
5	1	1	1	4	2	
5?	0	1	2	4	1	No. 36 Smithsonian collection.
5	1	2	2	4	2	
5	2	2	3	4	2	
6	1	1	2	2	2	No. 248 Smithsonian Collection.
5	2	1	2	3	2	
5	2	2	1 2	2	2	
5	1	1	2	2	3	<i>S. septemspinosa</i> , Brandt, according to Mr. Newport.
5	2	2	2	1	?	
5	2	2	2	1	?	
5	1	2	2	2	?	<i>S. sexspinosa</i> , according to Mr. Newport.
5	1	2	2	2	?	

As to the less important characters given by Mr. Newport in his diagnosis. We find in our specimens almost every shade of variation between the two.

248	2	Simoda, Japan.	N. Pacific Expl. Exp.	Wm. Stimpson, M. D.	Unc. $4\frac{1}{2}$
361	1	Nippon.	" " "	" " "	" $4\frac{1}{2}$

Gen. 2. CORMOCEPHALUS, Newp.\*

Segmenta podophora 21. Segmentum cephalicum breve, abrupte truncatum, haud imbricatum. Spiraculorum valvularium paria 9.

Mr. Gervais does not recognize this genus as distinct. But it seems to us perfectly so. It has not as yet been found in North America, but there are several specimens of the genus from foreign countries, in the collection of the Smithsonian Institution. They are as follows :

C. RUBRICEPS, Newp. Linn. Trans. xix. p. 420, et Catal. of Brit. Museum, Myriapoda, p. 72.

*Scolopendra rubriceps*, Newp., Ann. Mag. Nat. Hist. xiii. p. 99; Dieffenb. New Zealand, ii. p. 270; Gervais, Apteres iv. p. 274.

145 | 9 | New Zealand. | U. S. Expl. Exp. | ? | Unc. 2—4 $\frac{3}{4}$  | In very good condition.

C. VIRIDIS, n. sp.—C. viridis; pedibus antennisque dilute viridibus; capite obscure minute punctato, subsegmento prebasali conspicuo, segmento basali modice magno; antennis pubescentibus; dentibus labialibus 4, latis sed acutis, utrinque intimo obscure bifido; scuto postremo postice valde arenato, marginibus lateralibus valde elevatis; pedibus postremis gracilibus, valde elongatis, articulo basali multispinoso, tibiali subequali; appendicibus analibus lateralibus rude punctatis, elongatis, singula spinulis apicalibus 4—5 minutis et altero marginale armata.

Sterno-episternal and scuto-episcutal sutures well marked. Scuta obscurely bordered posteriorly by a light band. Lateral margins of many of them slightly raised. Feet somewhat compressed.

251 | 1 | Hong Kong. | N. Pacific Expl. Exp. | Wm. Stimpson, M. D. | Unc. 1 $\frac{1}{2}$  |

C. FÆCUNDUS, Newp., Linn. Trans. xix. p. 421, et Catal. Brit. Mus. Myriap. p. 74.

Our specimen differs from the description in the length of the tibia of posterior legs not equalling that of the femur.

*S. fecunda*, Gervais, Apteres, iv. p. 272.

362 | 2 | New Holland. | U. S. Expl. Exp. | ? | Unc. 2 $\frac{1}{2}$  | In bad condition.

C. MONILICORNIS, n. sp.—C. brunneus, capite polito; antennarum articulis brevibus, distalibus fere globosis et leviter pubescentibus; laminis dentalibus modice elongatis, antice leviter angustatis; dentibus 8, tribus intimis utrinque arete coadunatis, externo sejuncto; labio leviter punctato; scutis quadratis, postice abrupte truncatis, posteriorum lateribus elevatis; pedibus compressis; pari postremo robusto, articulo femorali tibiali vix æquali, superficie superiore spinula unica, interiore 3—4, inferiore 5—6 in serie triplici dispositis, processu angulari bifido, articulo tarsali tibiali fere æquali; appendicibus analibus lateralibus rude punctatis, brevibus, obtusis, spina apicali unica.

\* Linn. Trans. xix. p. 419.

The antennæ, owing to the shape of their joints have a peculiar beaded appearance. The sterno-episternal and scuto-episcutal sutures are very distinct. The labium has two indistinct (? sutural) markings, diverging from the anterior median portion. The distal portions of the femora and tibiæ of the last pair of legs are furnished with a well marked median groove on the superior surface.

354 | 1 | Choco, New Grenada. | A. Schott. | | Unc. 1 |

*C. AMBIGUUS?* Newp., Linn. Trans. xix. 423.

Our specimens are in a very bad state of preservation, and there is but a single posterior leg remaining. It has five spines arranged in two rows on the inferior internal as well as external margin; yet we feel confident that a suite of specimens would show that it belongs to *C. ambiguus*, Newp.

?*Scolopendra ambigua*, Brandt.

363 | 2 | Cape of Good Hope. | N. Pacific Explor. Exped. | Wm. Stimpson, M. D. | Unc. 2½ |

There is in the collection of the Smithsonian, besides the above, a *Cormocephalus* brought from Samoa by the United States Exploring Expedition. It belongs most probably to an undescribed species, but as the posterior pair of legs is lost, we will not describe it. There are also three specimens, brought from Nicaragua by the North Pacific Exploring Expedition, similarly mutilated, likewise probably undescribed.

### Gen. 3. RHOMBOCEPHALUS, Newp.\*

"Segmentum cephalicum elongatum, subtriangulare; subbasilare labiumque angustissima."

Not as yet found in this country.

### Gen. 4. CRYPTOPS, Leach.†

Segmenta podophora 21. Antennæ 17 articulatae. Oculi nulli vel inconspicui. Labium edentulum.

Scutum postremum Scolopendræ veræ illo simillimum. Pedum postremorum articulus basalis plerumque ineruis. Appendices anales laterales obtusæ.

"CRYPTOPS HYALINA, pallida, lævis, lineis 2 longitudinalibus saturatioribus, capite antennisque ferrugineis, pedibus postremis brunneis spinulis 5 in articulo tertio tarsalivæ. Long. lin. 7."

"*Crypt. hyalina*, Say, Journ. Acad. Nat. Sci. 1st series, vol. ii.; id. Œuvr. Entom. 1, sp. 23; Gerv. in Ann. Sci. Nat., Janv. 1837, sp. 3; Lucas, Hist. Nat. Anim. Artie. p. 546, sp. 3."

"*Hab.* In Georgiâ et Floridâ."

Species mihi ignota.

"*C. MILBERTII*, Gervais.—Point d'yeux; 22 segments, en comptant la tête d'un brun marron. Tête arrondie, non engagée dans le second segment. Plaques convexes non arrondies à leurs bords postérieurs, bordées. Segments très inégaux entre eux, les 1, 3, 5, 6, 8, 10, 12, 14, 16, 18, sont les moins allongés; le dernier est plus étroit et cylindroïde. En dessous, ces plaques sont un peu bombées et presque égales. Les deux paires de pattes postérieures sont plus allongées que les autres et terminées par une

\* Linn. Trans. xix. p. 425.

† Linn. Trans. xi. p. 384.



petite griffe; mais les cuisses ne sont point renflées ni beaucoup plus grosses que celles des autres pattes, et celles des pattes postérieures n'ont ni épines ni tubercules. Les mâchoires (ou les mandibules des auteurs) sont brunes, comme le menton ou la lèvre qui supporte les crochets des mandibules. Cette lèvre n'est point bifide, mais arrondie à son extrémité; elle n'a point de dents, mais seulement deux enfoncements latéraux. Les mandibules ou palpes ont leurs articles cylindriques et rougeâtres; le dernier article est comme tronqué et terminé par une pointe ou ongle. Les antennes sont allongées et quand on les renverse en arrière, elles atteignent le milieu du cinquième segment; leurs articles courts, renflés, mouliiformes, très-réguliers, presque égaux, sont au nombre de 17.

"Apporte de Jersey dans l'Amérique du Nord par M. Milbert. Cette espèce diffère de l'Hortensis par des pattes beaucoup plus comtes et une tête plus arrondie."

Species mihi ignota.

*C. Milberti*, Gervais, Apt. iv. p. 592.

### Gen. 5. OPISTHEMEGA,\* n. g.

Segmenta podophora 21. Ocelli nulli. Labium plerumque dentatum. Scutum postremum maximum, quadratum, alteris multo majore; pedes postremi crassi, breves. Appendices anales laterales obtusæ. (Figs. 7, 8.)

*O. POSTICA*, n. sp.—*O. aurantiaca*, capite polito punctato; segmento basali depressione triangulari mediana; labio antice elongato, mandibulisque punctatis; laminis dentalibus subelongatis, margine antico fere recto; denticulis 6, distinctis, acutis; antennis haud pubescentibus, 17 articulatis; scutis sternisque politis; scuto postremo subprofunde punctato, postice abrupte truncato, medio canaliculato, lateribus rotundatis, marginibus lateralibus valde elevatis; pedibus postremis brevissimis, subprofunde punctatis, subcylindricis; articulis basali tibialique sine spinis, supra subcomplanatis, intus complanatis, margine interiore superiore acuto, alteris rotundatis; appendicibus analibus lateralibus angustis, dense profunde punctatis, postice abrupte truncatis, sine spinis; squama preanali elongata, media vix canaliculata.

From the triangular depression on the basilar segment two sutures diverge posteriorly. The scuto-episcutal sutures are very distinct, the sterno-episternal wanting. The sterna are, however, provided with a mesian marking, the line of coalescence of the two primitive sterna. The last pair of feet are rather shorter than in the following species, more cylindrical and smoother, especially on their inner surface. The basal joint is rather shorter than the tibial, which is about twice as long as the tarsal. Can this be the same species as *Cryptops postica*, Say? It agrees with Mr. Newport's description of his *Theatops postica*, (*C. postica*, Say,) except as to the eyes and teeth. Is it possible that Mr. Newport is mistaken as to the possession of eyes? Say certainly did not see them.

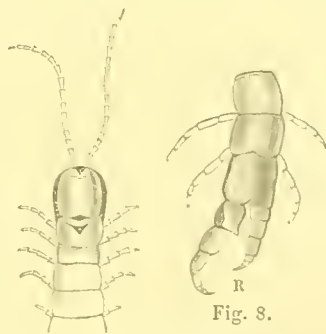


Fig. 7.

R.—A reproduced leg.

*Specimen belonging to Smithsonian Institution.*

287 | 1 | Goldsboro, N. C. | Wm. Stimpson, M. D. | | Unc. 1 $\frac{3}{4}$  |

\* Οπισθημεγα, postice, μυγα.

O. SPINICAUDA, n. sp. (figs. 7, 8).—O. aurantiaca, capite pelito, punctato; segmento basali depressione magna triangulari mediana; antennis ? 16 articulatis, antice pubescentibus; laminis dentalibus, labio mandibulisque subprofunde punctatis, margine anteo rotundato; denticulis labialibus 4, parvis, arcte coadunatis, indistinctissimis; labio medio antice subearinato; scuto postremo maximo, subprofunde punctato, alteris fere bis majore, lateribus rotundatis, marginibus lateralibus valde elevatis, pedibus postremis robustis, supra complanatis, intus complanatis et rude punctatis, articulo basali tibiali fere æquali; femora, tibia, tarsisque margine interiore superiore acuto et serrulato, femora tibiaque margine interiore inferiore quoque acuto et serrulato; processu angulari parvo, spina unica robusta acuta; appendicibus analibus lateralibus angustis, postice truncatis, dense profunde punctatis, singula spina unica apicali minutissima; squama preanali elongata, subprofunde punctata, media leviter canaliculata.

The color varies greatly in depth of shade, but the two ends are almost always darker than the intermediate portion of the body; the feet, with the exception of last pair, are generally lighter. The cephalic segment is slightly emarginate in front. The suture between the true basilar segment and the prebasilar fold is very deep, formed by two lines rapidly divergent from the centre, and at the central portion there is quite a large triangular depression. In some the scuto-episcutal sutures are well marked. The posterior border of the scuta is straight. The terminal scutum is nearly twice as large as any of the others, deeply punctate, and without a sulcus or any traces of the sutures. The last pair of legs are dark in color, short and very robust; their basilar joint, besides the terminal spine, is often furnished with one or two small ones on either the inferior or superior internal margin. They present the peculiar crossing of the nails found in the other species. The other legs are somewhat compressed.

*Specimens belonging to Smithsonian Institution.*

264	10	South Illinois.	R. Kennicott.	Unc. 1—2 $\frac{1}{4}$
347	1	Cook Co., Ill.	R. Kennicott.	" 2

Gen. 6. THEATOPS, Newp.\*

“Ocelli distincti. Antennæ breves, subulatæ, 17—articulatæ. Segmentum cephalicum truncatum subimbricatum; margine labiali denticulato. Pedum postremorum articulo magno, obconico, abbreviato. Pedum paria 21. Appendices anales laterales obtusæ.”

T. POSTICA, Newp.—“T. aurantiaca, ocellis inconspicuis lateralibus, dentibus 8 minutis, segmento postremo maximo elongato quadrato lateribus rotundato medio profunde sulcato margine posteriore transverso, pedibus postremis brevibus crassis rotundatis attenuatis; articulo basali brevissimo. Long. unc. 8–10.”

*Crypt. postica*, Say, Journ. A. N. S. Philad. ii. p. 112; Œuvr. Entom. i. p. 24; Gervais, Ann. Sci. Nat. Janv. 1837, p. 51, sp. 5; Apt. iv. p. 294; Lucas, Hist. Nat. Anim. Art. p. 547, sp. 5; Newp. Ann. Mag. Nat. Hist. xiii. p. 110.”

*Theatops postica*, Newp., Linn. Trans. xix. p. 410; Catal. British Mus. (Myriap.) p. 61.

“Hab.—In Georgia, Floridaque Orientali.”

\* Linn. Trans. xix. p. 410.

“The mandibles are short, thick, and have a distinct basal tooth; the dental plates are elongated and widely separated; the teeth S, minute but distinct. The basal joint of the posterior pair of legs much shorter than the second, which is twice as long as the succeeding joints. The lateral anal appendages deeply punctured. Preanal scale flat, with a median longitudinal sulcus and scattered punctures, with the margin straight.”

We have never seen a specimen of this species.

Gen. 7. SCOLOPENDROPSIS, Brandt.\*

“Des yeux au nombre de 4 pairés; 23 paires de pieds; stigmates peut-etre cribriformes?”

Not yet found in N. America.

Gen. 8. SCOLOPOCRYPTOPS, Newp.†

Ocelli nulli, segmenta podophora 23, postremum angustum; segmentum cephalicum imbricatum. Labium edentulum. Antennæ 17 articulatae.

S. SEXSPINOSA, Newp.—S. saturate aurantiaca; pedibus flavis, subcompressis; antennis flavis, interdum aurantiacis, pubescentibus; capite labio mandibulis scutis sternisque punctatis; segmento cephalico subovato; labii margine antico fere recto; scuto postremo angusto, longo; pedibus postremis elongatis, haud pilosis, articulo basali tibiali longiore, spina unica magna in superficie inferiore et altera minore mediana in margine superiore interno et rare altera articulari minutissima; appendicibus analibus lateralibus valde elongatis, profunde dense punctatis, singula spina apicali unica, alteraque minutissima in angulo superiore posteriore; squama preanali postice vix emarginata.

*Cryptops sexspinus*, Say, Journ. Acad. Nat. Sci. ii. p. 112, 1821, id (Lequien ed.) Œuvres Entom. i. p. 24; Gervais, Ann. Sc. Nat. Janv. 1837, p. 51; Lucas, Hist. Nat. Anim. Art. p. 547; Newp., in Ann. and Mag. Nat. Hist. xiii. p. 100.

*Scolopocryp. sexspinosa*, Newp., Linn. Trans. xix. p. 407; Gervais., Apt. iv. p. 297, et Tabl. Myriap. Amer. (Exp. Ameriq. du Sud, part. sept.) p. 36.

In this species the superior spine of the lateral anal appendages is very minute and occasionally present only on one side. The color varies from milk-white to a dark reddish orange. The lighter shades are found in those individuals which have recently shed their skins. The color given in our diagnosis may be considered as that which characterizes the species, being the one at which it finally arrives. The inferior surface of the posterior legs is marked with an elongate whitish blotch. The preanal scale is rather short and much narrowed posteriorly. We have examined a number of specimens, and have found the articular spine but in a few. We recently observed an individual just completing the operation of shedding his skin. This was crowded back so as to cover only the last two or three segments, giving the animal a very peculiar appearance. He soon, however, drew himself out of the old garment with

\* Recueil, p. 177, 1840.

† Linn. Trans. xix. pp. 275. 405.

many contortions. On examining it, we found that it contained the derm of the head and all its appendages, even to the maxillæ and maxillary palpi. The anterior portion of the skin was so torn as to show that the process of shedding probably commenced by the creature's withdrawing its head from its case, and then thrusting it out between some of the anterior sterna, completing the process by pushing the skin back with its legs aiding them by a peculiar wriggling motion. The exuvia has most of the posterior segments entire, showing that the occupant has been withdrawn from it like a hand from a glove. The animal is of a milk-white color, with the antennæ pubescent, and the lateral anal appendages not elongate and without spines. The lower spine on basal joint of last pair of legs is very small, and the upper one scarcely perceptible. We once had the pleasure of observing a female guarding the young. Being on her side, with her body coiled around them, she, by a rapid, cilia-like action of her feet, would pass them along and arrange them to suit her. This species is one of the most common chilopods around Philadelphia. The southern specimens are much larger, stouter and more highly colored than those from colder regions.

*Specimens belonging to the Smithsonian Institution.*

273	4	Salem, N. C.	J. T. Linneback.	Unc. $1\frac{1}{2}$ —2
281	5	Cook Co., Illinois.	R. Kennicott.	" $1\frac{1}{4}$ — $1\frac{3}{4}$
263	27	South Illinois.	R. Kennicott.	" $1\frac{1}{4}$ —2
81	6	Mississippi.	Mr. Wailes.	
21	3	Carlisle, Pa.	Prof. Baird.	
284	3	Charleston.	?	
32	1	St. Louis.	Dr. Engelmann.	" $1\frac{1}{2}$
274	1	En route from N. Orleans to Galveston.	E. B. Andrews.	

*S. GRACILIS*, n. sp.—*S. ferruginea*; capite labioque leviter punctato, segmento-cephalico subovato; antennis pubescentibus; labii margine antico modice angusto, lateribus obliquis apice emarginato et angulis acutis; pedibus flavis subcompressis; scutis sternisque vix punctatis; pedibus postremis gracilibus, elongatis, singula spinis duobus *S. sexspinosa* illis simillimis, articulo basali tibiali longiore, articulis tribus ultimis pubescentibus; appendicibus analibus lateralibus elongatis, rude punctatis, singula spina apicali unica (interdum bifida) alteraque minutissima in angulo superiore posteriore; squama preanali elongata, punctata, postice late emarginata.

Color in all of our specimens lighter and more ferruginous than the typical color of *S. sexspinosa*, but further investigations may show that that of this form also darkens with age. Prebasilar fold generally well marked. Scuto-episcutal sutures distinct; sterno-episternal absent, but a suture marking the line of coalescence of the primitive sterna is often very apparent. This species is closely allied to the preceding as well as to the following. It differs from both in the shape of the anterior margin of the labium, in the scarcity of punctations on the body, and in the pubescence of distal portion of the last pair of feet. The superior spine of the lateral anal appendages is perhaps a little larger than in *S. sexspinosa*, but certainly smaller than in *S. spinicauda*. The white blotches beneath the posterior feet are common to all the North American species.

*Specimens belonging to the Smithsonian Institution.*301 | 18 | Fort Tejon, California. | J. Xantus de Vesey. | | Unc.  $\frac{3}{4}$ —2 |

S. SPINICAUDA, n. sp.—S. aurantiaca, polita; capite labio mandibulis sternisque profunde punctatis; segmento-cephalico subovato; antennis pubescentibus; labii margine antico lato, fere recto, medio vix emarginato; scutis modice rugosis, punctatis, marginibus lateralibus elevatis; pedibus postremis elongatis, gracilibus, spinis duobus S. sexspinosæ illis simillimis, articulo basali tibiali longiore; appendicibus analibus lateralibus valde elongatis, rude punctatis, singula spina apicali unica alteraque in angulo posteriore superiore; squama preanali modice brevis, postice rotundata, vix emarginata.

The head is deeply punctate. The scuta somewhat rugous with the scuto-episcutal sutures traceable. The sterna are without any traces of sutures. The whole body is more or less deeply punctate. The superior posterior angle of the lateral anal appendages is slightly prolonged and armed with a rather small black spine, which is, however, considerably larger than in any other species known to us. The posterior legs are exactly like those of *S. sexspinosæ*, Newp.

*Specimens belonging to Smithsonian Institution.*

283	2	Shoal Water Bay, W. T.	Gov. I. I. Stevens.	Dr. J. Cooper.	Unc. $1\frac{1}{2}$ —2
153	6	Oregon.	?	?	" $1\frac{1}{2}$ — $1\frac{3}{4}$
189	1	N. Western U. S.	A. Campbell.	Dr. Kennerly.	" 2

S. LANATIPES, n. sp.—S. aurantiaca, pedibus compressis, flavis; capite mandibulis labio sternisque minute punctatis; segmento cephalico subovato; labio medio emarginato fere sicut in *S. gracile*, margine antico rotundato; pedibus postremis modice robustis, singula spinis duobus S. sexspinosæ illis simillimis, articulo tibiali basali fere æquali, tibia tarso metatarsoque pubescentibus; appendicibus analibus lateralibus brevibus, rude punctatis, singula spina apicali alteraque minutissima in angulo superiore posteriore; squama preanali modice lata, subtus convexa, margine postico interdum late emarginato.

This species is closely allied to *S. gracilis*, and it is possible that further specimens may show that the characters on which we rely in separating them vary. The differences are as follows: The labium closely resembles that of the first described species, but has the character perhaps not so well marked. The posterior pair of legs are more robust, with the tibia about equal to the femur in length, and pubescent. The lateral anal appendages are shorter and separated inferiorly by a much narrower space. The preanal scale is rather broader and more bent over the lateral anal appendages; and, finally, judging from our specimens, this species seems to attain to a larger size.

*Specimen belonging to the Smithsonian Institution.*308 | 5 | California. | ? | ? | Unc.  $1\frac{1}{2}$ — $2\frac{1}{4}$  |

Besides the above described species, there is in the collection the following foreign specimen:

S. QUADRATICEPS, n. sp.—S. brunnea, venuste polita; capite saturate rubro, profunde punctato; segmento cephalico quadrato, antice haud angustato, medio emarginato, angulis rotundatis; antennis antice pubescentibus; labio profunde punctato, margine antico lato, medio leviter emarginato; mandibulis profunde

punctatis, singula tuberculo magno; scutis rare punctatis, posterioribus marginibus lateralibus elevatis; pedibus postremis valde elongatis, gracillimis, asperis, singulo spinis duobus S. sexspinosæ illis similibus sed multo elongatioribus, articulo tibiali basali fere æquali; appendicibus analibus lateralibus valde elongatis, rude punctatis, singula spina apicali unica longa alteraque minutissima in angulo superiore posteriore; squama preanali antice et postice angustata, postice truncata sed haud emarginata.

The color of the body approximates to a dark bronze. Both the dorsum and the belly are very highly polished. The scuto-episcutal sutures apparent, the sterno-episternal absent. The posterior pair of legs are more than half an inch in length, very slender and have their distal portion tinged with green. The sterna are impunctate.

355 | 1 | Choco, N. Grenada. | A. Schott. | | Unc. 2½ |

Gen. 9. NEWPORTIA, Gervais.\*

“Pedes posteriores longissimi articulis 14, characteres cæteri ut in genere præcedente.”

Not yet found in N. America.

Subfamilia II. HETEROSTOMINÆ, Newp.†

Spiracula magna, circularia, haud valvularia, in paribus 10.

Gen. 10. RHYSIDA.‡

“Antennæ pedesque elongati. Dentes triangulares acuti, mandibularis maximus. Spiracula circularia, membranâ branchiformi corrugata intus vestita. Pedes postremes graciles, spinis minutis, articulari plerumque obsoletâ.”

*Branchiostoma*, Newp., Linn. Trans. xix. p. 411.

As the name given by Mr. Newport is preoccupied, having been used by Costa for a genus of fishes, we would suggest the one above. This genus has not as yet been found in N. America.

Gen. 11. HETEROSTOMA, Newp.§

“Antennæ elongatæ, 20 articulatæ. Segmentum cephalicum parvum, antice rotundatum; basilare latum, margine anteriore transverso. Dentes maximi, lanceolati, acuti. Spiracula magna cribriformia, in paribus 10. Pedes postremi spinis validis armati.”

Not as yet found in N. America.

Gen. 12. EUCORYBAS, Gerstäcker.

“Antennæ 19 articulatæ. Caput primo thoracis annulo receptum. Pedum paria 21, posterioribus longioribus; pedes ultimi paris articulo primo sub-cylindrico haud dentato, altero intus excavato, cæteris in laminas foliaceas perversis.”§

Not yet found in N. America.

\* Apt. iv. p. 298. † Linn. Trans. vol. xix. p. 410.

‡ *puos*, corrugatis. In allusion to the structure of the mouth.

§ Linn. Trans. vol. xix. p. 413. ¶ Gerstäcker, Stettin Entom. Zeit. 1854, p. 310.

## Fam. V. GEOPHILIDÆ, Leach.\*

Segmenta numerosa, singula subsegmentis duobus completis sed inæqualibus efformata, et pedum par unicum gerentia. Oculi nulli. Antennæ 14 articulatae. Pedes anales breves, styliformes.

The family character of this group, which first attracts attention, is the large number of segments, each of which is composed of two unequal subsegments. The boundaries of the respective scuta of each pair of the latter are well marked by sutures, &c., but the sterna are completely consolidated. The head varies in form, size, &c., and furnishes the principal generic characters. The number of joints of the antennæ is fixed for the family, but nevertheless good specific, and even generic, characters are derivable from these organs. The most important specific characters besides those before alluded to are founded upon, firstly, the peculiarities as to size, shape, proportion, &c., of the component portions of the head and its appendages; secondly, the color and form of the body and the number of segments composing it; thirdly, the structure of legs, especially of the last pair; and, finally, the markings and sutures of the scuta and sterna. We have never had an opportunity of examining large suites of specimens, so as to determine as to the constancy of the various characters enumerated, but they probably do not vary a great deal.

## Gen. 1. MECISTOCEPHALUS, Newp.†

Segmentum cephalicum elongatum, angustum, latitudine plus duplo longius. Antennæ approximatae, articulis obconicis. Subsegmentum prebasale sejunctum sed basale subbasaleque coalita. Mandibulæ magnæ, intus denticulatae. (Fig. 9.)

M. FULVUS, n. sp.—M. fulvus, politus; capite dilute aurantiaco, punctato, pilis longis rigidis paucis; segmento cephalico antice truncato, postice illico angustato et vix truncato; antennis longis, pilis longis rigidis multis; labio profunde punctato, antice emarginato, medio sulco impresso; mandibulis distincte punctatis, pilis rigidis paucis, quadridentatis; segmento anali piloso; pedibus pilis longis, paribus 57.

?*Geophilus attenuatus*, Say, Journ. Acad. Nat. Sci. 1st series, vol. ii.

Cephalic segment scarcely narrowed at all, except at the posterior end, where it is rapidly contracted, being indeed rounded off. Body slender and polished. Scuto-episcutal and sterno-episternal sutures very distinct, as well as those between the primitive sterna. We have found this species around Philadelphia, although not very abundantly. They appear to affect the inner bark or liber of decaying logs, especially that of the locust. (*Robinia pseudacacia*, L.) We have, however, occasionally observed them under stones. It may possibly be *Geophilus attenuatus*, but that species can never be determined from Say's description.



Fig. 9.

M. MELANOTUS, n. sp.—M. parvus, gracillis, dilute aurantiacus; lincis duobus dorsalibus, latis, nigris, c capite ad segmentum penultimum ductis; capite dense minutissime punctato, sparse breve pilosis;

\* Linn. Trans. xi.

† Proc. Zool. Soc., Dec., 1842, p. 179.

antennis sparse pilosis; labio dense minutissime punctato, medio valde canaliculato, utrinque maculis tribus nigris; mandibulis intus vix denticulatis; lateribus nigro maculatis; scuto postremo dilute aurantiaco; suturis scuto-episcutalibus indistinctis; pedibus compressis, utrinque fere 50, pari postremo gracille; sternis suturis sterno-episternalibus et sulco mediano impressis.

The two black bands are somewhat irregular and so broad that it would, perhaps, be correct to describe the dorsum as black, with a single median and two longitudinal light stripes. The labium has, in our specimen, three black dots on each side, but we suspect that these are not constant. The mandibles have, on their inner edge, the rudiments of a denticle. We have had great difficulty in determining the number of feet in our specimen, but think that fifty pairs are very near the mark.

There is in the Museum of the Academy a single specimen, collected in Georgia by Dr. John Le Conte. The length is about an inch.

*M. LIMATUS*, n. sp., (fig. 9).—*M. ? aurantiaeus*, venuste politus; capite appendicibusque saturate rubris, segmento cephalico ordinatim punctato, a fronte ordinatim angustato, segmento basali labioque lævibus; antennis sparse longe pilosis; labio valde emarginato, medio leviter canaliculato; mandibulis magnis, pilis longissimis, singula denticulationibus magnis, obtusis, 4; pedibus flavis?, pilosis, utrinque 43—44, postremis valde elongatis; scuto postremo elongato.

The alcohol, in which our specimens were preserved, having evaporated, they are in such a condition that we can only guess at the original color of the body and feet. The scuto-episcutal sutures are very distinct, as well as the subsegmental sutures of each fully-formed segment. The sterna are furnished with a median sulcus deeply marked on the posterior, but obsolescent on the anterior portion of most of them.

*Specimens belonging to the Smithsonian Institution.*

310 | 3 | California. | ? | ? | Unc. 2 $\frac{1}{4}$  |

Of foreign species there are in the collection of the Smithsonian the following specimens:

*M. RUBRICEPS*, n. sp.—*M. flavus*, aut dilute aurantiacus; capite rubro, magno; segmento cephalico postice illico angustato, haud rotundato, basaliq̄ue et labio mandibulisq̄ue punctatis; antennis proximis valde pilosis, ultimis pubescentibus; mandibulis crassis, pilis paucis, singula denticulis magnis obtusis 5; corpore supra subtusq̄ue linea media obscura; pedibus pilosis, utrinque 48, paribus postremis valde elongatis, gracillibus.

Color of the antennæ between that of the head and body, being a shade of orange. Cephalic segment with the posterior third rapidly narrowed and subtruncate. Labium scarcely emarginate in front, and with the median sulcus scarcely apparent. Dorsum, as well as the belly, with a central dark stripe, that on the lower surface much narrower but more distinct than the other. Scuto-episcutal sutures not very distinct. This species resembles *M. punctifrons*, but besides the difference in the teeth the head does not agree with Mr. Newport's figure, nor does he make any mention of the



stripes; which so accurate an observer could scarcely fail to have noticed if they had existed. As we have never seen a specimen of *M. punctifrons*, it is out of our power to make a minute comparative diagnosis.

259 | 2 | Bonin Islands. | N. Pacific Expl. Exp. | Wm. Stimpson, M. D. | Unc. 2½ |

*M. PILOSUS*, n. sp.—*M. flavus*, capite rubro; segmento cephalico antice emarginato, profunde punctato, a fronte ordinatim angustato; capite mandibulis pedibus scutisque pilosis; mandibulis distincte tridentatis; pedum paribus proxime 38.

The coloration of this species is almost identical with *M. rubriceps*. The punctations on the cephalic segment resemble those on *M. punctifrons*. The cephalic segment narrows more gradually from the front, with its anterior angles more rounded and the emargination deeper than in *M. rubriceps*. The number of feet given above is unfortunately only approximate, as the alcohol having dried off the specimen, it is in a condition hardly fit to describe from.

262 | 1 | Hong Kong. | N. Pacific. Expl. Exp. | Wm. Stimpson, M. D. | Unc. 1¼ |

*M. TAHITIENSIS*, n. sp.—*M. aurantiacus*, capite saturate rubido-brunneo; segmento cephalico, sparse profunde punctato, a fronte sed postice illicius angustato, antice posticeque truncato; mandibulis pilosis indistincte quadridenticulatis; labio leviter punctato, vix emarginato, haud canaliculato; antennis proximis pilosis, ultimis pubescentibus; pedibus elongatis, utrinque 47, pilosis, et superficie ventrali dilute aurantiacis; suturis sterno-episternalibus scuto-episcutalibusque indistinctis; sternis sulco medio leviter impressis; pedum pari postremo elongato, gracilli.

361 | 1 | Tahiti. | N. Pacific Expl. Exp. | Wm. Stimpson, M. D. | Unc. 1½. |

*M. SPISSUS*, n. sp.—*M. dilute aurantiacus*, robustus; capite saturate aurantiaco, punctato; segmento cephalico magno, copiose profunde punctato, a fronte sed postice illicius angustato; mandibulis punctatis, maximis, crassis, intus pilosis, singula denticulationibus 4 magnis obtusis; labio copiose profunde punctato, sparse piloso, antice valde anguste emarginato, bidentato, medio valde canaliculato; antennis brevibus subacuminatis, sparsissime pilosis; scutis irregulariter rugosis; suturis scuto-episcutalibus indistinctis; sternis mediis canaliculatis; pedibus gracillibus subcompressis, breve pilosis, utrinque 44.

348 | 1 | Oahu or Kaiu. | Commodore Perry. | | Unc. |

## Gen. 2. GEOPHILUS, Leach.\*

*Geophilus longicornes*, Gervais, Apt. iv. p. 313.

*Necrophleophaqus*, Newp., Proc. Zool. Soc. 1842, p. 180.

*Arthronomalus*, Newp., Linn. Trans. xix. p. 430; et Catal. Brit. Mus. Myriap. p. 83; haud *Geophilus* Newport et imitatores.

Segmentum cephalicum subquadratum. Segmentum prebasale haud sejunctum, sed basali absolute coalitum. Segmenti basalis margo posticus antico multo latior. Segmentum subbasale sejunctum. Mandibulæ modicæ, interdum denticulatæ. Antennæ capite multo longiores, subapproximatæ articulis inæqualibus. Labium plerumque emarginatum. (Fig. 10.)



Fig. 10.

\* Linn. Traus. xi. p. 384.

Since *Geophilus carpophagus* is the type of the original genus as instituted by Dr. Leach, the name *Geophilus* must be used for this section, to which *G. carpophagus* belongs, and not for that to which Mr. Newport applies it. Mr. Gervais does not adopt any of these genera, much to our surprise, for they appear to us as clearly and even beautifully defined as almost any that we have ever seen in any department of nature.

G. CEPHALICUS, n. sp.—G. antice obscure aurantiacus, postice saturate olivaceus; capite magno, latissimo, saturate aurantiaco; segmento cephalico antice haud emarginato, sparse inordinate punctato, marginibus lateralibus arcuatis; antennis modice longis, valde pilosis; labio sparse inordinate punctato, medio canaliculato, antice emarginato; pedibus longis, flavescens, pilosis, utrinque 48; suturis scuto-episcutalibus conspicuis; superficie ventrali, antice aurantiaca, postice saturate olivacea; sternis suturis sterno-episternalibus et depressione mediana impressis.

The body is very wide, as is also the head; the prebasilar segment of the latter is very strongly widened posteriorly. The mandibles have on the inner side one or two excessively minute denticulations. The anterior portion of the body is a dilute orange, but a short distance from the head a dark stripe commences, which, gradually widening, soon involves the whole surface in a very dark olive tint. The scuta are uneven and variously wrinkled. This form differs from the following in having the head very much broader, and the cephalic segment not emarginate anteriorly; the labium much more deeply canaliculate, and the number of segments not so great. Still it is possible that the differences are only sexual, and having but one specimen of each, we cannot decide this point. The creature was caught in this neighborhood by my friend Dr. Horn. We append a description of what may be the female of this species.

G. ———?—G. saturate aurantiacus, robustus, politus; capite parvo, segmento cephalico parvo, antice leviter emarginato, marginibus lateralibus rotundatis; antennis modice longis, postice pilosis, antice fere pubescentibus; mandibulis parvis, indistinctissime tridentatis; labio medio leviter canaliculato, antice leviter emarginato, sparse subprofunde punctato; pedibus brevibus, sparsissime pilosis, utrinque 51.

Sterno-episternal sutures well marked, but not as deeply as the scuto-episcutal. Surface of the most of the scuta quite uneven, sometimes almost coarsely rugose. Dorsum with a very indistinct dark median stripe, more apparent on the posterior portion.

*Specimen belonging to the Smithsonian Institution.*

27 | 1 | Cumberland, Md. | ? | ? | Unc. 1½ |

G. LEVIS, n. sp.—G. aurantiacus, modice robustus; linea mediana dorsali, duplici, nigra, passim obsoleta, ad segmentum penultimum ducta; capite modice magno, leviter punctato, segmento basali breve; antennis sparse pilosis; labio saturate aurantiaco, leviter convexo, sparse leviter punctato, medio valde canaliculato, antice emarginato; mandibulis haud denticulatis; suturis scuto-episcutalibus modice distinctis; pedibus utrinque 53; superficie ventrali linea mediana unica, obsoleta, nigra; sternis suturis et depressione mediana impressis.

The cephalic segment has the sides moderately arched, with the anterior angles very strongly rounded. The dorsal median line is entirely wanting on the anterior portion of the body. The feet generally are without any hairs, but there are a few on some of them. There are two specimens in the museum of the Academy, collected in Georgia by Dr. J. Le Conte.

*G. BREVICORNIS*, n. sp.—*G. saturate aurantiacus*, robustus, venuste politus; capite aurantiaco; segmento cephalico parvo, sparse subprofunde punctato; antennis pilosis, brevibus; mandibulis sparsissime pilosis, indistincte quadridentatis, utrinque denticulo unico (interdum duobus) modice magno; labio subprofunde punctato, antice emarginato, medio canaliculato; pedibus compressis utrinque (? in mare) 55, (? in femina.)?

Scuto-episcutal sutures very distinct, as are also the sterno-episternal. Scuta generally quite smooth. Body of each of our specimens subcylindrical. We were at first disposed to consider these as the males of the following species, but it seems to us most probable that they are distinct. The principal differences are found, first, in the size of the cephalic segment and length of antennæ; second, in the punctations of the head; and finally, in the number of segments and robustness of body.

*Specimens belonging to the Smithsonian Institution.*

276	1	On the route from New Orleans to Galveston.	E. B. Andrews.		Unc. 2.
350	1	S. Illinois.	R. Kennicott.		" "

*G. BIPUNCTICEPS*, n. sp.—*G. dilute aurantiacus*, gracilis, venuste politus; segmento cephalico saturate aurantiaco, magno, antice leviter emarginato, et labio mandibulisque et copiose profunde et dense minutissime punctatis; antennis modice longis, dense pilosis, antice fere pubescentibus; labio leviter emarginato, medio canaliculato; mandibulis magnis, crassis, indistincte quadridentatis, utrinque denticulo unico (interdum duobus) modice magno; pedibus brevibus, sparsissime pilosis, utrinque (in mare?) 61 (in femina?) 63.

The general arrangement of the larger punctations on the cephalic segment is as follows: On each side of the posterior mesian portion there is a longitudinal series of punctations; on each side of the latter is a broad patch of the same, and anteriorly they are disposed in transverse series. No such method is discoverable in the preceding species. The color in all the specimens we have seen is somewhat lighter, and the body less robust and perhaps more uniform than in *G. brevicornis*. The labium is of the same shade as the cephalic segment, but the basilar and subbasilar are colored like the body. The dorsum has occasionally an indistinct dark median stripe. The scuto-episcutal and sterno-episternal sutures are very distinct. The sterna have a median groove. We have seen an individual belonging to the collection of the Museum of Comparative Zoology, which has 65 pairs of feet on each side, but yet in other respects agree entirely with the others.

*Specimens belonging to the Smithsonian Institution.*

266	3	South Illinois.	R. Kennicott.		Unc. 1½—2¼
285	1	Charleston.	?		" 1¼
279	5	Sonora.	T. D. Graham.		" 1¼—1¾

## Gen. 3. GONIBREGMATUS, Newp.\*

"Antennæ filiformes, subapproximatæ. Segmentum cephalicum breve, transversum, cordiforme, antice acute triangulare; basilare cephalico latius, subbasilari brevius. Mandibulæ magnæ, arcuatæ, prominentes, contortæ. Labium brevissimum, transversum, margine integro prominente. Corpus subconvexum elongatum æquale; segmentis numerosis, posterioribus 2 vel 3 incrassatis tuberosis."

This genus has not as yet been found on the North American Continent.

## Gen. 4. STRIGAMIA, Sæger†.

Antennæ approximatæ. Segmentum cephalicum parvum, breve plerumque subtriangulare, antice angustatum. Corpus depressum antice attenuatum. Segmenta pedesque numerosæ. Styli anales breves, antenniformes. (Fig. 11.)

*Geophilus*, Leach, p.

*Strigamia*, Gray, p.

*Geophilus*, Newp., et imitatores.

As we have before shown, the type of Leach's genus *Geophilus* belongs to the section *Arthronomalus* of Newp.; and *Arthronomalus* must be replaced by *Geophilus*, and a new name given to *Geophilus*, Newp.

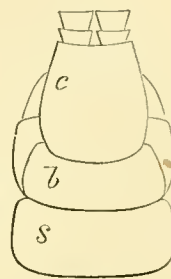


Fig. 11.

S. BOTHRIOPUS, n. sp.—S. læte rubens, robusta; segmento cephalico rare punctato, piloso; antennis pilosis, modice longis, haud acuminatis; mandibulis pilosis, intus dente magno, conico, acuto armatis; labio piloso, antice profunde emarginato, medio canaliculato; scutis pilosis, latis, brevibus, sine suturis; pedibus plerumque flavis, dense pilosis, utrinque 50; paris postremi coxis magnis, foveis minutis multis impressis; sternis suturis sterno-episternalibus et sulco medio obsoleto signatis.

The body is widest in the middle, but is much narrower at the anterior than at the posterior extremity. The last pair of feet are scarcely longer than the preceding. This species closely resembles *E. rubens*, Say, and may possibly prove identical with it, as the descriptions of that form are as usual quite meagre. We have in our possession two specimens from Broad Top Mountain, Huntingdon Co., Pa., and one from Montgomery Co., collected by Mr. E. D. Cope. The largest is about an inch in length.

S. RUBENS.—S. "saturate aurantiaca; linea mediana duplici nigra e segmento corporis primo ad penultimum ducta, segmento cephalico subcordato, antennis pilosis, labio mandibulisque lævigatis punctis raris, mandibulis nigris pedum paribus 50. Long. unc.  $1\frac{1}{4}$ ."

*Geophilus rubens*, Say, Journ. Acad. Nat. Sci. Philada. 1st series, vol. ii. ; Œuvr. Entom. i. p. 25; Gerv. in Ann. Sci. Nat. 1837, p. 52; Apt. iv. p. 320; Lucas, Hist. Nat. Anim. Art. p. 549; Newp. Ann. and Mag. Nat. Hist. xiii. p. 101; Linn. Trans. xix. p. 435; Catal. Brit. Mus. Myriapoda, p. 87.

"Hab.—In America boreali."

Species mihi ignota.

\* Proc. Zool. Soc. 1842, p. 181.

† Proc. Acad. vol. viii.

- S. *FULVA*, Sæger.—S. fulvo-aurantiaca, polita; corpore antice attenuato; capite parvo; segmento cephalico subtriangulare, impunctato; antennis modice longis, filiformibus, haud acumiatis, sparse pilosis, articulis obconicis; mandibulis brevibus, crassis, singula denticulo modice magno conico; labio breve, antice medio valde emarginato, impunctato; scutis interdum linea media obsoletissima; pedibus modice longis, pilosis, gracilibus, cylindricis, utrinque 47, pari postremo (in mare?) robusto, breve acuminato articulis obconicis, (in femina?); sternis suturis sterno-episternalibus et sulco medio lato impressis. *Strigamia fulva*, Sæger, Proc. Acad. Nat. Scien. vol. viii. p. 109.

The color of this graceful little animal is an orange, approaching somewhat to fulvous. The antennæ are very thread-like; but the posterior feet, in our only specimen, are very thick, being more so in the middle than at either end. The median linear depressions in the sterna are often dilated in their centre. The type of this species is in the Museum of the Academy.

*Specimen belonging to the Smithsonian Institution.*

349 | 1 | South Illinois. | R. Kennicott. | Unc. 1 | |

- S. *BIDENS*, n. sp.—S. aurantiaca, venuste polita; segmento cephalico triangulare, antice truncato, sparse late punctato, margine antico postico nonnihil latiore; antennis brevibus, filiformibus, articulis obconicis; labio sparse late punctato, sulco obsoleto, margine antico denticulis duobus obsoletis obtusis armato; mandibulis intus minute unidenticulatis; suturis scuto-episcutalibus nullis; pedibus utrinque 76, cylindricis, paris postremi coxis magnis, foveis signatis; sternis suturis sterno-episternalibus et sulco medio impressis; squama preanali infra convexa.

The coxæ of the last pair of feet are very large. Their inferior surface is convex, and indented with from twenty to thirty small, round pits, irregularly arranged in rows. The remainder of the feet are, in our specimen, slender. We presume that the above character is persistent in both sexes, but cannot be certain on this point. There is a single specimen in the Museum of the Academy, labelled as having been found near Philadelphia by Joseph Leidy, M. D. We have never met with it whilst collecting. The length is about an inch and a half.

- S. *WHITEI*.—S. "capite aurantiaco, corpore flavo-virente, segmento cephalico brevi subeordato, antennis nudis, moniliformibus, labio leviter longitudinaliter cristato, utrinque obliquè sulcato, pedum paribus 74. Long. unc. 1½."

*Geophilus Whitei*, Newp., Linn. Trans. xix. p. 436; Gervais, Apteres iv. p. 321.

"*Hab.*—In America Boreali."

Species mihi ignota.

*S. bidens* is closely allied to this species, but almost the only point of agreement is the number of pairs of legs. Mr. Newport's description is, however, meagre, and we have never seen a specimen entirely corresponding with it.

- G. *ATTENUATUS*, Say, Journ. Acad. Nat. Sci. 1st series, vol. ii. p. 114.

We have not been able to learn any thing as to what species Mr. Say referred in his description, which throws no light on the subject; possibly it belonged to the genus *Mecistocephalus*.

S. *LÆVIPES*, n. sp.—S. aurantiaca, robusta; capite modice magno, rare obsolete punctato, sparse piloso; segmento basilari margine antico postico nonnihil latiore; mandibulis magnis, singula intus denticulo magno acuto armata; dente mandibulari, gracile, longo; scutis latis, brevibus, suturis scuto-episternalibus nullis; pedibus modice longis, utrinque 69, pari postremo (in mare?) longo, valde incrassato, illico acuminato, articulis obeonicis, (in femina?) parvo, gracile, articulis subcylindricis; suturis sterno-episternalibus distinctis; squama preanali postice valde angustata.

One of the specimens has the last pair of legs very thick and long and vertically compressed. They are composed of eight joints, all of which are obconic except the last, which is very short and rapidly acuminate. This individual we believe to be the male. The other, the female, has the hindmost legs very slender, with the coxal joint proportionally very much larger than in the male.

*Hab.*—Georgia. Museum of Academy; Dr. J. Le Conte.

S. *TÆNIOPSIS*, n. sp.—S. dilute fulva; corpore valde depresso, modice lato, antice leviter angustato; capite magno; segmento cephalico subtriangulare; antennis brevibus, moniliformibus, postice leviter depresso, crassis, antice cylindricis, haud acuminatis, pilis brevissimis mollibus paucis; labio breve, lato, antice obsolete bidentato, sulco mediano leviter impresso; mandibulis crassis; scutis brevissimis, sine suturis sed interdum linea mediana obscura; sternis brevissimis, singulo depressione submediana ovata, in corpore antico conspicuissima; pedibus brevibus, crassis, cylindricis, haud pilosis, utrinque 141, pari postremo (in femina?) gracile, breve, (in mare?) ? Long. unc.  $4\frac{3}{4}$ .

In our specimen the color is very light, but originally may possibly have been an orange. The body is almost destitute of polish. The epimeral plates are very large. We are indebted to Dr. J. L. Le Conte for the specimen, which he captured in the mountains of Georgia.

S. *MACULATICEPS*, n. sp.—S. sordide aurantiaca, polita; corpore robusto, subsemicylindrico, antice modice attenuato; capite modice parvo, obscure saturate rubro, minute albomaculato, in lateribus sparse piloso; antennis longis, leviter pubescentibus, haud acuminatis; mandibulis crassis, obscure quadridentatis, pilis paucis, denticulo antico utrinque magno, conico; labio impunctato, antice vix emarginato, medio canaliculato; pedibus modice longis, gracilibus, subcompressis, utrinque 77, et superficie ventrali sordide flavis; scutis lævibus sine suturis; sternis lævibus, suturis sterno-episternalibus valde impressis et plerumque postice depressionum irregulariter ovatorum transversarum pari; pedibus postremis ("stylis analibus") (in mare solum?) robustissimis, supra subcomplanatis, subtus convexis, acuminatis.

The cephalic segment is slightly narrowed anteriorly, and the upper surface of the whole head is marked with very small whitish dots. The anterior and posterior extremities of the body are perhaps a little darker in color than the intervening portion. The inferior aspect of the head is of the same color as the superior, contrasting with the under surface of the body. Near the posterior border of each sterna there is a pair of subequal oval transverse depressions. The legs are almost destitute of hair, having occasionally, however, a few very short ones.

*Specimen belonging to the Smithsonian Institution.*

294 | 1 | Upper Colorado. | Lieut. J. C. Ives, U. S. A. | H. B. Mollhausen. | Unc.  $2\frac{1}{2}$  |

S. *LATICEPS*, n. sp.—S. dilute aurantiaca; capite magno, impunctato; segmento cephalico lato, breve, transverso, quinqueangulato, segmentis basali subbasalique marginibus curvatis et angulis anticis prolongatis; antennis brevibus, crassis, cylindricis, antice pubescentibus; labio breve, nonnihil convexo, haud canaliculato; mandibulis parvis, singula intus denticulo obtuso indistincto; pedibus subcompressis, gracilibus, utrinque 81, pari postremo (in mare solum?) nonnihil crasso, cylindrico, haud acuminato coxis magnis; sternis depressione lineari-ovata transversa et suturis sterno-episternalibus signatis; squama preanali valde caualiculata, postice valde emarginata, angulis posticis subacutis. Long. unc. 3.

The anterior of the two scuta covering each segment is very distinct from the other, and is much wider at its posterior than at its anterior margin. The posterior has its lateral margins arcuate but not elevated. The scuto-episcutal sutures are very distinct. Posteriorly there is an obsolete dark median dorsal line.

*Hab.*—Texas. Museum of Comparative Zoology; Geo. Stolley, Esq.

S. *CEPHALICA*, n. sp.—S. sordide dilute brunnea, superficie dorsali lineis pullis duabus, obsolete; corpore modice robusto, antice leviter sed postice illic valdeque angustato; capite magno; segmento cephalico subtriangulare, impunctato, basali postice leviter dilatato; antennis brevissimis, latis, depressis, haud pilosis, articulis brevissimis, elongate quadratis; labio impunctato, medio canaliculato, antice leviter emarginato; mandibulis crassis, haud denticulatis; scutis suturis scuto-episcutalibus leviter impressis; pedibus gracilibus, modice brevibus, haud pilosis, utrinque 75, pari postremo (in femina solum?) parvo, gracile; sternis suturis sterno-episternalibus et sulco mediano impressis.

The two dark lines on the dorsum are very obscure and are evanescent anteriorly. The cephalic segment is quite acute anteriorly. The legs are rather lighter in color than the body, and are shorter than in the preceding species.

*Specimen belonging to the Smithsonian Institution.*

129 | 1 | California. | ? | ? | Unc. 2¼ |

S. *PARVICEPS*, n. sp.—S. saturate aurantiaca, polita; corpore modice robusto, antice valde sed postice leviter angustato; capite parvo, segmento cephalico suborbiculare, impunctato; antennis modice longis, filiformibus, haud acuminatis, sparse pilosis, articulis vix obconicis; mandibulis crassis, sparse brevis pilosis, obscure tridentatis, denticulo antico utrinque magno conico acuto; labio lato, breve impunctato, antice vix emarginato, sulco mediano obscure impresso; scutis sine suturis; pedibus modice longis, gracilibus, pilis brevibus paucis, et superficie ventrali sordide aurantiacis, utrinque 71, pari postremo (in femina solum?) parvo, gracile; sternis suturis sterno-episternalibus et sulco mediano impresso.

In the only specimen that we have seen the mandibles are perfect, with the exception that they lack the mandibular tooth, probably the result of an accident; but it is rather curious that both should be lost and the remainder of mandibles be uninjured. The head appears to be destitute of punctations.

*Specimen belonging to the Smithsonian Institution.*

311 | 1 | California. | ? | ? | Unc. 2¼ |

S. *EPILEPTICA*, n. sp.—S. polita; corpore antice valde sed postice modice angustato, supra saturate sed subtus dilute aurantiaco; capite parvo; segmento cephalico suborbiculare, sparse minute albomaculato;

segment basali subbasali longiore; antennis longis, filiformibus, haud acuminatis, partim pubescentibus, articulis vix obconicis; mandibulis crassis, distincte tridenticulatis, denticulo antico magno, conico, acuto; labio convexo, copiose minute albomaculato, antice leviter emarginato, sulco mediano impresso; scutis longis, latis, sine suturis; pedibus gracilibus, modice longis, dilute aurantiacis, utrinque 81, pari postremo (in femina solum?) parvo, gracile, haud antenniforme; sternis suturis sterno-episternalibus et sulco mediano impressis.

This is much the largest Geophilid as yet found within our limits. The greatest breadth of the scuta is about two lines. The white dots on its head are very minute, resembling punctations.

*Specimen belonging to the Smithsonian Institution.*

297 | 1 | Puget's Sound. | A. Campbell, Com. N. W. B. S. | Dr. C. B. Kennerly. | Unc.  $5\frac{1}{2}$  |

S. CHIONOPHILA, n. sp.—S. aurantiaca gracilis, parva, venuste polita; segmento cephalico fere subquadrato, postice medio canaliculato; antennis pilosis haud acuminatis, articulis (ultimo excepto) obconicis; mandibulis dente modico in margine interno armatis; suturis scuto-episcutalibus interdum obsoletis sed plerumque distinctis; pedibus pilosis utrinque 43, pari postremo (in femina solum?) gracile, parvo; sternis et vel canaliculatis vel depressione subcirculare notatis et suturis sterno-episternalibus valde impressis.

The distal joint of the filiform antennæ is large and cylindrical, causing them to appear somewhat clavate. This species is a very interesting one, from the fact of its inhabiting a region so near the Arctic circle. Its diminutiveness shows that the Myriapoda form no exception to the general decrease in size observable among the lower animals as we leave the Equator.

*Specimens belonging to the Smithsonian Institution.*

258 | 3 | Fort Simpson, Red River. | R. Kennicott. | | Unc.  $\frac{1}{2}$ — $\frac{3}{4}$  |

Besides the American species, there are the following foreign ones in the collection of the Smithsonian Institution:—

S. TENIOPHERA, n. sp.—S. incana, superficie dorsali lineis duabus subnigris, confertim approximatis, antice evanescentibus; corpore robusto, et antice et postice modice angustato; segmento cephalico breve, subtriangulare, sordide albo, impunctato; antennis cylindricis, modice crassis brevibusque; labio convexo, impunctato, antice vix emarginato, sine sulco; mandibulis haud denticulatis; suturis scuto-episcutalibus distinctis; superficie ventrali fere albida; sternis suturis sterno-episternalibus et sulco mediano impressis; pedibus brevibus, gracilibus, anticis sordide albidis, utrinque 81, pari postremo (in femina solum?) parvissimo, gracile.

The color of this animal is a light grey; that of the head, the anterior feet and the belly approaches a dirty white. The median dark stripe is composed of two closely approximated lines, and is evanescent anteriorly, but posteriorly ends rather abruptly at the anal scutum. It is much more apparent in some portions of the body than in others. The median sulci of the sterna are very short, not extending through the whole length of each sternum.

260 | 1 | Loo Choo Islands. | N. Pacific Expl. Exp. | W. Stimpson, M. D. | Unc.  $2\frac{1}{2}$  |



S. LINEATA.—S. griseo-brunnea; capite magno; segmentis cephalico et basali appendicibusque saturate rubris; segmento anali obscure flavo (interdum "subcordato"); corpore antice leviter sed postice modice angustato; superficie dorsali lateribusque singula lineis duabus obscuris subnigris interruptis approximatis; segmento cephalico lato, breve, quinqueangulato, postice abrupte truncato (aut "saturate rubro"); antennis brevissimis et crassissimis, latis, depressis, haud cylindricis, sensim acuminatis, sparse brevissime pilosis; labio convexo, saturate rubro, antice vix emarginato, sulco mediano obscure impresso; mandibulis haud denticulatis; scutis longitudinaliter trisulcatis, et interdum depressione obscura utrinque impressis, suturis scuto-episcutalibus nullis, marginibus lateralibus elevatis; pedibus brevibus, gracilibus, flavis, utrinque 77, pari postremo (in femina solum?) parvo et gracile; sternis suturis sterno-episternalibus et sulco obscuro mediano impressis.

*G. lineatus*, Newp., Linn. Trans. xix. p. 436; Catal. British Mus. Myriap. p. 89; Gervais, Apteres iv. p. 321.

The subbasilar segment is of the same color as the body. The two median dark lines anteriorly are scarcely separable and less interrupted than other portions. One of the lateral lines is situated on the edge of the scuta, and the other just above the spiracles; they are composed of a series of dots. The three median sulci of the scuta are closely approximate. Our specimen differs from Mr. Newport's diagnosis both in the color of the anal segment, the shape of the cephalic subsegment, and the markings of the labium, but otherwise agrees very well.

356 | 1 | Choco, New Grenada. | A. Schott. | | Uuc. 2 |

S. TROPICA, n. sp.—S. dilute brunnea, capite antennisque aurantiacis, segmento anali obscure flavo, corpore antice modice sed postice illico valdeque angustato; superficie dorsali lateribusque singula lineis duabus approximatis, interruptis, subnigris; segmento cephalico subtriangulare, breve, modice angusto; antennis filiformibus, modice brevibus, nec acuminatis nec pilosis; labio convexo, antice haud emarginato, sulco mediano multo; mandibulis haud denticulatis; scutis longitudinaliter trisulcatis, et plerumque depressione utrinque impressis; suturis scuto-episcutalibus nullis; pedibus modice brevibus, gracilibus, obscure flavis, utrinque 77, pari postremo (in femina solum?) parvo, gracile; sternis dense punctatis, suturis sterno-episternalibus et depressione centrali suborbiculare impressis.

The subbasilar segment agrees with the rest of the head in color. The dark lines are almost exactly like those of the preceding species. The median sulci are perhaps not quite so sharply cut. The head is proportionally considerably smaller than that of *E. lineatus*. The antennæ are also essentially different from those of that species. We have a specimen which is of a very light yellow and with traces of the dark lines, even the head being of a very light shade. We have no hesitation in referring it to this form, believing it to be an individual that has just changed its skin or shell; the skins of all species probably being white, or nearly so, when just assumed, and gradually darkening and gaining their peculiarities with age.

358 | 2 | Nicaragua. | Capt. Rodgers. | E. Wright. | Uuc. 24 |

S. FILICORNIS, n. sp.—S. brunnea, corpore robusto, antice modice valde et postice abrupte angustato; superficie dorsali lineis duobus subapproximatis obscuris, pallis; segmento cephalico breve, subtriangulare, obscure minute albomaculato; antennis modice longis, filiformibus, partim subpubescentibus, haud sensim acuminatis; labio breve, convexo, antice leviter late emarginato; mandibulis haud denticulatis; seutis sulcis duobus, obscuris, subapproximatis et suturis scuto-episternalibus impressis; pedibus brevibus, gracilibus, utrinque 81, pari postremo parvo; sternis suturis sterno-episternalibus et aut sulco mediano aut depressione centrali impressis.

The whitish dots on the head are very minute as well as obscure. Many of the scuta are quite rough; the two lines are more separate and distinct on the posterior ones, and correspond with the sulci in position. The sterna, besides the sterno-episternal sutures, have a central round impression, occasionally replaced by a longitudinal median sulcus.

238 | 1 | Near La Union, Costa Rica. | Lieut. D. D. Porter, U. S. N. |

| Unc. 3 |

ART. II.—*New Unionida of the United States.*

By ISAAC LEA.

In this paper I have continued the descriptions and observations on the indigenous species which have come into my possession, since the last publication in the Society's Journal. They are all from the States of Mississippi, Alabama, Georgia and North Carolina, except a single one from Washington Territory. They consist of fifty-three *Uniones*, four *Margaritance*, and one *Anodonta*. Many of them are of great interest, and of forms which seem to be peculiar to those States. It is greatly to be regretted that so few have been obtained with the soft parts, so important to the development of our fresh water *Mollusca*. The illustrations will be found to be executed with great accuracy and with a high finish.

## UNIO INSULSUS. Pl. 1, fig. 199.

Testâ lævi, quadratâ, inflatâ, inæquilaterali, posticè obtusè angulatâ, ad latere subplanulatâ; valvulis subcrassis, natibus prominulis, ad apices rugoso-undulatis; epidermide virido-fuscâ, insulse, striatâ, obsolete radiatâ; dentibus cardinalibus parviusculis, subcompressis, in utroque valvulo duplicibus; lateraliibus sublongis subcurvisque; margaritâ vel albâ vel purpureâ et iridescente.

Shell smooth, quadrate, inflated, inequilateral, obtusely angular behind, flattened at the sides; valves rather thick, beaks somewhat prominent, rugosely undulate at the tips; epidermis greenish brown, dull, striate, obscurely radiate; cardinal teeth rather small, rather compressed, double in both valves; lateral teeth rather long and somewhat curved; nacre white or purple and iridescent.

Proc. Acad. Nat. Sci. 1857, p. 86.

*Hab.*—Roanoke River, Weldon, N. C. Prof. Emmons.

My cabinet and cabinet of Prof. Emmons.

Diam. .7,

Length 1.1,

Breadth 1.9 inch.

Shell smooth, quadrate, inflated, inequilateral, obtusely angular behind, slightly flattened at the sides; substance of the shell rather thick; beaks somewhat prominent; rugosely undulate at the tips; ligament very short, rather thin and dark brown; epidermis greenish brown, dull, obscurely rayed, striate below and with distant marks of growth; umbonial slope raised, obtusely angular; posterior slope rather wide, slightly raised and obscurely rayed; cardinal teeth rather small, somewhat compressed, crenulate and double in both valves; lateral teeth rather long and some-

what curved; anterior cicatrices distinct, large and well impressed; posterior cicatrices confluent, large and slightly impressed; dorsal cicatrices well impressed and placed immediately over the centre of the cavity of the beaks; cavity of the shell rather deep and wide; cavity of the beaks somewhat deep and rounded; nacre white or purple and iridescent.

*Remarks.*—This species, in general form, is near to *confertus* (nobis) inclining towards *Blandingianus* (nobis). I have a specimen from Dr. Newcomb, which seems to be the same, and which he thinks came from Tennessee.

UNIO CATAWBENSIS. Pl. 1, fig. 200.

Testâ lævi, quadratâ, subiufatâ, ad latere planulatâ, submarginatâ, valdè inæquilaterali; valvulis suberassis, anticè crassioribus; natibus prominulis; epidermide tenebroso-fuscâ; dentibus cardinalibus curtis, suberassis, in utroque valvulo duplicibus; lateralibus suberassis, prælongis subrectisque; margaritâ vel albâ vel purpureâ et iridescente.

Shell smooth, quadrate, somewhat inflated, flattened at the sides, subemarginate, very inequilateral; valves rather thick, thicker before; beaks a little prominent; epidermis dark brown; cardinal teeth short, rather thick, double in both valves; lateral teeth rather thick, very long and straight; nacre white or purple and very iridescent.

Proc. Acad. Nat. Sci. 1857, p. 85, U. Wheatley.\*

*Hab.*—Catawba River, Gaston Co., N. C. C. M. Wheatley.

My cabinet and cabinet of Mr. Wheatley.

Diam. 1·1, Length 1·8, Breadth 3·6 inches.

Shell smooth, quadrate, somewhat inflated, flattened at the sides, subemarginate, very inequilateral, subbiangular behind; substance of the shell rather thick, thicker before; beaks a little prominent; ligament long, thick and dark brown; epidermis dark brown, shining, roughly striate before, with distant marks of growth; umbonial slope raised and angular; posterior slope carinate, rather broad: cardinal teeth short, rather thick, striate and crenulate, double in both valves; lateral teeth rather thick, very long and straight; anterior cicatrices distinct, large and deeply impressed; posterior cicatrices confluent, large and well impressed; dorsal cicatrices deep and placed in the centre of the cavity of the beaks; cavity of the shell rather deep and wide; cavity of the beaks shallow and rounded; nacre white or purple, sometimes salmon and iridescent.

*Remarks.*—Several specimens were sent to me by Mr. Wheatley. It belongs to the *complunatus* group, and closely resembles *pullatus* (nobis), but is more quadrate. The umbonial slope is raised into a well marked rather acute angle, and the posterior slope is yellowish, with obscure greenish rays.

\* Changed to *Catawbensis*, the name of *Wheatleyi* being preoccupied.

## UNIO SPADICEUS. Pl. 1, fig. 201.

Testâ lævi, ellipticâ, subcompressâ, inæquilaterali, posticè subbiangulatâ, submarginatâ; valvulis subtenuibus, anticè crassioribus; natibus vix prominulis; epidermide spadiceâ, eradiatâ; dentibus cardinalibus parvis crenulatisque; lateralibus sublongis subrectisque; margaritâ salmonis colore tinctâ et iridescente.

Shell smooth, elliptical, somewhat compressed, inequilateral, subbiangular behind, submarginate; valves rather thin, thicker before; beaks scarcely prominent; epidermis reddish brown, without rays; cardinal teeth small and crenulate; lateral teeth rather long and nearly straight; nacre salmon color and iridescent.

Proc. Acad. Nat. Sci. 1857, p. 86.

*Hab.*—Deep River, Gulf, N. C., Prof. Emmons; and mountain streams, N. C., Mr. Joseph Clark.

My cabinet, and cabinets of Prof. Emmons and Mr. Clark.

Diam. .4,

Length .7,

Breadth 1.5 inch.

Shell smooth, elliptical, somewhat compressed, inequilateral, subbiangular behind, submarginate at base; substance of the shell rather thin, thicker before; beaks scarcely prominent; ligament short, thin and light brown; epidermis reddish brown, without rays; umbonial slope slightly raised and obtusely angular; posterior slope rather narrow, raised into a carina; cardinal teeth small, crenulate and double in both valves; lateral teeth rather long and nearly straight; anterior cicatrices distinct, small and well impressed; posterior cicatrices confluent, rather small and slightly impressed; dorsal cicatrices placed across the cavity of the beaks; cavity of the shell shallow and wide; cavity of the beaks very shallow, scarcely observable; nacre salmon color and iridescent.

*Remarks.*—I have only two specimens before me. The one figured is from my friend the late Joseph Clark, to whom I am indebted for so many species and so much information in this our favorite branch of zoology. The specimen is apparently an adult. The exact habitat is not known. A half-grown one is from Prof. Emmons, and was taken in Deep River, N. C. In general character it is near to *fulvus*, (nobis,) and reminds one of *lanceolatus*, (nobis,) but may easily be distinguished from both.

## UNIO STRIATULUS. Pl. 2, fig. 202.

Testâ lævi, triangulari, subinflatâ, subæquilaterali, posticè angulatâ; valvulis subcrassis, anticè crassioribus; natibus elevatis, acuminatis, ad apices rugoso-undulatis; epidermide castaneâ, minutè striatâ, obsolete radiatâ; dentibus cardinalibus parvulis, subcompressis, in utroque valvulo duplicibus crenulatisque; lateralibus brevibus, subcrassis rectisque; margaritâ vel albâ vel crocâ et iridescente.

Shell smooth, triangular, somewhat inflated, nearly equilateral, angular behind; valves rather thick, thicker before; beaks elevated, acuminate, rugosely undulate at the tips; epidermis chestnut brown, minutely striate, obscurely radiate; cardinal

teeth small, rather compressed, crenulate, double in both valves; lateral teeth short, rather thick and straight; nacre white or saffron and iridescent.

Proc. Acad. Nat. Sci. 1857, p. 86.

*Hab.*—Roanoke River, Weldon, N. C. Prof. Emmons.

My cabinet and cabinet of Prof. Emmons.

Diam. .6,    Length 1,    Breadth 1.5 inch.

Shell smooth, triangular, somewhat inflated, nearly equilateral, angular behind and round before; substance of the shell rather thick, thicker before; beaks elevated, acuminate, rugosely undulate at the tips; ligament very short, somewhat thick and light brown; epidermis chestnut brown, minutely striate, obscurely rayed and with very distant marks of growth; umbonial slope slightly and obtusely angular; posterior slope rather compressed, slightly raised, with two slightly impressed lines from the beaks to the margin; cardinal teeth small, rather compressed, very much crenulate and double in both valves; lateral teeth short, rather thick and straight; anterior cicatrices distinct, small and well impressed; posterior cicatrices confluent, small and slightly impressed; dorsal cicatrices placed on the under side of the plate posterior to the cardinal teeth; cavity of the shell rather deep and wide; cavity of the beaks rather deep and angular; nacre white or saffron and iridescent.

*Remarks.*—Several specimens are before me. In outline it is near to *rubiginosus*, (nobis,) and belongs to the group of which that is the type; but it is a smaller species, is rather more inflated, and has higher beaks. In some specimens the lateral teeth are disposed to turn up at the posterior end.

#### UNIO EMMONSII. Pl. 2, fig. 203.

Testâ lævi, transversâ, subcompressâ, valdè inæquilaterali, posticè subbiangulatâ, ad latere planulatâ; valvulis subcrassis; natibus vix prominulis, ad apices undulatis, epidermide tenebroso-fuscâ, radiatâ, nitidâ; dentibus cardinalibus subgrandibus, compressis, crenulatis, in utroque valvulo duplicibus; lateralibus prælongis, lamellatis rectisque; margaritâ albâ et iridescente.

Shell smooth, transverse, rather compressed, very inequilateral, subbiangular behind, flattened at the sides; valves thick; beaks scarcely prominent, undulate at the tips; epidermis dark brown, rayed, shining; cardinal teeth rather large, compressed, crenulate and double in both valves; lateral teeth very long, lamellar and straight; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1857, p. 86.

*Hab.*—Roanoke River, Weldon, N. C. Prof. E. Emmons.

My cabinet and cabinet of Prof. Emmons.

Diam. 1,    Length 1.7,    Breadth 4.4 inches.

Shell smooth, transverse, rather compressed, very inequilateral, subbiangular behind, flattened at the sides; substance of the shell thick; beaks scarcely prominent,

undulate at the tips; ligament long, thick and dark brown; epidermis dark brown, rayed, shining above and striate below; umbonial slope somewhat raised and obtusely angular; posterior slope long, narrow and very slightly raised; cardinal teeth rather large, compressed, crenulate and double in both valves; lateral teeth very long, lamellar, straight and enlarged towards the posterior end; anterior cicatrices distinct, rather large and well impressed; posterior cicatrices confluent, rather large and slightly impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell shallow and wide; cavity of the beaks very shallow, scarcely observable; naere white and iridescent.

*Remarks.*—This is a fine species, belonging to the group of which *nasutus*, Say, is the type. It is closely allied to *Fisherianus*, (nobis), but differs in being larger, stouter, and a more expanded shell. The young and more perfect specimens have rays, which are obsolete in the old and more imperfect specimens. There are three or four undulations of the tips which are coarser than in *nasutus*. It is with great pleasure I dedicate this fine species to Prof. E. Emmons, to whose kindness I am indebted for so many interesting new species, collected in various parts of North Carolina, during his important geological survey of that State.

UNIO GENTHII. Pl. 2, fig. 204.

Testâ lævi, obliquâ, inflatâ, inæquilaterali, posticè obtusè angulatâ; valvulis suberassis, anticè crassioribus; natibus prominentibus; epidermide tenebroso-fuscâ, politâ obsoletè radiatâ; dentibus cardinalibus subgrandibus, obtusè conicis crenulatisque; lateralibus crassis, curtis rectisque; margaritâ albâ et iridescente.

Shell smooth, oblique, inflated, inequilateral, obtusely angular behind; valves somewhat thick, thicker before; beaks prominent; epidermis dark brown, polished, obscurely rayed; cardinal teeth rather large, obtusely conical and crenulate; lateral teeth thick, short and straight; naere white and iridescent.

Proc. Acad. Nat. Sci. 1857, p. 85.

*Hab.*—Catawba River, Gaston Co., N. C.; Dr. Genth and C. M. Wheatley. Deep River, Gulf, N. C. Prof. Emmons.

My cabinet, and cabinets of Dr. Genth, Mr. Wheatley and Prof. Emmons.

Diam. .7,    Length 1,    Breadth 1.6 inch.

Shell smooth, oblique, inflated, inequilateral, obtusely angular behind and rounded before; substance of the shell somewhat thick, thicker before; ligament short, thick and light brown; epidermis dark brown, polished on the sides towards the beaks and striate below; umbonial slope raised, obtusely angular; posterior slope wide and dark brown; cardinal teeth rather large, compressed, obtusely conical, crenulate and double in both valves; lateral teeth thick, short and straight; anterior cicatrices distinct, rather large and well impressed; posterior cicatrices confluent, rather small and slightly impressed; dorsal cicatrices placed near the centre of the cavity of the beaks

under the cardinal teeth; cavity of the shell deep and nearly round; cavity of the beaks deep and angular; nacre white and iridescent.

*Remarks.*—This does not seem to be a rare species in North Carolina, having received it from several habitats. It is a small species belonging to the group of which *castaneus* (nobis) may be considered the type. It is also near to *nux* (nobis) and *pulvinulis* (nobis). The junior specimens have numerous minute rays, and some have a tint of salmon color in the cavity of the beaks. It was first called to my attention by F. A. Genth, M. D., to whom I with great pleasure dedicate it.

UNIO GRACILENTUS. Pl. 3, fig. 205.

Testâ lævi, valdè transversâ, valdè compressâ, ad latere planulatâ, valdè inæquilaterali, posticè obtusè biangulatâ; valvulis tenuibus, natibus vix prominentibus, ad apices undulatis; epidermide tenebroso-fuseâ, striatâ, posticè obsoletè radiatâ; dentibus cardinalibus parvis, crenulatis, in utroque valvulo duplicibus; lateralibus prælongis, lamellatis rectisque; margaritâ cæruleo-albâ et valdè iridescente.

Shell smooth, very transverse, very much compressed, flattened at the sides, very inequilateral, obtusely biangular behind; valves thin; beaks scarcely prominent, undulate at the tips; epidermis dark brown, striate, obsoletely radiate behind; cardinal teeth small, crenulate and double in both valves; lateral teeth very long, lamellar and straight; nacre bluish white and very iridescent.

Proc. Acad. Nat. Sci. 1857, p. 85.

*Hab.*—Catawba River, Gaston Co., N. C. C. M. Wheatley.

My cabinet and cabinet of Mr. Wheatley.

Diam. .5,

Length 1.1,

Breadth 2.8 inches.

Shell smooth, very transverse, very much compressed, flattened at the sides, very inequilateral, obtusely biangular behind; substance of the shell thin, very slightly thicker before; beaks scarcely prominent, undulate at the tips; ligament long, thin and dark brown; epidermis dark brown, striate, obscurely rayed behind; umbonial slope very slightly raised, obtusely angular; posterior slope very narrow, raised into a carina, much compressed; cardinal teeth small, crenulate and double in both valves; lateral teeth very long, lamellar and straight; anterior cicatrices distinct, rather small, moderately well impressed; posterior cicatrices confluent, rather large and slightly impressed; dorsal cicatrices well impressed and placed nearly in the centre of the cavity of the beaks; cavity of the shell very shallow and wide; cavity of the beaks very shallow and obtusely angular; nacre bluish white and very iridescent.

*Remarks.*—Several specimens are before me of different ages. It has some of the characters of *percoarctatus*, herein described, but it is not quite so compressed, and is wider and more pointed at the posterior margin. In outline it reminds one of *rostriformis* and *perstriatus*. The nacre is white in the adult, in my possession, but in the young disposed to reddish brown. The striæ on the whole surface is disposed to be rough.



## UNIO PERCOARCTATUS, Pl. 3, fig. 206.

Testâ lævi, quadratâ, valdè coarctatâ, ad latere planulatâ, posticè subbiangulatâ; valdè inæquilaterali; valvulis tenuibus; natibus vix prominentibus, ad apices undulatis; epidermide tenebroso-fuscâ, minutè et valdè striatâ; dentibus cardinalibus parvis, striatis, in utroque valvulo duplicibus; lateralibus prælongis, lamellatis rectisque; margaritâ purpureâ et valdè iridescente.

Shell smooth, quadrate, very much compressed, flattened at the sides, subbiangular behind, very inæquilateral; valves thin; beaks scarcely prominent, undulate at the tips; epidermis dark brown, much and finely striate; cardinal teeth small, striate, double in both valves; lateral teeth very long, lamellar and straight; nacre purple and very iridescent.

Proc. Acad. Nat. Sci. 1857, p. 85.

*Hab.*—Catawba River, Gaston Co., N. C. C. M. Wheatley and Dr. Genth.

My cabinet and cabinet of Mr. Wheatley and Dr. Genth.

Diam. .8, Length 1.8, Breadth 3.7 inches.

Shell smooth, quadrate, very much compressed, flattened at the sides, subbiangular behind; substance of the shell thin, slightly thickened before; beaks scarcely prominent, undulate at the tips; ligament long, thin and dark brown; epidermis dark brown, closely and finely striate; umbonial slope very slightly raised, obtusely angular; posterior slope raised into a high carina, very much compressed and covered with loose striæ; cardinal teeth small, striate and double in both valves; lateral teeth very long, lamellar and straight; anterior cicatrices distinct, large and well impressed; posterior cicatrices confluent, large and slightly impressed; dorsal cicatrices in a row across the centre of the cavity of the beaks; cavity of the shell very shallow and very wide; cavity of the beaks very shallow and rounded; nacre purple and very iridescent.

*Remarks.*—A number of fine specimens were given to me by Mr. Wheatley, but none were received in alcohol. This species belongs to the *complanatus* group, but differs from them all in being more compressed, and in having the whole surface covered with loose striæ. These striæ are remarkable in this species, the whole surface being usually covered; and the edges being loose, a variable glossiness is exhibited, except on the posterior slope, which is fuller, and here it is velvety. The striæ are usually coarse and rough along the basal and anterior margins. All the numerous specimens I have seen are purple in the nacre, some of them tinged with salmon color. None of the adult specimens were rayed; some of the young ones are obscurely rayed.

## UNIO MICANS. Pl. 3, fig. 207.

Testâ lævi, ellipticâ, subcompressâ, valdè inæquilaterali, posticè angulatâ; valvulis subtenuibus, posticè crassioribus; natibus prominulis; epidermide luteo-fuscâ, valdè radiatâ et valdè micante; dentibus cardinalibus parvis, compressis, erectis crenulatisque; lateralibus longis, lamellatis rectisque; margaritâ vel albâ vel salmonis colore tinctâ et valdè iridescente.



Shell smooth, oblong, subcompressed, flattened at the side, swollen and biangular behind, very inequilateral; substance of the shell rather thick; beaks prominent, slightly pointed; ligament long, thin and brown; epidermis blackish, striate, without rays, with rather distant marks of growth; umbonial slope swollen and subbiangular; posterior slope narrow, slightly raised, with slightly impressed lines on each valve from the beaks to the margin; cardinal teeth rather small, crenulate, striate, disposed to be double in both valves; lateral teeth very long, somewhat curved, lamellate and corrugate; anterior cicatrices distinct, very large and well impressed; posterior cicatrices confluent, large and well impressed; dorsal cicatrices placed nearly in the centre of the cavity of the beaks; cavity of the shell wide and shallow; cavity of the beaks very shallow; nacre purple or salmon color and iridescent.

*Remarks.*—In outline this species is very near to *Roanokensis*, (nobis,) but it is much smaller and more inflated. It belongs to the group of which *complanatus* is the type. In one of the specimens before me there is a well defined cicatrix of the attachment of a ventral muscle, like that in *trapezoides*, but it is more anterior.

UNIO PURUS. Pl. 4, fig. 209.

Testâ lævi, ellipticâ, subcompressâ, posticè rotundatâ, inæquilaterali; valvulis subcrassis, anticè spissatis; natibus subprominentibus; epidermide luteo-olivâ, glabrâ, ad umbones politâ, obsoletè radiatâ; dentibus cardinalibus subgrandibus, acuminatis, crenulatis, in utroque valvulo subduplicibus; lateralibus sublongis, lamellatis subcurvisque; margaritâ albâ et iridescente.

Shell smooth, elliptical, rather compressed, rounded behind, inequilateral; valves rather thick, thickened before; beaks rather prominent; epidermis yellowish-olive, smooth, polished towards the beaks, obsoletely radiate; cardinal teeth rather large, pointed, crenulate and double in both valves; lateral teeth rather long, lamellar and somewhat curved; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1858, p. 41.

*Hab.*—Neuse River, six miles from Raleigh, N. C. Prof. Emmons.

My cabinet and cabinet of Prof. Emmons.

Diam. .8,

Length, 1.5,

Breadth, 2.6 inch.

Shell smooth, elliptical, rather compressed, flattened at the sides, rounded behind, inequilateral; substance of the shell rather thick, thickened before; beaks rather prominent; ligament rather short, thick, brownish; epidermis yellowish-olive, smooth, polished towards the beaks, obscurely rayed; umbonial slope swollen and subbiangular; posterior slope rather wide and slightly raised; cardinal teeth rather large, pointed, crenulate and double in both valves; lateral teeth rather long, lamellar and somewhat curved; anterior cicatrices distinct, somewhat large and well impressed; posterior cicatrices confluent, large and slightly impressed; dorsal cicatrices placed

over the centre of the cavity of the beaks; cavity of the shell rather deep and wide; cavity of beaks rather shallow and obtusely angular; nacre white and iridescent.

*Remarks.*—This species has an outline of a nearly regular ellipse. It reminds one of *ligamentinus*, Lam., having the same yellowish, shining epidermis, but it has not the rays over the whole disk, as that species usually has.

UNIO EXACTUS. Pl. 4, fig. 210.

Testâ lævi, ellipticâ, compressâ, posticè rotundatâ, inæquilaterali; valvulis subcrassis; natibus prominulis; epidermide tenebroso-fuscâ, striatâ, obsoletè radiatâ; dentibus cardinalibus parviusculis, crenulatis, in utroque valvulo duplicibus; lateralibus sublongis, lamellatis subrectisque; margaritâ albâ et iridescente.

Shell smooth, elliptical, compressed, rounded behind, inequilateral; valves rather thick; beaks a little prominent; epidermis dark brown; cardinal teeth rather small, crenulate and double in both valves; lateral teeth rather long, lamellar and nearly straight; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1858, p. 41.

*Hab.*—Neuse River, six miles from Raleigh, N. C. Prof. Emmons.

My cabinet and cabinet of Prof. Emmons.

Diam. .6, Length 1.3, Breadth 2.3 inches.

Shell smooth, regularly elliptical, compressed, rounded behind, inequilateral; substance of the shell rather thick, very slightly thicker before; beaks a little prominent; ligament rather short, thin and brownish; epidermis dark brown, obscurely rayed, with rather distant marks of growth; umbonial slope slightly raised and subbiangular; posterior slope narrow, slightly raised, with obscure impressed lines from the beaks to the margin; cardinal teeth rather small, crenulate, double in both valves; lateral teeth rather long, lamellar and nearly straight; anterior cicatrices distinct, rather large and well impressed; posterior cicatrices confluent, large and slightly impressed; dorsal cicatrices placed immediately above the cavity of the beaks; cavity of the shell very shallow and wide; cavity of the beaks very shallow and rounded; nacre white and iridescent.

*Remarks.*—This belongs to the *complanatus* group. It is remarkable for its exact ellipse. There was only a single specimen received; this was white in the nacre. Others may be found to be purple or salmon, but I suspect that it will usually be a clear white.

UNIO TURGIDULUS. Pl. 5, fig. 211.

Testâ lævi, ellipticâ, subæquilaterali, ad latere vel paulisper planulatâ vel impressâ; valvulis crassis, anticè crassioribus; natibus tumidis, subelevatis incurvisque; epidermide luteo-olivaceâ, crebrè virido-radiatâ; dentibus cardinalibus subgrandibus, elevatis, subconicis, crenulatis, in utroque valvulo duplicibus; lateralibus curtis, subcrassis subrectisque; margaritâ albâ et iridescente.

Shell smooth, elliptical, subequilateral, at the side flattened or a little impressed; valves thick, thicker before; beaks swollen, somewhat raised and incurved; epidermis yellowish olive, with close green rays; cardinal teeth rather large, raised, subconical, crenulate, double in both valves; lateral teeth short, somewhat thick and rather straight; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1858, p. 40.

*Hab.*—Cumberland River; Dr. Troost and T. C. Downie. Florence, Ala.; Rev. G. White.

My cabinet and cabinets of Mr. Downie and Mr. White.

Diam. .9,

Length 1.2,

Breadth 1.6 inch.

Shell smooth, elliptical, subequilateral, at the side flattened or a little impressed; substance of the shell thick, thicker before; beaks swollen, somewhat raised and incurved, with rather coarse undulations; ligament short, rather stout and bright brown; epidermis yellowish olive, with numerous close capillary rays over the whole disk, and with distant marks of growth; umbonial slope raised and angular; posterior slope wide, cordate, flattish, with two raised lines on each valve from the beaks to the margin; cardinal teeth rather large, raised, subconical, crenulate and double in both valves; lateral teeth short, somewhat thick and rather straight; anterior cicatrices distinct, rather small and deeply impressed; posterior cicatrices confluent, rather large and moderately impressed; dorsal cicatrices placed over the centre of the cavity of the beaks; cavity of the shell deep and rounded; cavity of the beaks deep and obtusely angular; nacre white and iridescent.

*Remarks.*—This belongs to the group which embraces *capsaformis*, *Florentinus*, *biemarginatus*, &c. It is much more solid and inflated than the first, more elliptical, larger and more rayed than the second, and though some specimens are disposed to be emarginate, they are less so than in the last, and it is greener and more inflated. The figure is from a male.

#### UNIO PROPINQUUS. Pl. 5, fig. 212.

Testâ subnodulosâ, obliquâ, subtriangulari, valdè inæquilaterali, ad latere sulcatâ; valvulis crassis, anticè crassioribus; natibus erectis, tumidis; epidermide vel luteâ vel viridi, radiatâ; dentibus cardinalibus subgrandibus, creuulatis, in utroque valvulo duplicibus; lateralibus percrassis, crenulatis, curtis subcurvisque; margaritâ albâ et iridescente.

Shell subnodulous, oblique, subtriangular, very inequilateral, sulcate on the sides; valves thick, thicker before; beaks erect, swollen; epidermis yellowish or green, rayed; cardinal teeth rather large, crenulate, double in both valves; lateral teeth very thick, crenulate, short and somewhat curved; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1857, p. 83.

*Hab.*—Florence, Ala.; Rev. G. White. Tuscumbia, Ala.; L. B. Thornton, Esq.

My cabinet and cabinets of Mr. Thornton and Mr. White.

Diam. 1·3,

Length 1·8,

Breadth 2 inches.

Shell subnodulous, oblique, subtriangular, very inequilateral, sulcate on the sides; substance of the shell thick, thicker before; beaks erect, swollen; ligament short, thick and dark brown; epidermis yellowish or green, with numerous capillary rays over nearly the whole disk and with well marked lines of growth; umbonal slope raised, rounded and subnodulous; posterior slope very oblique, somewhat compressed; cardinal teeth rather large, crenulate, double in both valves; lateral teeth very thick, crenulate, short and somewhat curved; anterior cicatrices distinct, rather small and deeply impressed; posterior cicatrices distinct, rather large and well impressed; dorsal cicatrices placed under the plate above the cavity of the beaks; cavity of the shell rather shallow and wide; cavity of the beaks deep and obtusely angular; nacre white and iridescent.

*Remarks.*—A number of specimens are before me, varying very much in form and color of the epidermis. The nacre of the specimens I have seen is of a clear white. They may be found purple, as the kindred species *perplexus* are sometimes. None of the specimens had perfect beaks. It belongs to the group of which *perplexus* is the type. It usually has small swellings at each stage of growth on both sides of the oblique furrow. The female enlargement is like that in *Rangianus* (nobis) in form, and in being of a light color. It is between *perplexus* and *Rangianus*. In some specimens the rays are very numerous, while others have few. The palleal cicatrix is emarginate. The figure is from a male.

#### UNIO FLORENTINUS. Pl. 5, fig. 213.

Testâ lævi, ellipticâ, subæquilaterali, ad latere paulisper planulatâ; valvulis crassis, anticè crassioribus; natibus tumidis, ad apices undulatis; epidermide rufo-olivaceâ, valdè radiatâ; dentibus cardinalibus subgrandibus, conicis, crenulatis, in utroque valvulo duplicibus; lateralibus curtis, crassis subcurvisque; margaritâ albâ.

Shell smooth, elliptical, nearly equilateral, slightly flattened at the sides; valves thick, thicker before; beaks swollen, undulate at the tips; epidermis reddish olive, much rayed; cardinal teeth rather large, conical, crenulate, double in both valves; lateral teeth short, thick and somewhat curved; nacre white.

Proc. Acad. Nat. Sci. 1857, p. 83.

*Hab.*—Florence, Alabama; Rev. G. White. Cumberland River, Tenn.; Drs. Troost, Edgar and T. C. Downie, Esq.

My cabinet and cabinets of Mr. White and Mr. Downie.

Diam. ·7,

Length ·9,

Breadth 1·3 inch.

Shell smooth, elliptical, nearly equilateral, slightly flattened on the sides; substance of the shell thick, thicker before; beaks small, undulate at the tips; ligament very

short, rather thick and light brown; epidermis reddish olive, usually rayed over the whole disk, with distant marks of growth; umbonial slope raised and rounded; posterior slope wide, cordate, usually yellowish; cardinal teeth rather large, conical, crenulate, double in both valves; lateral teeth short, thick and somewhat curved; anterior cicatrices distinct, small, deeply impressed; posterior cicatrices confluent, large and well impressed; dorsal cicatrices small, placed on the plate above the centre of the cavity of the beaks; cavity of the shell rather deep and rounded; cavity of the beaks rather deep and obtusely angular; nacre white.

*Remarks.*—This diminutive species is very near to *capsæformis*, (nobis), but is thicker and much smaller. It has, usually, capillary rays over the whole disk. The enlargement of the female disk is at the posterior basal margin, and more like that of *Stewardsonii*, (nobis), than *capsæformis*, and it is usually lighter colored. The specimen figured is a female. The enlargement takes place after the third growth. The nacre of all I have seen is white.

UNIO MEREDITHII. Pl. 6, fig. 214.

Testâ sulcatâ, subtrigonâ, valdè compressâ, posticè obtusè angulatâ, inæquilaterali; valvulis subcrassis, anticè crassioribus; natibus prominulis; epidermide croceâ; dentibus cardinalibus subcrassis crenulatisque; lateralibus crassis, curtis subrectisque; margaritâ subcroceâ et iridescente.

Shell sulcate, subtriangular, very much compressed, obtusely angular behind, inequilateral; valves rather thick, thicker before; beaks slightly prominent; epidermis reddish yellow; cardinal teeth rather thick and crenulate; lateral teeth thick, short and nearly straight; nacre light reddish yellow and iridescent.

Proc. Acad. Nat. Sci. 1858, p. 40.

*Hab.*—Tennessee River, Tusculumbia, Alabama. L. B. Thornton, Esq.

My cabinet and cabinets of L. B. Thornton, Esq. and B. Pybas.

Diam. .7, Length 1.3, Breadth 1.8 inch.

Shell sulcate, subtriangular, very much compressed, obtusely angular behind, inequilateral; substance of the shell rather thick, thicker before; beaks slightly prominent; ligament short, thick and light brown; epidermis reddish yellow, with distant distinct lines of growth; umbonial slope slightly raised and rounded; posterior slope very oblique, compressed, but slightly raised, with an indistinct impressed line from the beaks to the margin; cardinal teeth rather thick, crenulate; lateral teeth thick, thicker towards the end, short and nearly straight; anterior cicatrices distinct, rather large and well impressed; posterior cicatrices distinct, rather large and moderately well impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell shallow and wide; cavity of the beaks shallow and rounded; nacre light reddish yellow and iridescent.

*Remarks.*—Two specimens only were received—one probably full grown, from which the figure is made, the other probably one-third grown. The former is no doubt adult. It is nearly allied to *Estabrookianus*, (nobis), and somewhat in outline to *rubiginosus*. It is *sulcate* like the former. The young specimen has an indistinct ray down the middle of the disks, the adult one a few indistinct rays near the beak. The tips of the beaks of these two specimens are too imperfect to observe their undulations.

I name this after Mr. Meredith, a young student of natural history, to whose industry I owe this and many other shells from the same habitat.

UNIO PERRADIATUS. Pl. 6, fig. 215.

Testâ lævi, subtriangulari, inflatâ, posticè obtusè biangulatâ, subinaequilaterali; valvulis crassiusculis, posticè crassioribus; natibus subgrandibus, tumidis et incurvis; epidermide nitidâ, luteâ et totâ viridoriadâtâ; dentibus cardinalibus parviusculis, valdè crenulatis, in utroque valvulo duplicibus; lateralibus subbrevibus, lamellatis subcurvisque; margaritâ albâ et iridescente.

Shell smooth, subtriangular, inflated, obtusely biangular behind, rather inequilateral; valves a little thick, thicker before; beaks rather large, swollen and incurved; epidermis shining, yellow, with green rays over the whole disk; cardinal teeth rather small, very much crenulate, double in both valves; lateral teeth rather short, lamellar and curved; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1858, p. 40.

*Hab.*—Florence, Alabama. Rev. George White.

My cabinet and cabinet of Mr. White.

Diam. 1.2,

Length 1.5,

Breadth 2.3 inches.

Shell smooth, subtriangular, inflated, obtusely biangular behind, rather inequilateral; substance of the shell a little thick, thicker before; beaks rather large, swollen, incurved; ligament rather long, thick and dark brown; epidermis shining, yellow, with green rays over the whole disk; umbonial slope raised, obtusely angular; posterior slope wide, subcordate, with a furrow in each valve from the beaks to the margin; cardinal teeth rather small, very much crenulate, double in both valves; lateral teeth rather short, lamellar and curved; anterior cicatrices confluent, rather large and well impressed; posterior cicatrices distinct, large and moderately impressed; dorsal cicatrices placed over the centre of the cavity of the beaks and across the base of the cardinal tooth; cavity of the shell deep and large; cavity of the beaks deep and obtusely angular; nacre white and iridescent.

*Remarks.*—I have seen but a single specimen of this species. It is very imperfect about the beaks, and therefore the form of the undulations is not ascertained. It belongs to the group of which *multiradiatus* (nobis) may be considered the type, but it differs in being more inflated and in not having an elliptical outline.



## UNIO PYBASII. Pl. 6, fig. 216.

Testâ lævi, ellipticâ, inflatâ, posticè obtusè angulatâ, inæquilaterali; valvulis subcrassis; natibus prominulis, ad apices undulatis; epidermide tenebroso-fuscâ, obsoletè radiatâ; dentibus cardinalibus subgrandibus obtusè angulatis, ereulatis; lateralibus longis, lamellatis curvisque; margaritâ vel purpureâ vel salmonis colore tinetâ et valdè iridescente.

Shell smooth, elliptical, inflated, obtusely angular behind, inequilateral; valves rather thick; beaks a little prominent, undulate at the tips; epidermis dark brown, obscurely rayed; cardinal teeth rather large, obtusely angular and crenulate; lateral teeth long, lamellar and curved; nacre purple or salmon color and very iridescent.

Proc. Acad. Nat. Sci. 1858, p. 40.

*Hab.*—Tennessee River, Tuscumbia, Alabama. B. Pybas.

My cabinet, and cabinets of B. Pybas and L. B. Thornton, Esq.

Diam. .9, Length 1.4, Breadth 2.2 inches.

Shell smooth, elliptical, inflated, obtusely angular behind, inequilateral; substance of the shell rather thick; beaks a little prominent, with a few parallel undulations; ligament rather long, thick and dark brown; epidermis dark brown, obscurely rayed, with rather distant marks of growth; umbonial slope slightly raised and rounded; posterior slope narrow, elliptical, slightly raised, with two slightly impressed lines from the beaks to the margin; cardinal teeth rather large, obtusely angular and crenulate; lateral teeth long, lamellar and curved; anterior cicatrices distinct, rather large and well impressed; posterior cicatrices confluent, large and moderately impressed; dorsal cicatrices placed nearly across the centre of the cavity of the beaks; cavity of the shell rather deep and wide; cavity of the beaks rather shallow and subangular; nacre purple or salmon color and very iridescent.

*Remarks.*—A number of specimens were sent to me by Mr. Pybas, after whom I name it. It is nearly allied to *Nashvillensis* and *Vannxemii* (nobis), but it is more inflated than the latter, and of a wider ellipse than the former; one of the specimens was perfect in the beaks. The undulations are fine, but not so numerous as in *Nashvillensis*. Usually the nacre is of a fine purple, with a mixture of salmon color, and often with a white basal margin.

## UNIO CONSANGUINEUS. Pl. 7, fig. 217.

Testâ lævi, valdè obliquâ, anticè tumidâ et truncatâ, posticè compressâ et obtusè angulatâ; valvulis crassis, anticè paulisper crassioribus; natibus tumidis, elevatis, incurvis terminalibusque; epidermide luteo-castaneâ, obsoletè radiatâ, transversè vittatâ; dentibus cardinalibus subgrandibus, striatis subcompressisque; lateralibus longis, crassis, corrugatis subcurvisque; margaritâ argenteâ et iridescente.

Shell smooth, very oblique, swollen and truncate before, compressed and obtusely angular behind; valves thick, a little thicker before; beaks swollen, raised, incurved, and terminal; epidermis yellowish chestnut, obscurely rayed, transversely banded;

cardinal teeth rather large, striate, and somewhat compressed; lateral teeth long, thick, corrugate and somewhat curved; nacre silver white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 60.

*Hab.*—Etowah River; Rev. G. White. Oostenaula River, Georgia; Bishop Elliott; and Cahawba River, Alabama; E. R. Showalter, M. D.

My cabinet and cabinets of Mr. White, Bishop Elliott, and Dr. Showalter:

Diam. 1,                                      Length 1·3,                                      Breadth 2·1 inches.

Shell smooth, very oblique, swollen and truncate before, compressed and obtusely angular behind; substance of the shell very thick, thicker before; beaks swollen, raised, incurved and terminal; ligament rather long, somewhat thick and dark brown; epidermis yellowish chestnut brown, obscurely rayed, transversely banded along the lines of growth, which though numerous, are not very close, shining above and striate below; umbonial slope very slightly raised, flattish; posterior slope slightly raised, elongate heart-shaped, with a well impressed line from the beak to the posterior margin; cardinal teeth rather large, striate and somewhat compressed; lateral teeth long, thick, corrugate, slightly curved and nearly horizontal; anterior cicatrices distinct, small and deeply impressed; posterior cicatrices distinct, rather small and well impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell shallow and wide; cavity of the beaks very shallow and rounded; nacre silver white and iridescent.

*Remarks.*—Some specimens of this shell were sent to me some years since by Bishop Elliott and the Rev. G. White. Recently, I have received from Dr. Showalter several, including some young ones. These have enabled me to come to the conclusion, that they did not form simply a variety of *decisus*, as I thought probable. It is higher in the beaks than that species, and is not so much spread out, nor has it so pale yellow an epidermis. It is very near to *crebrivittatus*, herein described, and may easily be confounded with that shell, having many of its characters, but the more distant marks of growth will at once distinguish it. It has very much the same character of teeth, the cardinal and lateral ones being nearly parallel. The young are well banded, and have well defined rays over most of the disk. There were none with perfect heads.

#### UNIO ASPERATUS. Pl. 7, fig. 218.

Testâ valdè tuberculatâ, subrotundâ, inflatâ, anticè et posticè rotundâ, subæquilaterali; valvulis crassis, anticè crassioribus; natibus valdè prominentibus; epidermide rufo-luteâ, eradiatâ; dentibus cardinalibus percrassis, obtuso-conicis, corrugatis; lateralibus brevissimis, valdè obliquis rectisque; margaritâ argenteâ et iridescente.

Shell very much tuberculate, nearly round, inflated, round behind and before; nearly equilateral; valves thick, thicker before; beaks very prominent; epidermis

reddish yellow, without rays; cardinal teeth very thick, obtusely conical and corrugate; lateral teeth very short, very oblique and straight; nacre silver white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 61.

*Hab.*—Alabama River, Claiborne, Alabama; Judge Tait. Coosa River, Alabama; E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. 1·2,

Length 1·8,

Breadth 1·7 inch.

Shell very tuberculate, subrotund, inflated, rounded before and behind, nearly equilateral; substance of the shell thick, thicker before; beaks very prominent, tumid; ligament short, thick and dark brown; epidermis reddish yellow, without rays, darker on the anterior portion, with rather close lines of growth; umbonial slope raised and rounded; posterior slope wide, cordate, very slightly raised and usually covered with tubercles; cardinal teeth very thick, obtusely conical and corrugated; lateral teeth very short, very oblique, straight and separated from the cardinal teeth by a broad plate, which extends towards the high beaks; anterior cicatrices distinct, small and very deeply impressed; posterior cicatrices distinct, large and well impressed; dorsal cicatrices placed under the plate within the cavity of the beaks; cavity of the shell rather deep and rounded; cavity of the beaks deep and angular; nacre silver white and iridescent.

*Remarks.*—A number of specimens of various ages were sent to me many years since by my late friend, Judge Tait. I had always regarded them as belonging to that group of which the well known and common species *pustulosus* (nobis) may be considered the type, but I then had doubts whether they should be considered only as a strong variety. On comparison with many hundred specimens of *pustulosus* from many widely separated habitats, and with some which inhabited the Alabama with them, I am now satisfied that they differ specifically. The *pustulosus* has a more or less raised carina, which, in some cases, almost makes the outline of the plane of the disk quadrate; *asperatus* never has, but is always rounded, and is more elongate.

*Soft Parts.*—A single specimen scarcely one-fourth grown, too young to decide on the sex, was received recently from Dr. Showalter. As far as could be ascertained, the various organs are very nearly the same as those of *pustulosus*. Adults may be found, when examined, to differ more, and the embryonic form also to differ; but in species so nearly allied as these are in the hard or enveloping parts, they would be likely to resemble closely each other in the soft parts.

#### UNIO PERPASTUS. Pl. 7, fig. 219.

Testâ lævi, ellipticâ, valdè ventricosâ, valdè inaquilaterali, posticè obtusè biangulatâ, anticè obliquè rotundatâ; valvulis crassiusculis, anticè paulisper crassioribus; natibus subprominentibus, inflatis; epider-

mide luteo-fuscéscente, supernè micanti, infernè striatâ, eradiatâ; dentibus cardinalibus parviusculis, erectis, conicis corrugatisque; lateralibus sublongis, lamellatis, corrugatis subeurgisque; margaritâ albâ et iridescente.

Shell smooth, elliptical, very ventricose, very inequilateral, obtusely biangular behind, obliquely rounded before; valves somewhat thick, slightly thicker before; beaks somewhat prominent and inflated; epidermis yellowish brown, shining above, striate below, without rays; cardinal teeth rather small, erect, conical and roughened; lateral teeth rather long, lamellar, roughened and slightly curved; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 60.

*Hab.*—Coosa River, Alabama. E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. 1·2,

Length, 1·4,

Breadth, 2 inches.

Shell smooth, elliptical, ventricose, very inequilateral, obtusely angular behind, obliquely rounded before; substance of the shell somewhat thick, a little thicker before; beaks somewhat prominent and inflated; ligament rather long, thick and chestnut brown; epidermis yellowish brown, shining above and striate below near the basal margin, without rays, with obscure distant marks of growth; umbonial slope very much raised and rounded; posterior slope regularly elliptical, slightly raised, yellowish, with a broad slightly impressed groove from the beaks to the margin; cardinal teeth rather small, erect, conical, corrugate, and disposed to be double in the right as it is in the left valve; lateral teeth rather long, lamellar, corrugate and somewhat curved; anterior cicatrices distinct, moderately large and very deeply impressed; posterior cicatrices confluent, rather large and well impressed; dorsal cicatrices placed above the centre of the cavity of the beaks and along the base of the cardinal teeth; cavity of the shell deep and regularly elliptical; cavity of the beaks rather deep, wide and angular; nacre white and iridescent.

*Remarks.*—Like several other new species from Dr. Showalter herein described, a single specimen only was received. It is evidently an adult, and two inches wide, by one and a half inches long. It is very much of the same outline as *pallescens* (nobis), but is a very much smaller shell, more inflated, rather more oval and of a darker epidermis. It is also very like to some varieties of *cariosus*, Say, but is more inflated, particularly on the umbonial slope; it is thicker in the substance of the valves, and differs in the teeth. The specimen before me is much eroded, so that the character of the beaks cannot be ascertained. The color of the epidermis is perhaps darker than younger specimens will be found to be. No doubt young and perfect specimens will prove to have bright yellow disks, and perhaps rays, which the specimen before me has not a trace of.

## UNIO LEWISII. Pl. 8, fig. 220.

Testâ lævi, subrotundâ, suborbiculari, subæquilaterali; valvulis crassissimis, anticè crassioribus; natibus elevatis, tumidis incurvisque; epidermide lateolâ, punctatâ; dentibus cardinalibus crassissimis, erectis crenulatisque; lateralibus crassissimis, brevibus et obliquis; margaritâ alba et iridescente.

Shell smooth, subrotund, suborbicular, nearly equilateral; valves very thick, thicker before; beaks raised, swollen and incurved; epidermis yellowish and with spots; cardinal teeth very thick, erect and crenulate; lateral teeth very thick, short and oblique; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 40.

*Hab.*—Coosa River, Alabama. E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter, Dr. Lewis and Dr. Hartman.

Diam. .9, Length 1.3, Breadth 1.3 inch.

Shell smooth, subrotund, subglobose, nearly equilateral; substance of the shell very thick, thicker before; beaks very much raised, swollen and incurved; ligament very short, thick and light brown; epidermis yellowish, inclining to horn color, with regular rather close lines of growth, without rays, with two or three small, well defined dark spots at the intersection of the lines of growth before the umbonial slope; umbonial slope raised and rounded; posterior slope broad, cordate, very slightly raised, with two indistinct impressed lines in each valve; cardinal teeth very thick, elevated, somewhat compressed and crenulate; lateral teeth very thick, short and oblique; anterior cicatrices distinct, small and deeply impressed; posterior cicatrices distinct, small and well impressed; dorsal cicatrices small, placed on the plate within the cavity of the beaks; cavity of the shell somewhat deep and rounded; cavity of the beaks very shallow and rounded; nacre white and iridescent.

*Remarks.*—Several specimens of this species are before me. It is a remarkably solid species, having high solid massive beaks and teeth. It is nearly allied to *cor*, Con., but is more rotund than that species, with less elevated beaks. All the specimens before me are without any ray or spot, except the younger and more perfect ones, which have a single pointed, green spot at the intersection of the first two or three lines of growth in each valve before the umbonial slope. These are remarkable for their small size and distinctness. In one specimen these are elongate, and make an obscure line. In all the old individuals these spots have disappeared. I have great pleasure in naming this species after my friend, James Lewis, M. D., of Mohawk, New York, who has done so much to promote a knowledge of the fresh water and land Mollusca of our country, and to whom I am under very many obligations in sending me new species, with his valuable notes, on all occasions.

## UNIO STABILIS. Pl. 8, fig. 221.

Testâ lævi, triangulari, valdè tumidâ, valdè inæquilaterali, posticè subbiangulari, anticè rotundatâ; valvulis pererassis, anticè crassioribus; natibus valdè prominentibus, tumidis, solidissimis, incurvis; epidermide

pallido-melleâ, eridiatâ, infernè striatâ; dentibus cardinalibus crassiusculis, compressis, erectis striatisque; lateralibus crassis, curtis, obliquis, rectis corrugatisque; margaritâ albâ et iridescente.

Shell smooth, triangular, very much swollen, very inequilateral, subbiangular behind, rounded before; valves very thick, thicker before; beaks very prominent, swollen, very solid, incurved; epidermis pale honey yellow, without rays, striate below; cardinal teeth rather thick, compressed, erect and striate; lateral teeth thick, short, oblique, straight and corrugate; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 59.

*Hab.*—Coosa River, Alabama. E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. 1·1,

Length 1·2,

Breadth 1·7 inch.

Shell smooth, triangular, very much swollen, very inequilateral, subtriangular behind, rounded before; substance of the shell very thick, thicker before; beaks very prominent, tumid, very solid and incurved; ligament short, thick and light brown; epidermis pale honey yellow, without rays, striate below, with rather close marks of growth; umbonial slope raised and rounded; posterior slope cordate, wide, nearly flattened, with an indistinct groove from the beaks to the margin; cardinal teeth rather thick, compressed, erect and striate; lateral teeth thick, short, oblique, straight and corrugate; anterior cicatrices distinct, rather small and deeply impressed; posterior cicatrices distinct, rather large and well impressed; dorsal cicatrices situated above the centre of the cavity of the beaks; cavity of the shell rather deep and rounded; cavity of the beaks shallow and angular; nacre white and iridescent.

*Remarks.*—Two specimens of this massive little species are before me. The larger is 1·7 inches wide, and the smaller 1·4 wide. It is near in outline to *instructus* herein described, and to *favidens*, Benson; but while it is tumid on the umbones like the latter species, it is very different in other characters, particularly in the color of epidermis, in the teeth and in the nacre. It is much more inflated than *instructus*, more solid, has higher and more massive beaks, and evidently has not the large undulations of the beaks of that species, although the tips are too much eroded to make them out. The lateral teeth are remarkably massive, thickened at the end, and disposed to duplication in the right valve, as it is in the left one. In the full grown specimen, the upper branch of the lateral tooth of the left valve is much smaller than that of the lower branch, which is very thick and rugose. There is no appearance of a ray on either of the specimens, but the younger one has an obscure spot on the umbonial slope at the intersection of the first line of growth. It is so solid a little species, that, together with its color, one is reminded of a worn quartz pebble.

## UNIO HARTMANIANUS. Pl. 8, fig. 222.

Testâ lævi, obliquè triangulâri, crassâ, tumidâ, posticè subbiangulâri, inæquilaterali; valvulis percrassis, anticè crassioribus; natibus valdè elevatis, crassis; epidermide tenebroso-fuscâ, posticè luteolâ, eradiatâ; dentibus cardinalibus subgrandibus, erectis, compressis, corrugatis, in utroque valvulo duplicibus; lateralibus brevibus, percrassis, obliquis corrugatisque; margaritâ argenteâ et iridescente.

Shell smooth, obliquely triangular, thick, swollen, somewhat biangular behind; valves very thick, thicker before; beaks very much raised, thick; epidermis dark brown, yellowish behind, eradiate; cardinal teeth rather large, erect, compressed, corrugate, double in both valves; lateral teeth very thick, oblique and corrugate; naere silver white and iridescent.

Proc. Acad. Nat. Sci. 1860, p. 307.

*Hab.*—Coosa River, Wetumpka, Alabama. E. R. Showalter, M. D.

My cabinet, and cabinets of Dr. Hartman and Dr. Showalter.

Diam. .1,

Length 1.3,

Breadth 1.5 inch.

Shell smooth, obliquely triangular, thick, swollen, subbiangular behind; substance of the shell very thick, thicker before; beaks very much raised and thick; ligament thick and short; epidermis dark brown, yellowish behind, without rays, shining towards the beaks, striate below, and with rather distant marks of growth; umbonial slope raised and very obtusely angular; posterior slope broad, flattened, yellowish, with a slight broad furrow from the beaks to the posterior margin; cardinal teeth rather large, erect, compressed, corrugate, double in both valves; lateral teeth very thick, oblique, corrugate; anterior cicatrices distinct, rather small, but well impressed; posterior cicatrices distinct and very well impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell rather deep and rounded; cavity of the beaks shallow and obtusely angular; naere silver white and iridescent.

*Remarks.*—Two specimens are before me, nearly of the same size. It is very near to *fulgidus* (nobis), but is a rather larger species, and not so shining. It belongs to that group of which *solidus* (nobis) may be considered the type. The lateral teeth are thick and short, and that of the right valve is disposed to be double. I owe the possession of one of the two specimens to W. D. Hartman, M. D., after whom I have great pleasure in naming it. They were sent to him by Dr. Showalter. A larger specimen of this species, or very closely allied, was received many years since from President Estabrook, taken by him in Clinch River, Tennessee. A specimen about one-third grown has very obscure rays on the middle of the disk.

## UNIO SHOWALTERII. Pl. 8, fig. 223.

Testâ lævi, subrotundâ, crassâ, sublenticulari, æquilaterali; valvulis crassis, anticè crassioribus; natibus elevatis, tumidis; epidermide tenebroso-fuscâ, obsolete radiatâ; dentibus cardinalibus crassis, erectis,





as it is in the left, and the interspace between the teeth form quite an arch. I name this after Dr. Showalter, to whom I am greatly indebted for many fine specimens of the Molluscs from Alabama.

## UNIO DOLOSUS. Pl. 9, fig. 224.

Testâ lævi, obovatâ, subalatâ, subcompressâ, ad latere planulatâ, posticè et anticè rotundatâ, valdè inæquilaterali; valvulis subtenuibus; natibus prominulis, ad apices minutè undulatis; epidermide virido-olivâ et obsoletè radiatâ; dentibus cardinalibus parvis, compressis crenulatisque; lateralibus longis, lamellatis subcurvisque; margaritâ albidâ et purpureâ paulisper tinctâ et valdè iridescente.

Shell smooth, obovate, scarcely winged, rather compressed, flattened at the sides, rounded before and behind, very inequilateral; valves rather thin; beaks a little prominent and minutely undulate; epidermis greenish olive and obscurely rayed; cardinal teeth small, compressed and crenulated; lateral teeth long, lamellar and somewhat curved; nacre whitish, slightly tinted with purple and very iridescent.

Proc. Acad. Nat. Sci. 1860, p. 307.

*Hab.*—Alabama River, at Claiborne, Ala., Judge Tait. Coosa River, E. D. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .8, Length 1.4, Breadth 2.3 inches.

Shell smooth, obovate, scarcely winged, rather compressed, flattened at the sides, rounded before and behind, very inequilateral; substance of the shell thin; beaks a little prominent and minutely undulate; ligament rather long, rather thin and light brown; epidermis greenish olive and obscurely rayed, with distant marks of growth; umbonial slope rather low and rounded; posterior slope raised, compressed, with three dark lines on each valve; cardinal teeth small, compressed, crenulate and disposed to be double in both valves; lateral teeth long, lamellar and somewhat curved; anterior cicatrices distinct, rather large, well impressed; posterior cicatrices confluent, large, very slightly impressed; dorsal cicatrices placed in a row across the cavity of the beaks; cavity of the shell shallow and wide; cavity of the beaks rather shallow and angular; nacre whitish, slightly tinted with purple and very iridescent.

*Soft Parts.*—*Branchial uterus* fully charged, and occupying the posterior half of the outer leaves of the branchiæ, much as in the form of *cariosus*, Say, being nearly oval, and the ovisacks coming below the edges of the branchiæ. *Branchiæ* large, nearly semicircular, inner one much the larger, united the whole length of abdominal sack. *Pulpi* large, falcate, united more than half way down the posterior edges. *Mantle* very thin, thickened on the edges and fringed below the branchial opening. *Branchial opening* rather small, with numerous minute papillæ on the inner edges. *Anal opening* small, with very numerous minute papillæ. *Super-anal opening* rather long, colored on the edges and united below. Color of the mass whitish.

*Embryonic shell* elongato-pouch-shape, nearly that of the *U. multiradiatus*, (nobis); color clear white.

*Remarks.*—I have three specimens before me. The largest one nearly two and a half by one and a half inches, has been in my possession about thirty years. It was sent to me, with many fine shells, by my deceased friend Judge Tait, of Claiborne, Ala. It so closely resembles, in outline, young specimens of *purpuratus*, Lam., that it was placed with them with a mark of doubt. Since then, until recently, I have never seen another specimen of it. Dr. Showalter, of Unionville, Ala., among other species in alcohol, has sent me two young individuals, the larger of which fortunately is a female with the embryonic form well developed in the branchial uterus. This at once settled the difficulty, the form being *pouch-shape* while that of *purpuratus* is *wedge-shape*. *Purpuratus* is a large, thick, deep purple species, usually much inflated, while *dolosus* is a thin, smaller species, the three species before me, neither of which is probably full grown, being respectively nearly two and a half, two and one inch wide. It differs also in being white, with a very slight tint of purple about the teeth. The largest specimen is abnormal in the lateral teeth, *being single in both valves*. The rays are scarcely to be observed on the oldest and youngest specimens, while they are observable on the middle-aged one. The beaks are eroded in each of them, but there remains enough in one to show that there are small undulations on the tips. It is very closely allied to *permiscens* (nobis), but is not so much inflated, and has stronger teeth.

UNIO NEGATUS. Pl. 9, fig. 225.

Testâ sulcatâ, subtriangulari, compressâ, ad latere planulatâ, posticè obtusè biangulatâ, anticè rotundâ, subæquilaterali; valvulis suberassis, anticè crassioribus; natibus subprominentibus, acuminatis, ad apices corrugatis; epidermide refuo-fuscâ, obsoletè radiatâ; dentibus cardinalibus subgrandibus, striatis crenulatisque; lateralibus suberassis, sublougis subrectisque; margaritâ vel albâ vel rosaceâ et iridescente.

Shell sulcate, subtriangular, compressed, flattened at the sides, obtusely biangular behind, rounded before, nearly equilateral; valves rather thick, thicker before; beaks somewhat prominent, acuminate, corrugate at the tips; epidermis reddish brown, obscurely radiate; cardinal teeth rather large, striate and crenulate; lateral teeth rather thick, rather long and nearly straight; nacre white or rose colored and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 59.

*Hab.*—Big Prairie Creek, Ala., E. R. Showalter, M. D.; and Columbus, Miss., W. Spillman, M. D.

My cabinet and cabinets of Drs. Showalter and Spillman.

Diam. 1,

Length 1·8,

Breadth 2·7 inches.

Shell sulcate, subtriangular, compressed, flattened at the side, obtusely biangular

behind and round before, nearly equilateral; substance of the shell rather thick, thicker before; beaks somewhat prominent, pointed and corrugate at the apex; ligament rather large, somewhat long, and light brown; epidermis reddish brown, very obscurely radiate, with two or three very distant marks of growth; umbonial slope well raised and angular; posterior slope somewhat carinate, narrow, with two slightly impressed lines from the beaks to the posterior margin; cardinal teeth rather large, striate, somewhat compressed and crenulate; lateral teeth rather thick, somewhat long and nearly straight; anterior cicatrices distinct, somewhat large and well impressed; posterior cicatrices distinct, rather large and slightly impressed; dorsal cicatrices situated within the cavity of the beak under the plate; cavity of the shell rather shallow and wide; cavity of the beaks deep and angular; nacre sometimes white, generally pinkish and iridescent.

*Remarks.*—I have before me seven specimens of various ages of this interesting species, which I owe to the kindness of my energetic and assiduous friends Dr. Showalter, of Alabama, and Dr. Spillman, of Mississippi. On the first receipt of two specimens I thought that they presented a remarkable sulcate variety of *rubiginosus* (nobis), having the exact outline of that species, and a general aspect which allies them closely. But on the receipt of younger specimens, with perfect beaks, I found that important region exhibited a totally different arrangement. The *rubiginosus* has only two or three small subconcentric folds with nodes along the angle of the umbonial slope, while the *negatus* has the whole region of the beak covered with corrugate folds, in one of the young specimens reaching down the sides for three-quarters of an inch, reminding one forcibly of the corrugations on the well known species *corrugatus*, Lam., from India. It is allied also to *rubidus* (nobis,) which accompanied it; but that species, while it is sulcate usually all over, as this is, is much more inflated, and has a much darker epidermis. Of the seven specimens before me, five are rosaceous in the nacre, one is white, and one reddish salmon. There is much disposition in the lateral tooth of the right valve to be double. In some of the specimens it is quite so.

UNIO GLANDACEUS. Pl. 9, fig. 226.

Testâ lævi, subtriangulari, inflatâ, inæquilaterali, posticè subbiangulatâ, anticè rotundatâ; valvulis crassis, anticè crassioribus; natibus prominulis, crassis; epidermide glandaceâ, rugosâ, cradiatâ; dentibus cardinalibus magnis, valdè sulcatis, erectis; lateralibus curtis, crassis, corrugatis, obliquis subrectisque; margaritâ albâ et iridescente.

Shell smooth, subtriangular, inflated, inequilateral, subbiangular behind, rounded before; valves thick, thicker before; beaks somewhat prominent, thick; epidermis reddish-brown, rough, without rays; cardinal teeth large, very much sulcate, erect;

lateral teeth short, thick, corrugate, oblique and nearly straight; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 59.

*Hab.*—Cahawba River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. 1·1,    Length 1·5,    Breadth 2 inches.

Shell smooth, subtriangular, inflated, inequilateral, subbiangular behind, rounded before; substance of the shell thick, thicker before; beaks a little prominent and thick; ligament large and dark brown; epidermis reddish-brown, rather rough, without rays and with somewhat close lines of growth; umbonial slope raised and obtusely angular; posterior slope narrow cordate, slightly carinate, with two impressed lines on each valve from the beaks to the posterior margin; cardinal teeth very large, deeply and numerous sulcate, erect, compressed and crenulate; lateral teeth short, thick, corrugate, oblique and nearly straight; anterior cicatrices distinct, rather small and very deeply impressed; posterior cicatrices confluent, moderately large and well impressed; dorsal cicatrices placed along the side and base of the cardinal teeth; cavity of the shell rather shallow and wide; cavity of the beaks deep and angular; nacre white and iridescent.

*Remarks.*—Among the interesting specimens sent to me by Dr. Showalter were two which though somewhat different are, I think, of the same species. The smaller one is only half grown, and may not prove when we get suites really to be the same, as I observe some well marked difference. The older one is evidently mature, and being somewhat eroded, may not be perfect in the characters above described. It belongs to the triangular group of species approaching to obliqueness. The umbones are high, and the disks somewhat inflated. It is near to *instructus*, herein described in outline, but it has a rougher epidermis, and is more inflated. The beaks of neither of the specimens are perfect enough to show any undulations. The older one has some rough furrows along some of the marks of growth.

#### UNIO MEDIUS. Pl. 10, fig. 227.

Testâ lævi, obliquâ, valdè inflatâ, valdè inæquilaterali, posticè obtusè angulatâ, anticè obliquè rotundatâ; valvulis crassis, posticè crassioribus; natibus elevatis, tumidis; epidermide fuscâ, maculatâ, infernè striatâ, supernè micanti; dentibus cardinalibus crassis, pyramidatis crenulatisque; lateralibus crassis, rectis brevibusque; margaritâ argenteâ et iridescente.

Shell smooth, oblique, very much inflated, very inequilateral, obtusely angular behind, obliquely rounded before; valves thick, thicker before; beaks raised, swollen; epidermis brown, spotted, striate, shining below; cardinal teeth thick, pyramidal and crenulate; lateral teeth thick, straight and short; nacre silver white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 40.

*Hab.*—Near Coosa River, Alabama. E. R. Showalter, M. D.

My cabinet, and cabinets of Dr. Showalter, Dr. Hartman and Mr. Anthony.

Diam. .7, Length .9, Breadth 1.2 inch.

Shell smooth, oblique, very much inflated, very inequilateral, obtusely angular behind and obliquely rounded before; substance of the shell thick, thicker before; beaks elevated, swollen; ligament very short, rather thick and light brown; epidermis light brown, with a series of spots before the umbonial slope from the beaks to the margin, with three or four regular, well marked, nearly equidistant marks of growth; umbonial slope raised and rounded; posterior slope wide, subcordate, with an obscure impressed line in each valve; cardinal teeth thick, pyramidal and crenulate; lateral teeth thick, straight and short; anterior cicatrices distinct, small and well impressed; posterior cicatrices distinct and well impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell small, rather deep and rounded; cavity of the beaks somewhat deep and obtusely angular; nacre silver white and iridescent.

*Soft parts.*—*Branchial uterus* not charged, but six specimens had ova in the ovarium. *Branchiæ* large, semicircular, very thin, inner ones much the larger, free nearly the whole length of abdominal sack. *Palpi* very small, thin and suboval, united only at the upper portion of the posterior edges. *Mantle* very thin, slightly thickened at the edges. *Branchial opening* rather small, with numerous small brownish papillæ. *Anal opening* rather large, with very minute dark brown papillæ on the inner edges. *Supranal opening* small, edged with dark brown and slightly united below; color of the mass dirty white.

*Remarks.*—This species is very nearly allied in outline, size and color to *modicellus* (nobis). They are both very diminutive species, but robust. They may be distinguished at once by the colored spots on *medius*, *modicellus* having in the same place a few capillary rays, and it is not quite so much rounded as *medius*. *Medius* may be confounded with *nucleopsis*, Con., and at first I thought it was the young of that species, but having nine specimens before me, some of them evidently adult, I have no doubt of their being different. *Medius* is a much smaller species, is more oblique, and has more, larger and better defined spots in a row, which, in some specimens, are so much elongate as almost to constitute a ray from the beak to the margin. In some, the spots are not well defined. It is to be regretted that none of the females, six in number, had the ova in the branchial uterus. They were not of course developed, and therefore the *embryonic form* could not be ascertained. They were sent to me in June, in alcohol, by Dr. Showalter, and at that season incubation had not sufficiently advanced. None of the beaks were perfect enough to show undulations.

## UNIO PORPHYREUS. Pl. 10, fig. 228.

Testâ lævi, ellipticâ, ventricosâ, valdè inæquilaterali, posticè obtusè biangulatâ, anticè rotundatâ; valvulis suberassis, anticè crassioribus; natibus prominulis; epidermide rufo-fuscescente, micanti, eradiatâ; dentibus cardinalibus crassiusculis, corrugatis, crenulatis, in utroque valvulo duplicibus; lateralibus longis, suberassis, corrugatis subrectisque; margaritâ saturate-purpureâ et valdè iridescente.

Shell smooth, elliptical, ventricose, very inequilateral, obtusely biangular behind, rounded before; valves rather thick, thicker before; beaks somewhat prominent; epidermis reddish brown, shining, without rays; cardinal teeth rather thick, corrugate, crenulate, double in both valves; lateral teeth long, somewhat thick, corrugate and rather straight; nacre deeply purple and very iridescent.

Proc. Acad. Nat. Sci. 1861, p. 60.

*Hab.*—Coosa River, Alabama. E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. 1,    Length 1·1,    Breadth 1·8 inch.

Shell smooth, elliptical, ventricose, very inequilateral, obtusely biangular behind, rounded before; substance of the shell rather thick, thicker before; beaks somewhat prominent; ligament rather long and somewhat thick; epidermis reddish brown, shining, without rays, with distant dark lines of growth; umbonial slope much raised and rounded; posterior slope regularly elliptical, slightly raised, very dark brown, with an obscure groove from the beaks to the posterior margin; cardinal teeth rather thick, corrugate, crenulate, double in both valves; lateral teeth long, rather thick, corrugate and nearly straight; anterior cicatrices distinct, small and deeply impressed; posterior cicatrices distinct, rather large and well impressed; dorsal cicatrices in a row above the cavity of the beaks and on the cardinal tooth; cavity of the shell deep and wide; cavity of the beaks rather shallow and rounded; nacre very deep purple and very iridescent.

*Remarks.*—As in many of the new species from Dr. Showalter, I have but a single imperfect one of this. It is very distinct from any I know, and is perhaps most nearly allied in outline to *umbrosus* (nobis) and *Lecontianus* (nobis). It is a smaller species than the former, more inflated, and of a much deeper color in the nacre, as well as in the epidermis. It is also smaller than the latter, has a darker epidermis, and has a deep purple nacre; while *Lecontianus* has it usually white or very pale purple. It is also more inflated. The specimen before me is very much eroded at the beaks and upper part of the disk, so that we cannot have any idea of the undulations of the tips. Young and perfect specimens would have a lighter epidermis, and may be found to have rays, but this has no appearance of them. The nacre is intensely purple, even more so than *purpuratus*, Lam., which cannot be confounded with this, as it is a much larger species, is obovate and very much more inflated, and has a darker epidermis.

## UNIO PLANCUS. Pl. 10, fig. 229.

Testâ lævi, obliquo-ovatâ, subcompressâ, posticè biangulatâ, anticè rotundatâ, valdè inæquilaterali; valvulis crassiusculis, anticè paulisper crassioribus; natibus prominulis; epidermide luteo-fuscâ, radiatâ; dentibus cardinalibus parvis, erectis, crenulatis, in utroque valvulo duplicibus; lateralibus sublongis subrectisque; margaritâ cæruleo-albâ et valdè iridescente.

Shell smooth, obliquely elliptical, somewhat compressed, biangular behind, rounded before and very inequilateral; valves somewhat thick, slightly thickened before; beaks a little prominent; epidermis yellowish brown, radiated; cardinal teeth small, erect, crenulate, double in both valves; lateral teeth rather long and nearly straight; nacre bluish white and very iridescent.

Proc. Acad. Nat. Sci. 1860, p. 307.

*Hab.*—Coosa River, Wetumpka, Alabama. E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .6, Length 1, Breadth 1.6 inch.

Shell smooth, obliquely elliptical, somewhat compressed, biangular behind, rounded before and very inequilateral; substance of the shell somewhat thick, slightly thickened before; beaks a little prominent; ligament short and dark brown; epidermis yellowish brown, with rather regular rays nearly over the whole disk, but broader and darker on the posterior slope, with rather distant marks of growth; umbonial slope but slightly raised and somewhat flattened; posterior slope slightly carinate, with two impressed lines on each valve from the beaks to the posterior margin; cardinal teeth small, erect, crenulate, double in both valves; lateral teeth long and nearly straight; anterior cicatrices distinct, rather small and well impressed; posterior cicatrices confluent and very slightly impressed; dorsal cicatrices placed in the centre of the cavity of the shell; cavity of the shell shallow and wide; cavity of the beaks shallow and obtusely angular; nacre bluish white and very iridescent.

*Soft parts.*—*Branchial uterus* not charged, but very minute ova were found in the ovarium. *Branchiæ* large, nearly semicircular, inner ones much the larger, united the whole length of abdominal sack. *Pulpi* rather small, subangular, united one-third down the posterior edges. *Mantle* very thin, thickened and colored on the inferior edges, and furnished with dark brown papillæ below the branchial opening. *Branchial opening* rather large, with numerous nearly black papillæ. *Anal opening* rather large, with very numerous, very small papillæ on the inner edges. *Super-anal opening* rather large, colored on the edges and united below; color of the mass dirty white.

*Remarks.*—There were three specimens of this small species received from Dr. Showalter. They are nearly allied to *simus* (nobis), but it may be distinguished by its being biangular behind, by the rays being larger and wider apart, by being a

larger species, and not having a salmon colored naure. It is also darker in the epidermis, being inclined to reddish brown.

UNIO INSTRUCTUS. Pl. 10, fig. 230.

Testâ levi, subtriangulari, subcompressâ, inæquilateralî, posticè subbiangulatâ, anticè rotundâ; valvulis crassiuseulis, anticè crassioribus; natibus prominentibus, ad apices rugoso-undulatis; epidermidè melleâ, exilissimè striatâ, eradiatâ; dentibus cardinalibus parviuseulis, striatis crenulatisque; laterali-bus subcurtis, striatis, obliquis subreectisque; margaritâ argenteâ et iridescente.

Shell smooth, subtriangular, rather compressed, inequilateral, subangular behind, round before; valves rather thick, thicker before; beaks prominent, roughly undulate at the tips; epidermis honey yellow, very finely striate, without rays; cardinal teeth rather small, striate and crenulate; lateral teeth rather short, striate, oblique and nearly straight; naure silver white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 59.

*Hab.*—Cahawba River, Alabama. E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .7, Length 1.1, Breadth 1.5 inch.

Shell smooth, subtriangular, rather compressed, inequilateral, subbiangular behind, round before; substance of the shell somewhat thick, thicker before; beaks prominent, with two or three large undulations on each one; ligament short, somewhat thick and light brown; epidermis honey yellow, very minutely and transversely striate, without rays, with very distant, rather thin lines of growth; umbonial slope raised and rounded; posterior slope rather narrow, elliptical, with a slightly impressed line from the beaks to the posterior margin; cardinal teeth rather small, striate and crenulate; lateral teeth rather short, striate, oblique, nearly straight and thickened at the end; anterior cicatrices confluent, rather large and deeply impressed; posterior cicatrices distinct, rather large and well impressed; dorsal cicatrices placed over the centre of the cavity of the beaks; cavity of the shell rather shallow and wide; cavity of the beaks rather shallow and angular; naure silver white and iridescent.

*Remarks.*—A single specimen only was received from Dr. Showalter. While, in outline, it is nearly the same as *favidens*, Ben., and *Barnesianus* (nobis), it is entirely different in other characters, particularly in the very remarkable undulations of the beaks, which are large and irregular. In its close, shining striæ, it resembles *striatus* (nobis), but it is lighter colored, and cannot be confounded with that species, which is much smaller and more oval in outline. It also reminds one of some varieties of younger *coccineus*, Hild., but it has no rays, as they usually have, and is lighter in the epidermis, and totally different in the undulations of the beaks, *coccineus* having only a few very small ones at the tips.



## UNIO VERUS. Pl. 11, fig. 231.

Testâ lævi, subtriangulari, subcompressâ, valdè inæquilaterali, posticè ferè rotundâ, anticè rotundâ; valvulis crassiusculis, anticè crassioribus; natibus elevatis; epidermide tenebroso-oliva, eradiatâ, vittatâ, ad umbones micanti, infernè striatâ; dentibus cardinalibus parviusculis, compresso-pyramidatis striatisque; lateralibus subbrevis, obliquis subrectisque; margaritâ albâ et iridescente.

Shell smooth, subtriangular, somewhat compressed, very inequilateral, nearly round behind, round before; valves somewhat thick, thicker before; beaks raised; epidermis dark olive, without rays, banded, shining on the umbones, striate below; cardinal teeth rather small, compressed, pyramidal and striate; lateral teeth rather short, oblique and straight; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 40.

*Hab.*—Cahawba River, Perry Co., Alabama. E. R. Showalter, M. D.

My cabinet, and cabinets of Dr. Showalter, Dr. Hartman and Mr. Anthony.

Diam. .6,                                      Length 1,                                      Breadth 1.2 inches.

Shell smooth, subtriangular, somewhat compressed, very inequilateral nearly round behind, round before; substance of the shell somewhat thick, thicker before; beaks raised; ligament rather short and thin; epidermis dark olive, without rays, with broad bands at the marks of growth, shining towards the beaks, striate at the basal margin, banded along the marks of growth, which are distant; umbonial slope slightly raised and obtusely angular; posterior slope narrow, very slightly raised, with indistinct lines on each valve from the beaks to the posterior margin; cardinal teeth rather small, compressed, pyramidal and striate; lateral teeth rather short, oblique and nearly straight; anterior cicatrices confluent, small and well impressed; posterior cicatrices distinct, moderately large and somewhat impressed; dorsal cicatrices placed on the plate within the cavity of the beaks; cavity of the shell shallow and wide; cavity of the beaks somewhat deep and angular; nacre white and iridescent.

*Remarks.*—This is a well characterized little species, which in outline is very close to *Barnesianus* (nobis), but is slightly more triangular. The three specimens before me have their beaks eroded, and therefore the character of the beaks cannot be ascertained. This species is not easily confounded with any other. Having broad, dark brown bands, at the marks of growth, it is easily distinguished at once from *Barnesianus* and from *medius*, the color of the epidermis also differs; it is a small species, the largest being 1.7 inch wide, and 1.3 inch long. The soft parts were not received, and therefore no comparison of that important portion of the animal can be made.

## UNIO PALLIDOFULVUS. Pl. 11, fig. 232.

Testâ lævi, obliquâ, tumidâ, valdè inæquilaterali, posticè rotundatâ, anticè rotundâ; valvulis crassis, anticè crassioribus; natibus elevatis, subincurvis; epidermide pallido-fulvâ, maculatâ, infernè striatâ; dentibus cardinalibus parvis, pyramidatis striatisque; lateralibus subcurtis, crassis, subobliquis; margaritâ argenteâ et iridescente.

Shell smooth, oblique, swollen, very inequilateral, rounded behind and round before; valves thick, thicker before; beaks raised, somewhat incurved; epidermis pale yellow, spotted, striate below; cardinal teeth small, pyramidal and striate; lateral teeth short, thick and somewhat oblique; nacre silver white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 60.

*Hab.*—Cahawba River, Alabama; E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .7,

Length 1,

Breadth 1.4 inch.

Shell smooth, oblique, swollen, very inequilateral, rounded behind and round before; substance of the shell thick, thicker before; beaks raised, somewhat incurved; ligament small and very light brown; epidermis pale yellow, nearly honey yellow, with two or three small, isolated spots on the umbonial slope at the upper lines of growth, which are rather distant, striate at the basal margin, and smooth and bright at the beaks; umbonial slope somewhat raised and rounded; posterior slope slightly carinate, elliptical, with two obscure lines on each valve from the beaks to the margin; cardinal teeth small, pyramidal and striate; lateral teeth rather short, thick and somewhat oblique; anterior cicatrices distinct, small and deeply impressed; posterior cicatrices distinct, rather small and well impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell rather shallow; cavity of the beaks shallow and rounded; nacre silver white and iridescent.

*Remarks.*—Several specimens are before me; none were received in alcohol, and therefore the soft parts are not observed. In outline it is nearly allied to *interventus*, herein described; but it is more oblique and has different markings, that species having obscure rays, while this has simple, dark green spots before the umbonial slope at the intersection of the lines of growth. There is a group of species which have this peculiar character of well defined spots in a row before the umbonial slope. In outline it is also very near to *Hanleyianus* (nobis), and is about the same size, but it differs in having a much lighter epidermis, more distant lines of growth, and in having the above mentioned spots. The lines of growth, without being dark, are well defined.

#### UNIO INTERVENTUS. Pl. 11, fig. 233.

Testâ lævi, subobliquâ, subcompressâ, inæquilaterali, posticè rotundatâ, anticè rotundâ; valvulis crassiusculis, anticè crassioribus; natibus elevatis; epidermide luteo-corneâ, supernè radiatâ, infernè striatâ, ad umbones micanti; dentibus cardinalibus parvis, pyramidatis striatisque; lateralibus subcurtis, crassis, subobliquis subcurvisque; margaritâ argenteâ et valde iridescente.

Shell smooth, somewhat oblique, rather compressed, inequilateral; rounded behind and round before; valves rather thick, thicker before; beaks raised; epidermis yellowish horn color, rayed above, striate below, shining on the umbones; cardinal teeth small,

pyramidal and striate; lateral teeth rather short, thick, somewhat oblique and somewhat curved; nacre silver white and very iridescent.

Proc. Acad. Nat. Sci. 1861, p. 60.

*Hab.*—Cahawba River, Alabama. E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .6. Length 1. Breadth 1.4 inch.

Shell smooth, suboblique, rather compressed, inequilateral, rounded behind and round before; substance of the shell somewhat thick, thicker before; beaks raised; ligament rather short, thin and light brown; epidermis yellowish horn color, rayed and shining above, striate below, and with three or four distant lines of growth; umbonial slope slightly raised and rounded; posterior slope narrow-elliptical, slightly carinate, with an obscure impressed line from the beaks to the margin; cardinal teeth small, pyramidal and striate; lateral teeth rather short, thick, somewhat oblique and slightly curved; anterior cicatrices distinct, rather large and deeply impressed; posterior cicatrices distinct, rather large and well impressed; dorsal cicatrices situated above the centre of the cavity of the beaks; cavity of the shell rather shallow and wide; cavity of the beaks rather shallow and obtusely angular; nacre silver white and very iridescent.

*Remarks.*—Two specimens of this species are before me. It is closely allied to *pallidofulvus*, herein described; but differs somewhat in the outline, in being devoid of spots on the umbonial slope, and in being more compressed. That species has no rays of any kind. This has them on the beaks, interrupted at the lines of growth, and extending but a short distance. This species reminds one of *Hanleyanus* on one side and *devisus* on the other. It is not so transverse as the former, and not so oblique as the latter. The beaks are not perfect enough to give us an idea of the character of the undulations.

#### UNIO ORNATUS. Pl. 11, fig. 234.

Testâ lævi, subrotundâ, compressâ, inæquilaterali, posticè subrotundâ, anticè rotundâ; valvulis crassiusculis, anticè crassioribus; natibus subprominentibus, ad apices rugoso-undulatis; epidermide melleâ, viridi-maculatâ, supernè nitidâ, infernè striatâ; dentibus cardinalibus parviusculis, sulcatis; laterali-bus brevibus, obliquis rectisque; margaritâ argenteâ et valdè iridescente.

Shell smooth, subrotund, compressed, inequilateral, nearly round behind, round before; valves somewhat thick, thicker before; beaks rather prominent, rugosely undulate at the tips; epidermis honey yellow, green spotted, bright above, striate below; cardinal teeth rather small, sulcate; lateral teeth short, oblique and straight; nacre silver white and very iridescent.

Proc. Acad. Nat. Sci. 1861, p. 41.

*Hab.*—Alabama? T. R. Ingalls, M. D.

My cabinet.

Diam. .5,

Length .9,

Breadth 1.1 inch.

Shell smooth, subrotund, compressed, inequilateral, nearly round behind, round before; substance of the shell rather thick, thicker before; beaks rather prominent, with a few rough undulations at the tips; ligament short, thin and yellowish brown; epidermis honey yellow, ornate, with well marked green spots below the marks of growth, which are rather distant, bright and shining above and striate below along the margin; umbonial slope slightly raised and rounded; posterior slope narrow, very slightly raised with an impressed line on each valve from the beaks to the posterior margin; cardinal teeth rather small and sulcate; lateral teeth short, oblique and straight; anterior cicatrices distinct, small and well impressed; lateral cicatrices distinct, small and moderately impressed; dorsal cicatrices placed under the plate and along the base of the cardinal tooth; cavity of the shell shallow and wide; cavity of the beaks shallow and subangular; nacre silver white and very iridescent.

*Remarks.*—The description is made from a single specimen which has been in my possession several years. It was sent to me by Dr. Ingalls to describe, if new, with the privilege of keeping it in my cabinet. Being in frequent receipt of specimens from Alabama, Georgia and Tennessee of species belonging to this group and nearly allied to this species, I delayed in hopes of getting other specimens, but I have been disappointed, and I regret to describe it without others, both older and younger. I doubt if this specimen be full grown, while I suspect it to be nearly so. In outline it is close to *coccineus*, Hild., but in color and spots it is nearly allied to *Bigbyensis* (nobis) and *oviformis*, Con. It differs from the former in being rounder and having less maculation or rays, from the latter in not being oblique and having less maculation or rays. The maculations are formed by bundles of short, green, capillary lines immediately below the marks of growth, and are strikingly in contrast with the clear yellow of the surrounding epidermis. In this specimen the two valves differ in regard to these maculations; they are fewer and larger in the right valve, and more numerous and thinner in the left.

UNIO TRINACRUS. Pl. 12, fig. 235.

Testâ lævi, triangulari, ad umbones tumidâ, inæquilaterali, posticè angulatâ, anticè obliquè rotundatâ; valvulis crassis, anticè et posticè crassioribus; natibus prominentibus, tumidis; epidermide fusco-virente, obsoletè radiatâ, striatâ; dentibus cardinalibus parvinseculis, depressis striatisque; lateralibus subcurtis, pererassis, obliquis, corrugatis rectisque; margaritâ argenteâ et iridescente.

Shell smooth, triangular, swollen at the umbones, inequilateral, angular behind, obliquely rounded before; valves thick, thicker behind and before; beaks prominent and swollen; epidermis brownish green, obscurely rayed, striate; cardinal teeth somewhat

small, depressed and striate; lateral teeth rather short, very thick, oblique, corrugate and straight; nacre silver white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 59.

*Hab* —Coosa River, Alabama. E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .9,

Length 1.3,

Breadth 2 inches.

Shell smooth, triangular, swollen at the umbones, inequilateral, angular behind, obliquely rounded before; substance of the shell thick, thicker before and behind; beaks prominent and swollen; ligament rather short, somewhat thick and greenish brown; epidermis brownish green, obscurely rayed, and transversely and closely striate, with indistinct, distant lines of growth; umbonial slope much raised and acutely angular; posterior slope elliptical, flattened, yellowish, with a few obscure capillary lines, with two obscure, impressed lines from the tips to the posterior margin; cardinal teeth rather small, depressed and striate; lateral teeth rather short, very thick, oblique, corrugate and straight; anterior cicatrices distinct, rather small and deeply impressed; posterior cicatrices distinct, rather large and well impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell rather deep, irregular, and deeply and obliquely guttered in the middle; cavity of the beaks rather shallow and rounded.

*Remarks.*—A single specimen only of this interesting species was received from Dr. Showalter. In outline it is very nearly the same as *Woodwardianus* (nobis), but differs in the color of the epidermis, in the rays, which are closer and not interrupted, and in the greater thickness of *trinacrus*. The lateral teeth are much thicker and more blunt at the posterior termination. It is about the same size, but still may easily be distinguished. The beaks are too much eroded to observe any undulations. The specimen before me seems to be adult, and well developed. The disk, up to the angular edge of the umbonial slope, is dark olive green, the color being caused by the close, broad, greenish rays, showing obscure, yellowish intervals. The yellow face of the posterior slope comes up sharply to this angle of the umbonial slope. The irregular, waving surface of the interior is very remarkable, having a deep gutter in the centre from the beaks to the posterior basal margin. It is greatly to be regretted that we have not the soft parts of the female in a state of development to exhibit the *branchial uterus*, which, I suspect, will prove to be much like that of *Woodwardianus*, as well, also, the embryonic form.

UNIO DECUMBENS. Pl. 12, fig. 236.

Testâ lævi, arcuatâ, valdè compressâ, ad latere planulatâ, inæquilaterali, posticè biangulatâ, anticè rotundâ; valvulis subtenuibus, anticè et posticè paulisper crassioribus; natibus prominulis; epidermide

tenebro-rufo-fuscâ, obsoletè radiatâ, transversè striatâ; dentibus cardinalibus minimis, subcompressis, in utroque valvulo duplicibus; lateralibus prælongis, arcuatis; margaritâ purpurecente et valdè iridescente.

Shell smooth, arcuate, much compressed, flattened at the sides, inequilateral biangular behind, round before; valves rather thin, slightly thicker before and behind; beaks slightly prominent; epidermis dark reddish brown, obscurely rayed, transversely striate; cardinal teeth very small, rather compressed, double in both valves; lateral teeth very long, arcuate; nacre purplish and very iridescent.

Proc. Acad. Nat. Sci. 1861, p. 40.

*Hab.*—Alabama. E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter and Dr. Hartman.

Diam. .7,

Length 1.7,

Breadth 3.3 inches.

Shell smooth, arcuate, very much compressed, very much flattened at the sides, inequilateral, biangular behind and rounded before; substance of the shell rather thin, slightly thicker behind and before; beaks slightly prominent; ligament long, thin and concealed; epidermis dark reddish brown, obscurely rayed, with very distant marks of growth; umbonial slope very low and obtusely angular; posterior slope very narrow, raised into a high carina, almost constituting a wing; cardinal teeth very small, rather compressed and double in both valves; lateral teeth very long, arcuate and thickened at the posterior extremities; anterior cicatrices distinct, rather small and slightly impressed; posterior cicatrices confluent and very slightly impressed; dorsal cicatrices placed in a curve line from the centre of the cavity of the beaks along the under side of the arch of the lateral teeth; cavity of the shell very shallow and very wide; cavity of the beaks very shallow, scarcely perceptible; nacre purplish and very iridescent.

*Remarks.*—A single specimen only of this remarkable species is before me. It reminds one at once of *percoarctatus* (nobis). Like it, it is exceedingly compressed, has the broad, flat posterior slope, with its biangular, obtuse termination, and has its loose, closely striate and dark epidermis. It differs in the outline in having an arcuate, basal line, in having arcuate lateral teeth, and in the cardinal teeth being nearly direct, while in *percoarctatus*, the cardinal teeth are larger and nearly perpendicular to the basal margin of the shell. The longest perpendicular line is about one-third from the posterior margin. The long, lateral teeth are very thin and arched about the middle, and very much thickened at the posterior termination. It is imperfectly double in the left valve only. It is greatly to be regretted that a single individual only is under examination, as others might vary in some of the remarkable characters of this one. The thinning of the central parts of the substance of the valves may differ in other individuals.

## UNIO CONCOLOR. Pl. 12, fig. 237.

Testâ lævi, obliquè ellipticâ, subinflatâ, inæquilaterali, posticè subbiangulatâ, anticè rotundâ; valvulis subcrassis, anticè crassioribus; natibus subprominentibus; epidermide tenebroso-olivâ, radiatâ, ad umbones nitidâ, infernè striatâ; dentibus cardinalibus crassiusculis, erectis, obtusè compressis; laterali-bus sublongis, obliquis subrectisque; margaritâ albâ et iridescente.

Shell smooth, obliquely elliptical, somewhat inflated, inequilateral, subbiangular behind, rounded before; valves rather thick, thicker before; beaks rather prominent; epidermis dark olive, without rays, bright towards the beaks, striate below; cardinal teeth somewhat thick, erect, obtusely compressed; lateral teeth somewhat long, oblique and nearly straight; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 40.

*Hab.*—Big Prairie Creek, Alabama. E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter and Dr. Lewis.

Diam. .8, Length 1.3, Breadth 2 inches.

Shell smooth, obliquely elliptical, somewhat inflated, inequilateral, subbiangular behind, round before; substance of the shell rather thick, thicker before; beaks rather prominent; ligament rather large and dark brown; epidermis very dark olive, without rays, shining on the umbones and striate below; umbonial slope slightly raised and very obtusely angular; posterior slope rather narrow, very slightly raised, with an indistinct impressed line on each valve from the beaks to the posterior margin, with four or five rather close marks of growth; cardinal teeth somewhat thick, erect, obtusely compressed, oblique; lateral teeth rather long, oblique and nearly straight; anterior cicatrices distinct, rather small and well impressed; posterior cicatrices confluent, rather large and slightly impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell rather shallow and wide; cavity of the beaks very shallow and rounded; nacre white and iridescent.

*Soft parts.*—*Branchial uterus* not charged, but very small ova were found in the ovarium. *Branchiæ* rather large, nearly semicircular, inner ones somewhat the larger, free nearly the whole length of the abdominal sack. *Palpi* rather large, united half way down the posterior edges. *Mantle* thin, with a broad, thickened border colored on the margin. *Branchial opening* small, with a few small papillæ slightly colored. *Anal opening* small, with very small papillæ on the inner edges. *Super-anal opening* rather large, colored on the edges and united below. Color of the mass whitish, inclining to salmon.

*Remarks.*—Three specimens of this species are before me—nearly all of the same size. It belongs to a group of which *Brumbyanus* (nobis) may be considered the type in regard to outline, in that character being very nearly the same; but it is not allied to it in the character of the epidermis, *Brumbyanus* being nearly or quite black,

and it is more inflated also. It reminds one of *nux* (nobis), but it is a larger species, with beaks more terminal, but not so much elevated. The color of the epidermis, which is rather unusual, being of a dark olive, is remarkably uniform; neither of these specimens have rays. The beaks are not perfect enough to exhibit any undulations at the tips. It was supposed that this was the *perovatus* of Mr. Conrad, but it cannot be the same species described and figured by him, under that name, in the "American Journal of Science," vol. 28, pl. 1, fig. 3. Neither the description nor figure answers to *concolor*, and the marks of growth in his figures are fifteen, while this species has five or six only.

UNIO FABACEUS. Pl. 13, fig. 238.

Testâ lævi, oblongâ, subquadratâ, subinflatâ, postice subbiangulatâ, subæquilaterali; valvulis crassiusculis, anticè crassioribus; natibus prominulis; epidermide tenebroso-fuscâ, micanti, obsoletè radiatâ; dentibus cardinalibus parvis, erectis, acuminatis, crenulatis; lateralibus curtis, lamellatis subcurvisque; margaritâ purpurecentè, salmonis colore tinctâ et valdè iridescente.

Shell smooth, oblong, subquadrate, rather inflated, subbiangular behind, nearly equilateral; valves somewhat thick, thicker before; beaks slightly prominent; epidermis dark brown, shining, obscurely radiate; cardinal teeth small, erect, pointed, crenulate; lateral teeth short, lamellar and somewhat curved; nacre purplish and salmon color and very iridescent.

Proc. Acad. Nat. Sci. 1861, p. 38.

*Hab.*—Oostanaula River, Georgia. Bishop Elliott.

My cabinet and cabinet of Bishop Elliott.

Diam. .6, Length, .9, Breadth, 1.3 inch.

Shell smooth, oblong, subquadrate, rather inflated, subbiangular behind and nearly equilateral; substance of the shell somewhat thick, thicker before; beaks slightly prominent; ligament very short, thin and light brown; epidermis dark brown, inclining to olive, shining, very obscurely rayed, with distant, well marked lines of growth; umbonial slope inflated and rounded; posterior slope rather broad, with a small carina, with a rather broad furrow, which causes an emargination at the edges; cardinal teeth small, erect, acuminate and crenulate; lateral teeth short, lamellar and somewhat curved; anterior cicatrices distinct, rather large and well impressed; posterior cicatrices confluent, large and slightly impressed; dorsal cicatrices placed within the cavity of the beaks at the base of the cardinal teeth; cavity of the shell rather deep and rounded; cavity of the beaks somewhat deep and angular; nacre purplish and salmon color and very iridescent.

*Remarks.*—A single specimen only of this little species was received from Bishop Elliott, and without the soft parts. In outline it is near to *cacao* (nobis), and is about the same size, but cannot be confounded with that species, as it is a thinner shell, more inflated, has not the flattened sides, and is not so dark in the epidermis. It is



also more quadrate, and the lines of growth are more distinct. It reminds one of *nitens* (nobis), and has a nacre of purple in the cavity, and salmon color in the lower part of the valves. It is, however, more quadrate, and the beaks are more medial. The tips of the beaks are imperfect in this specimen, but there is an appearance of a few rather coarse undulations. It is also allied to *hebes* (nobis), but that is a much larger species, more transverse, and more compressed.

## UNIO IRRASUS. Pl. 13, fig. 239.

Testâ lævi, rotundo-trigonâ, inflatâ, posticè obtusè angulatâ, anticè rotundâ; valvulis subcrassis, anticè crassioribus; natibus subelevatis, crassis; epidermide luteo-fuscâ, vel obsoletè radiatâ vel cradiatâ; dentibus cardinalibus crassis, elevatis, subcompressis crenulatisque; lateralibus curtis, crassis, obliquis rectisque; margaritâ argenteâ et iridescente.

Shell smooth, rotundo-triangular, inflated, obtusely angular behind and round before; valves rather thick, thicker before; beaks rather raised and thick; epidermis yellowish brown, obscurely rayed or without rays; cardinal teeth thick, elevated, somewhat compressed and crenulate; lateral teeth short, thick, oblique and straight; nacre silver white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 38.

*Hab.*—Etowah River, Georgia. Rev. G. White.

My cabinet and cabinet of Mr. White.

Diam. .7, Length 1.1, Breadth 1.4 inch.

Shell smooth, rotundo-triangular, inflated, obtusely angular behind, round before; substance of the shell rather thick, thicker before; beaks rather raised and thick; ligament thick, short and light brown; epidermis yellowish brown, without rays or obscurely rayed, with numerous close lines of growth; umbonial slope slightly raised and rounded; posterior slope rather broad, rather depressed, with two raised lines on each valve from the beaks to the margin; cardinal teeth thick, elevated, compressed, and crenulate; lateral teeth short, thick, oblique and straight; anterior cicatrices distinct, small, and deeply impressed; posterior cicatrices distinct, rather small and well impressed; dorsal cicatrices placed on the plate within the cavity of the beaks; cavity of the shell rather deep and rounded; cavity of the beaks rather shallow and obtusely angular; nacre silver white and iridescent.

*Remarks.*—This is a small species which while it reminds one of *trigonus* (nobis), is more rotund, approaching to *ebenus* (nobis), but it cannot be confounded with either. It is smaller than either, and not by any means so thick and solid, the largest being only  $1\frac{1}{4}$  inch by  $1\frac{3}{8}$ . It is also more lenticular. The lines of growth are close and well marked, there being twelve on the oldest of nearly a dozen specimens in my possession. One of the specimens has close, dark green rays over the umbones and towards the tips of the beaks. No soft parts were received with these.

## UNIO ANATICULUS. Pl. 13, fig. 240.

Testâ levi, obliquâ, ad umbones valdè tumidâ, anticè truncatâ, posticè obtusè angulatâ, valdè inæquilaterali; valvulis crassiusculis, anticè crassioribus; natibus elevatis, crassis, incurvis, ferè terminalibus; epidermide castaneâ, vittatâ, obsoletè radiatâ; dentibus cardinalibus suberassis, subpyramidatis crenulatisque; lateralibus crassis, obliquis subrectisque; margaritâ argenteâ et iridescente.

Shell smooth, oblique, very much swollen at the beaks, truncate before, obtusely angular behind, very inequilateral; valves somewhat thick, thicker before; beaks raised, thick, incurved, nearly terminal; epidermis chestnut color, banded, obscurely radiate; cardinal teeth rather thick, subpyramidal and crenulate; lateral teeth thick, oblique and nearly straight; nacre silver white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 40.

*Hab.*—Near Columbus, Mississippi. Wm. Spillman, M. D.

My cabinet, and cabinet of Dr. Spillman.

Diam. .7,

Length 1.

Breadth 1.4 inch.

Shell smooth, oblique, much swollen, at the beaks, truncate before, obtusely angular behind, very inequilateral; substance of the shell somewhat thick, thicker before; beaks raised, thick, incurved and nearly terminal; ligament rather short, somewhat thick and brown; epidermis chestnut color inclining to yellow, transversely banded, with a few obscure rays, and with three or four distant lines of growth; umbonial slope slightly raised and flattish; posterior slope rather narrow, elongate cordate, with two obscure impressed lines in each valve; cardinal teeth somewhat thick, subpyramidal and crenulate; lateral teeth thick, oblique and nearly straight; anterior cicatrices distinct, rather small and deeply impressed; posterior cicatrices distinct, rather small and well impressed; dorsal cicatrices placed on the upper side of the cavity of the beak at the end of the cardinal tooth; cavity of the shell rather shallow and rounded; cavity of the beaks very shallow and obtusely angular; nacre silver white and iridescent.

*Remarks.*—This species is closely allied to *curtus* (nobis). They are so nearly alike that at first I considered it only a variety. They may, however, be distinguished by the color, the bands and slight difference of form. Of seven specimens before me none have the dark green color which pervades the umbones of *curtus*. In the bands, which are strongly marked at the lines of growth in *anaticulus*, they differ entirely. *Curtus* is a somewhat larger species, and more tumid, heavier, is not so oblique, and has more depression before the umbonial slope. The rays of *anaticulus* are more distinct on the young, and are interrupted by the transverse bands, none of them extending to the margin. The color of the epidermis is very uniform except on a single specimen, which inclines to olive yellow, and is almost rayless. It reminds one also of *medius* (nobis) on one side, and *decisus* (nobis) on the other, but is

more transverse than the former and less so than the latter. None of the beaks were perfect, but there were evidently two or three rugose undulations on one of the specimens.

UNIO CICUR. Pl. 13, fig. 241.

Testâ lævi, oblongâ, subinflata, ad latere subplanulatâ, posticè rotundatâ, valdè inæquilaterali; valvulis tenuibus, subdiaphanis; natibus subprominentibus, ad apices undulatis; epidermide olivaceâ, eradiatâ; dentibus cardinalibus parvissimis, compressis subrectisque; lateralibus longis, prætenuis, lamellatis subrectisque; margaritâ cæruleâ et valdè iridescente.

Shell smooth, oblong, somewhat inflated, flattened at the sides, rounded before very inequilateral; valves thin, semi-transparent; beaks somewhat prominent, undulate at the tips; epidermis olivaceous, without rays; cardinal teeth very small, compressed and nearly straight; lateral teeth long, very thin, lamellar and nearly straight; nacre bluish white and very iridescent.

Proc. Acad. Nat. Sci. 1861, p. 39.

*Hab.*—Little Ocmulgee River, Georgia. S. W. Wilson, M. D.

My cabinet and cabinet of Dr. Wilson.

Diam. .6, Length 1, Breadth 1.8 inch.

Shell smooth, somewhat inflated, slightly flattened at the sides, rounded behind and very inequilateral; substance of the shell rather thin and semi-transparent; beaks somewhat raised and rather coarsely undulate at the tips; ligament very thin, rather long and light brown; epidermis olivaceous, without rays, not shining, with rather close lines of growth; umbonial slope raised and very obtusely angular; posterior slope rather broad, subelliptical, carinate, with three obscure lines on each valve; cardinal teeth very small, compressed and nearly straight; lateral teeth long, very thin, lamellar and nearly straight; anterior cicatrices distinct, rather large and slightly impressed; posterior cicatrices confluent, rather large and very slightly impressed; dorsal cicatrices placed in the centre of the cavity of the beaks, but scarcely perceptible; cavity of the shell rather deep and wide; cavity of the beaks rather shallow and rounded; nacre bluish white and very iridescent.

*Remarks.*—A single specimen only, and without the soft parts, is before me. In outline it is very near to *inusitatus* (nobis), the dorsal and basal margins being nearly parallel. The form of the teeth is very nearly the same also. It may, however, easily be distinguished from that species. It is a smaller and much thinner species, and has much more delicate teeth. The color of the epidermis differs very much, *inusitatus* being of a reddish brown and bright, while *cicur* is olivaceous and dull, having no brightness. It differs essentially too in not having the constriction of the middle of the valve which is so remarkable in *inusitatus*.

## UNIO BEADLEIANUS. Pl. 14, fig. 242.

Testâ lævi, subrotundâ, ventricosâ, subæquilaterali, anticè rotundatâ, posticè obtusè angulatâ; valvulis crassis, anticè crassioribus; natibus subelevatis, incurvis; epidermide tenebroso-fuscâ, obsoletè radiatâ; dentibus cardinalibus magnis, erectis, compressis corrugatisque; lateralibus crassis, curtis corrugatisque; margaritâ vel albâ vel roseâ et iridescente.

Shell smooth, subrotund, ventricose, nearly equilateral, rounded before and obtusely angular behind; valves thick, thicker before; beaks somewhat raised and incurved; epidermis dark brown, obscurely rayed; cardinal teeth large, erect, compressed and corrugate; lateral teeth thick, short and corrugate; nacre white or rose color, and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 39.

*Hab.*—Pearl River, Jackson, Mississippi. Rev. E. R. Beadle.

My cabinet and cabinets of Rev. Mr. Beadle, Mr. Wheatley and Dr. Hartman.

Diam. 1,

Length 1·5,

Breadth 1·8 inch.

Shell smooth, subrotund, ventricose, nearly equilateral, rounded before and obtusely angular behind; substance of the shell thick, thicker before; beaks somewhat raised and incurved; ligament short, thick and dark brown; epidermis dark brown, without rays, or obscurely radiate and with distant marks of growth; umbonial slope raised into an obtuse angle; posterior slope wide, flattened, with an obscure furrow in each valve; cardinal teeth large and massive, erect, compressed and corrugate; lateral teeth thick, short, corrugate, disposed to duplication in the left as they are in the right valve; anterior cicatrices distinct, rather small and very deeply impressed; posterior cicatrices nearly distinct, rather large and well impressed; dorsal cicatrices placed nearly in the centre of the beaks; cavity of the shell deep and rounded; cavity of the beaks deep and obtusely angular; nacre white or rose color, and iridescent.

*Remarks.*—This species very closely resembles *circulus* (nobis), but may be distinguished at once by the angle on the umbonial slope, by its being higher in the beaks, and by the color of the epidermis, which is more rufous in the *Beadleianus*. There is also a difference in the rose color of the nacre. In both species, I believe, the white color prevails; it certainly does in the *circulus*. Of the four specimens before me, two are white and two rose color, one of the latter being rather intense, and the other only having a blush. The position of the color differs from that in *circulus*, being spread over the nacre, while in the *circulus*, it is usually a tint in the centre of the cavity.

Specimens were sent by the Rev. Mr. Beadle, of Hartford, Connecticut, to Mr. Wheatley, and I have great pleasure in dedicating the species to the gentleman who discovered it, and to whom our cabinets are indebted for their possession.

## UNIO OCMULGÉENSIS. Pl. 14, fig. 243.

Testâ lævi, transversâ, inflatâ, posticè obtusè biangulatâ, anticè subtruncatâ, valdè inæquilaterali; valvulis crassis, anticè crassioribus; natibus prominulis; epidermide tenebroso-fuscâ, eradiatâ, supernè micanti, infernè valdè striatâ; dentibus cardinalibus parviusculis, pyramidatis striatisque; lateralibus prælongis, lamellatis subrectisque; margaritâ aurantiâ et valdè iridescente.

Shell smooth, transverse, inflated, obtusely biangular behind, somewhat truncate before, very inequilateral; valves thick, thicker before; beaks a little prominent; epidermis dark brown, eradiate, shining above and much striated below; cardinal teeth rather small, pyramidal and striate; lateral teeth very long, lamellar and nearly straight; nacre golden and very iridescent.

Proc. Acad. Nat. Sci. 1861, p. 38.

*Hab.*—Little Ocmulgee River, Lumber City, Georgia. S. W. Wilson, M. D.

My cabinet and cabinet of Dr. Wilson.

Diam. 1·3, Length 2, Breadth 4·1 inches.

Shell smooth, transverse, inflated, obtusely biangular behind, subtruncate before and very inequilateral; substance of the shell thick, thicker before; beaks a little prominent, nearly terminal; ligament long, rather thick and dark brown; epidermis dark brown, without rays, shining above, with loose, scaly striæ near the margin, and with irregular, indistinct marks of growth; umbonial slope slightly raised and very obtusely angular; posterior slope long, elliptical and slightly furrowed; cardinal teeth rather small, pyramidal, striate and crenulate; lateral teeth very long, lamellar and nearly straight; anterior cicatrices distinct, very large, corrugate and deeply impressed; posterior cicatrices confluent, very large and well impressed; dorsal cicatrices placed a little above the centre of the cavity of the beaks; cavity of the shell not deep, but wide; cavity of the beaks very shallow and rounded; nacre golden, inclining to salmon, very rich and iridescent.

*Remarks.*—A single specimen, and without the soft parts, was received from Dr. Wilson. The beaks are much eroded, and do not, of course, give the character of the undulations. It is a well marked species, with a nacre, which yields to no other species in richness, being very satin-like, pure and perfectly iridescent. Younger and more perfect specimens may exhibit obscure rays; this one has none whatever. In outline, it is nearest to *verutus* (nobis), but it is a larger species, with a much darker epidermis, is more inflated, the *verutus* being flattened on the sides.

## UNIO RUBIDUS. Pl. 14, fig. 244.

Testâ sulcatâ, subtriangulari, valdè inflatâ, ad latere planulatâ, subæquilaterali; valvulis suberassis, anticè crassioribus; natibus subprominentibus, subinflatis; epidermide tenebroso-rufo-fuscâ, eradiatâ, supernè micanti, infernè striatâ; dentibus cardinalibus crassiusculis, elevatis, subpyramidatis crenulatisque; lateralibus sublongis, curvis subcrassisque; margaritâ vel rosaceâ vel albâ vel salmonis colore tinctâ et iridescente.

Shell sulcate, subtriangular, very much inflated, flattened at the sides, nearly equilateral; valves somewhat thick, thicker before; beaks somewhat prominent, slightly inflated; epidermis dark reddish brown, without rays, shining above and striate below; cardinal teeth rather thick, raised, subpyramidal and crenulate; lateral teeth rather long, curved and somewhat thick; nacre rose-colored, white or salmon and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 40.

*Hab.*—Tombigbee River, Mississippi. W. Spillman, M. D.; Coosa River and Big Prairie Creek, Alabama. E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Spillman, Dr. Showalter and Dr. Hartman.

Diam. 1·1,

Length 1·7,

Breadth 2·2 inches.

Shell sulcate, subtriangular, very much inflated, flattened at the sides, subequilateral; substance of the shell rather thick, thicker before; beaks somewhat prominent and slightly inflated; ligament rather large and dark brown; epidermis dark reddish brown, without rays, shining above and striate below, with numerous, rather close lines of growth; umbonial slope raised into a well-defined angle; posterior slope broad, very dark brown, with two impressed lines from the beaks to the margin in each valve; cardinal teeth rather thick, elevated, somewhat pyramidal and crenulate; lateral teeth rather long, curved and somewhat thick; anterior cicatrices distinct, rather large and deeply impressed; posterior cicatrices confluent, large and well impressed; dorsal cicatrices placed on the under side of the plate within the cavity of the beaks; cavity of the shell deep and rounded; cavity of the beaks very deep and angular; nacre rosaceous, white or salmon tinted and iridescent.

*Soft parts.*—*Branchial uterus* not charged. Ova were found in the ovarium only. *Branchiæ* very large, curved below, inner ones much the larger, free two-thirds the length of abdominal sack. *Palpi* large, subtriangular, united half way down the posterior edges. *Mantle* very thin, with a very broad border. *Branchial opening* large, with numerous small papillæ on the inner edges. *Anal opening* large, with very minute, closely-set papillæ on the inner edges. *Super-anal opening* very large, edges colored, united below; color of the mass whitish.

*Remarks.*—The soft parts of these specimens were not in good order, and were blackened by the liquor or some other matter. There was no appearance of redness in the ova as in the kindred species *rubiginosus*. This species is, in many characters, closely allied to *rubiginosus*, but it differs in being much more inflated, in being sulcate, in being more quadrate, and in having the lines of growth much more close. Two specimens of *rubiginosus* were received from Dr. Spillman, with several *rubidus*. An adult of the former has but three marks of growth. In all of the adults of the latter there are seven or eight such marks. In all the specimens before me the epidermis

is of a reddish brown; but when the nacre is white, it inclines to lighter brown. Five specimens are rosaceous, two salmon tinted and two white. None of the specimens had perfect tips on the beaks, and therefore the character of the undulations is unknown. It is likely they will be found to be the same as those of *rubiginosus*, closely corrugate.

UNIO FLAVIDULUS. Pl. 15, fig. 245.

Testâ lævi, ellipticâ, subinflatâ, valdè inæquilaterali, posticè obtusè angulatâ, anticè rotundâ; valvulis subtenuibus, anticè crassioribus; natibus prominulis; epidermide vel luteo-fuscâ vel luteo-viridi, eradiatâ; dentibus cardinalibus parviusculis, erectis, compressis, in utroque valvulo duplicibus; lateralibus sublongis, lamellatis, subrectisque; margaritâ albâ et iridescente.

Shell smooth, elliptical, rather inflated, very inequilateral, obtusely angular behind, round before; valves somewhat thin, thicker before; beaks slightly prominent; epidermis yellowish brown or yellowish green, without rays; cardinal teeth somewhat small, erect, compressed and double in both valves; lateral teeth rather long, lamellar and nearly straight; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 39.

*Hab.*—Stream near Columbus, Mississippi. Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .6, Length .9, Breadth 1.5 inch.

Shell smooth, elliptical, rather inflated, very inequilateral, obtusely angular behind, round before; substance of the shell somewhat thin, thicker before; beaks a little prominent; ligament small, thin and dark brown; epidermis yellowish brown or greenish on the sides, without rays, with rather close, equidistant lines of growth; umbonial slope somewhat raised and round, or very obtusely rounded; posterior slope rather narrow, elliptical, yellow with two greenish lines on each valve from the beaks to the posterior margin; cardinal teeth rather small, erect, compressed, double in both valves; lateral teeth somewhat long, lamellar and straight; anterior cicatrices distinct, small and well impressed; posterior cicatrices distinct, rather large and slightly impressed; dorsal cicatrices under the plate, and across the base of the cardinal tooth; cavity of the shell moderately deep and wide; cavity of the beaks rather shallow and subangular; nacre white and iridescent.

*Remarks.*—This is a small species of a nearly regular ellipse. The largest of four is  $1\frac{1}{2}$  inches wide and nine-tenths long. In outline it is very near to the male of *parvus*, Bar., but it belongs to the natural group of which *Hanleyanus* (nobis) may be considered the type; it is not, however, an oblique species having a nearly regular transverse elliptical form. It is totally different from *parvus* in the color of the epidermis, and the nacre is not pearly but rather a dead white. In color and general aspect it reminds one at once of *Hanleyanus*, but it is not so thick and is not

oblique, although there is a tendency to that form. All the specimens being eroded at the beaks, the character of the undulations cannot be ascertained. The most perfect specimen has a distinct double tooth in the right valve, but the others have only rudiments of duplication, being affected by the erosion of the beaks. The specimens have all been badly cleaned, being scraped to eject the deposit of oxide of iron, but it is evident that there is a disposition on the whole side, anterior to the umbonial slope, to be greenish in some specimens, and when perfect ones shall be found, I have no doubt that this portion of the disks in some will be found to be of a fine green, contrasting with the yellow of the posterior slope.

UNIO SPILLMANI. Pl. 15, fig. 246.

Testâ levi, ellipticâ, subinflatâ, inæquilaterali, posticè obtusè angulatâ, anticè rotundatâ; valvulis subcrassis, anticè paulisper crassioribus; natibus prominulis; epidermide tenebroso-fuscâ vel luteo-fuscâ, ad umbones nitidâ, radiatâ; dentibus cardinalibus crassiusculis, obtusè pyramidatis, corrugatis; lateralibus longis, crassis corrugatisque; margaritâ vel albâ vel salmonis colore tinctâ et valde iridescente.

Shell smooth, elliptical, somewhat inflated, inequilateral, obtusely angular behind, rounded before; valves rather thick, a little thicker before; beaks somewhat prominent; epidermis brown or yellow brown, shining on the umbones, radiated; cardinal teeth somewhat thick, obtusely pyramidal, corrugate; lateral teeth long, thick and rough; nacre white or salmon color and very iridescent.

Proc. Acad. Nat. Sci. 1861, p. 39.

*Hab.*—Luxpalila Creek, near Columbus, Mississippi. Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. 1.1,

Length 1.8,

Breadth 2.9 inches.

Shell smooth, elliptical, subinflated, inequilateral, obtusely angular behind, rounded before; substance of the shell rather thick, somewhat thicker before; beaks somewhat prominent; ligament rather large and dark brown; epidermis dark brown or yellowish brown, shining on the umbones, covered over the whole disk with nearly equidistant rather dull rays, with two or three distant lines of growth; umbonial slope slightly raised and very obtusely angular; posterior slope rather narrow, elliptical, slightly raised; cardinal teeth rather thick, obtusely pyramidal, corrugate; lateral teeth long, thick and corrugate; anterior cicatrices distinct, large and well impressed; posterior cicatrices confluent, large and moderately well impressed; dorsal cicatrices placed immediately over the centre of the cavity of the beaks; cavity of the shell rather deep and wide; cavity of the beaks rather deep and obtusely angular; nacre white or salmon color and very iridescent.

*Remarks.*—Some dozen specimens of this species have from time to time been sent to me by Dr. Spillman. I have, until I got some better specimens recently from him, feared it might be a mere variety of *crocatus*, (nobis), the females taking very much



the same form. It is, however, a larger species and the males are more angular posteriorly. The female shell is smaller than the male, and is enlarged on the umbonial slope, and dilated at the posterior basal margin. None of the specimens were perfect enough to observe undulations at the beaks. In outline it is very closely allied to *cariosus*, Say, but differs entirely in the color of the epidermis, in the greater thickness of the substance of the shell and in the rays, as well as having a much more depressed posterior slope. Some of the old specimens of *Spillmanii* are so dark a brown as to be almost black, and these are entirely without rays. Perfect and younger specimens have all more or less nearly equidistant, well defined rays over the whole disk. Among thirteen specimens three only have white nacre, the remainder being of a fine salmon color. The cardinal tooth in the right valve is disposed to duplication. That of the left is perfectly duplicate. I have great pleasure in naming this species after Wm. Spillman, M. D., to whom I am under many obligations for several *envois* of the fresh water mollusca of his part of the State of Mississippi.

UNIO PAUPERCULUS. Pl. 15, fig. 247.

Testâ lævi, subrotundâ, subcompressâ, subequilaterali, posticè subrotundâ, anticè rotundâ; valvulis subcrassis, anticè crassioribus; natibus prominulis; epidermide luteo-corneâ, eradiatâ; dentibus cardinalibus magnis, elevatis, decussatis; lateralibus brevissimis, obliquis rectisque; margaritâ albâ et iridescente.

Shell smooth, subrotund, somewhat compressed, nearly equilateral, nearly round behind, round before; valves somewhat thick, thicker before; beaks slightly prominent; epidermis yellowish horn color, without rays; cardinal teeth large, raised, decussate; lateral teeth very short, oblique and straight; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1861, p. 39.

*Hab.*—Stream near Columbus, Mississippi. Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .6,                                      Length .9,                                      Breadth 1.1 inch.

Shell smooth, subrotund, somewhat compressed, nearly equilateral, nearly round behind, round before; substance of the shell somewhat thick, thicker before; beaks slightly raised; ligament very short, thick and dark brown; epidermis yellowish horn color, without rays, with close, equidistant lines of growth; umbonial slope somewhat raised and very obtusely angular; posterior slope carinate. subcordate; cardinal teeth large, raised and much divided; lateral teeth very short, oblique, straight, and leaving a wide plate between them and the cardinal teeth; anterior cicatrices distinct, small and deeply impressed; posterior cicatrices confluent, small and well impressed; dorsal cicatrices placed under the plate at the base of the cardinal tooth; cavity of the shell rather shallow and rounded; cavity of the beaks rather deep and acutely angular; nacre white and iridescent.

*Remarks.*—This small species looks like some of the small depauperated specimens of *rubiginosus* (nobis); but while its angular umbonial slope gives it a triangular appearance in outline, it is really subrotund. In outline, it is nearest to *petrinus*, Gould, but cannot be confounded with that species, being much smaller and thinner, and not so regularly round. The cardinal teeth are remarkably large for so small a species, and the lateral teeth remarkably small. The nacre is unusually thin in the middle towards the base, being very iridescent there. None of the beaks were nearly perfect, and therefore the character of the undulations of the tips could not be observed. The largest of five specimens was only an inch long and an inch and three-tenths wide. The plate between the cardinal and lateral teeth is remarkably large.

UNIO CINNAMOMICUS. Pl. 16, fig. 248.

Testâ lævi, ellipticâ, inflatâ, ad umbones tumidâ, inæquilateralî, posticè angulatâ, anticè rotundâ; valvulis suberassis, anticè crassioribus; natibus subprominentibus; epidermide cinnamomicâ, infernè striatâ, eradiatâ; dentibus cardinalibus parviusculis, erectis, subcompressis crenulatisque; lateralibus curtis subrectisque; margaritâ albidâ et valdè iridescente.

Shell smooth, elliptical, inflated, swollen towards the beaks, inequilateral, angular behind, round before; valves somewhat thick, thicker before; beaks somewhat prominent; epidermis cinnamon brown, striate below, without rays; cardinal teeth rather small, erect, somewhat compressed and crenulate; lateral teeth short and nearly straight; nacre whitish and very iridescent.

Proc. Acad. Nat. Sci. 1861, p. 39.

*Hab.*—Tombigbee River, Columbus, Mississippi. Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .7,

Length 1,

Breadth 1.4 inch.

Shell smooth, elliptical, inflated, swollen on the umbones, inequilateral, angular behind and round before; substance of the shell somewhat thick, thicker before; beaks somewhat prominent; ligament short, rather thin and dark brown; epidermis cinnamon brown, darker and striate below, above brighter and smooth, without rays, and with very distant marks of growth; umbonial slope slightly raised and very obtusely angular; posterior slope cordate, slightly paler in color, very slightly raised, with two capillary lines from beak to margin on each valve; cardinal teeth rather small, erect, somewhat compressed, corrugate and crenulate; lateral teeth short and nearly straight; anterior cicatrices distinct, rather small and well impressed; posterior cicatrices distinct, rather small and slightly impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell rather shallow and rounded; cavity of the beaks rather shallow and obtusely angular; nacre whitish and very iridescent.

*Remarks.*—This is a very distinct little species, which is not likely to be confounded with any other I am acquainted with. I have two specimens before me. None were

received from Dr. Spillman with the soft parts. The beaks of both were eroded, and therefore the character of the tips could not be described. This species is remarkable for its fine cinnamon-colored epidermis, in which it is peculiar. In outline, it is allied to *nux* (nobis) and *Brumbyanus* (nobis), but cannot be confounded with either. The epidermis of *Brumbyanus* is nearly or quite black; *nux* is dark olive, and has higher umbones. The nacre of *cinnamomicus* is remarkable. The anterior two-thirds of the valve is thickened, and, in one of the specimens, a dead-cream white, the posterior third being thin and beautifully iridescent. The other specimen is very slightly tinted with a blush color.

UNIO CHICKASAWHENSIS. Pl. 16, fig. 250.

Testâ lævi, subrotundâ, subcompressâ, sublenticulari, inæquilaterali, posticè obtusè angulatâ, anticè rotundâ; valvulis crassiusculis, anticè paulisper crassioribus; natibus prominulis; epidermide tenebrososfuscâ, eradiatâ, excellismè striatâ; dentibus cardinalibus parviusculis, pyramidatis, corrugatis crenulatisque; lateralibus brevibus, subvalidis subcurvisque; margaritâ rosaceâ et valdé iridescente.

Shell smooth, subrotund, rather compressed, sublenticular, inequilateral, obtusely angular behind, round before; valves somewhat thick, slightly thicker before; beaks slightly prominent; epidermis dark brown, without rays and very closely striate; cardinal teeth rather small, pyramidal, corrugate and crenulate; lateral teeth short, rather stout and somewhat curved; nacre rose color and very iridescent.

Proc. Acad. Nat. Sci. 1861, p. 39.

*Hab.*—Chickasawha River, Mississippi. Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .6, Length 1.1, Breadth 1.5 inch.

Shell smooth, subrotund, rather compressed, sublenticular, inequilateral, obtusely angular behind and round before; substance of the shell somewhat thick, slightly thicker before; beaks slightly prominent; ligament short, thick and dark brown; epidermis very dark brown, without rays, very minutely striate and with rather distant marks of growth; umbonial slope slightly raised and obtusely angular; posterior slope narrow, elliptical, subcarinate, with two indistinct, impressed lines on each valve; cardinal teeth rather small, pyramidal, corrugate and crenulate; lateral teeth short, rather stout and slightly curved; anterior cicatrices distinct, rather small and well impressed; lateral cicatrices confluent, rather small and well impressed; dorsal cicatrices placed on the plate within the cavity of the beaks; cavity of the shell rather shallow and wide; cavity of the beaks shallow and subangular; nacre slightly rose-color, reddish along the margin and very iridescent.

*Remarks.*—A single specimen of this species was received from Dr. Spillman. The beaks being imperfect, it is impossible to know what may be the character of the undulations of the tips. In outline, it is nearly allied to *rotundatus*, Lam., but it is

not quite so rotund, nor is it nearly so thick. It is also a much smaller species, and differs entirely in the form of the cardinal teeth, which, in the *rotundatus*, are very much divided. In the *Chickasawhensis* the cardinal tooth in the right valve is disposed to be duplicate, as that of the left valve is entirely.

UNIO PERMISCENS. Pl. 17, fig. 251.

Testâ lævi, obovatâ, inflatâ, posticè latè rotundâ, valdè inæquilaterali; valvulis tenuibus; natibus prominulis; epidermide tenebroso-fuscâ, nigricante, obsoletè perradiatâ, nitidâ; dentibus cardinalibus parvulis, compressis, obliquis; lateralibus prælongis, lamellatis subcurvisque; margaritâ cæruleo-albâ et valdè iridescente.

Shell smooth, obovate, inflated, broadly rounded behind, very inequilateral; valves thin; beaks a little prominent; epidermis dark brown, inclining to black, obscurely radiated all over, shining; cardinal teeth small, compressed, oblique; lateral teeth very long, lamellar and somewhat curved; nacre bluish white and very iridescent.

Proc. Acad. Nat. Sci. 1859, p. 112.

*Hab.*—Tombigbee River, Columbus, Mississippi. Wm. Spillman, M. D.

My cabinet, and cabinet of Dr. Spillman.

Diam. .7, Length 1.4, Breadth 2.1 inches.

Shell smooth, obovate, inflated, broadly rounded behind and obliquely rounded before, very inequilateral; substance of the shell thin; beaks a little prominent; ligament rather long, thin and dark brown; epidermis dark brown, almost black, obscurely radiated all over, and with distant marks of growth; umbonial slope raised and rounded; posterior slope blackish and almost raised into a wing; cardinal teeth small, compressed, oblique and scarcely double in the left valve; lateral teeth very long, lamellar and somewhat curved; anterior cicatrices rather large and distinct; posterior cicatrices confluent; dorsal cicatrices in a row across the centre of the cavity of the beaks; cavity of the shell rather deep and wide; cavity of the beaks rather shallow and rounded; nacre bluish white and iridescent.

*Soft parts.*—A male. *Branchiæ* thin, rather large, inner ones much the larger, rounded below, free only at the extreme point of abdominal sack. *Pulpi* very large, nearly semi-circular, rather thin, united one-third down the posterior edges. *Mantle* thin, with rather a broad border, crenulate below the branchial opening. *Branchial opening* rather small, with rather large brownish papillæ. *Anal opening* rather large, with numerous small, brownish papillæ. *Anus* with small crenulations on the rim and pointed at the lower end. *Super-anal opening* large, colored within and united below. Color of the mass whitish.

*Remarks.*—The above description is made from two specimens, one only being received in alcohol with the soft parts. It is very much like *U. purpuratus*, Lam., in outline, and at first I supposed it might be immature; but it is a very much thinner species,

much smaller and the teeth are delicate, very small, and not crenulate; nor is it so much inflated. In the soft parts it differs much, particularly in the anal opening being furnished with well defined papillæ.

UNIO CURTUS. Pl. 17, fig. 253.

Testâ lævi, obliquâ, ad umbones valdè tumidâ, anticè truncatâ, posticè obtusè angulatâ, valdè inæquilaterali; valvulis percrassis, anticè crassioribus; natibus elevatis, crassis, ferè terminalibus; epidermide vel tenebroso-castaneâ vel tenebroso viridi, ad apices virescens, obsoletè radiatâ; dentibus cardinalibus subgraudibus, compressis, acuminatis, obliquis; lateralibus crassis subcurvisque; margaritâ argenteâ et iridescente.

Shell smooth, oblique, much swollen at the beaks, truncate before, obtusely angular behind, very inequilateral; valves very thick, thicker before; beaks elevated, thick, nearly terminal; epidermis dark chestnut or dark green, greenish towards the beaks, obscurely radiate; cardinal teeth rather large, compressed, pointed and oblique; lateral teeth thick and somewhat curved; nacre silver white and iridescent.

Proc. Acad. Nat. Sci. 1859, p. 112.

*Hab.*—Tombigbee River, Columbus, Mississippi. Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. 1,    Length 1·2,    Breadth 1·6 inch.

Shell smooth, oblique, very much swollen at the beaks, truncate before, obtusely angular behind, very inequilateral, depressed before the umbonial slope; substance of the shell very thick, thicker before; beaks elevated, thick, nearly terminal; ligament short, thick and light brown; epidermis dark chestnut color or dark green, greenish towards the beaks, obscurely rayed, with rather distant marks of growth; umbonial slope slightly raised and subangular; posterior slope very narrow, with two obscure lines leading from the tips to the posterior margin; cardinal teeth rather large, compressed, pointed, crenulate and oblique; lateral teeth thick and somewhat curved; anterior cicatrices distinct; posterior cicatrices distinct; dorsal cicatrices placed on the under side of the plate and posterior to the cardinal tooth; cavity of the shell rather deep and rounded; cavity of the beaks shallow and obtusely angular; nacre silver white and very iridescent behind.

*Soft parts.*—There were ova in the branchial uterus, and the ovarium of one, but only in the ovarium of the other female. The uterus occupied the whole length of the outer branchiæ. *Branchiæ* large, semi-circular, outer ones rather the larger, free nearly the whole length of the abdominal sack. *Pulpi* small, thin, subtriangular, pointed at the end, united on the posterior edges only at the upper part. *Mantle* very thin, slightly thickened at the margin. *Branchial opening* rather small, with small brownish papillæ. *Anal opening* rather large, with very small papillæ. *Super-anal opening* small, colored on the inner margin and united below. Color of the mass whitish.

*Remarks.*—This small species is remarkably tumid and heavy. In outline it is between *castaneus* and *decisus*. It is more oblique than the former, and less so than the latter. It cannot be confounded with either of them. The lines of growth are somewhat distant, well marked by light brown bands, the upper ones being bordered with darker bands. The upper portion is disposed to be smooth and greenish, while the lower is brown and striate. The beaks are very nearly terminal, and the anterior slope is broad and flat, while the posterior one is very narrow. The color of the epidermis seems to be very variable; though the greenish brown predominates.

MARGARITANA ALABAMENSIS. Pl. 16, fig. 249.

Testâ lævi, oblongâ, inflatâ, ad latera paulisper planulatâ, inæquilateralî, posticè obtusè biangulatâ, anticè obliquè rotundatâ; valvulis suberassis, anticè paulisper crassioribus; natibus prominulis, ad apices rugoso-undulatis; epidermide luteo-olivâ politâ, eradiatâ; dentibus cardinalibus parvis, suberectis; margaritâ albâ et salmoneâ et iridescente.

Shell smooth, oblong, inflated, slightly flattened at the sides, inequilateral, obtusely biangular behind, obliquely rounded before; valves somewhat thick, slightly thicker before; beaks a little prominent, rugosely undulate at the tips; epidermis yellowish olive, polished, without rays; cardinal teeth small, somewhat erect; nacre white and salmon, very iridescent.

Proc. Acad. Nat. Sci. 1861, p. 41.

*Hab.*—Talladega Creek, Alabama. Wm Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. 1·4,

Length 2·1,

Breadth 4·2 inches

Shell smooth, oblong, inflated, somewhat flattened at the sides, inequilateral, obtusely biangular behind and obliquely rounded before; substance of the shell somewhat thick, slightly thicker before; beaks a little prominent, with a few coarse undulations at the tips; ligament rather long, very thick and dark brown; epidermis yellowish olive, polished, without rays, with somewhat distant marks of growth; umbonial slope inflated and rounded; posterior slope narrow-elliptical, slightly carinate, with two impressed lines on each valve; cardinal teeth small, somewhat erect, compressed, and direct in the right valve and tuberculate in the left; anterior cicatrices confluent, very large and well impressed; posterior cicatrices confluent, very large and slightly impressed; dorsal cicatrices in the right valve placed on the under-side of the plate posterior to the cardinal tooth, in the left valve on the base of the cardinal tooth; cavity of the shell deep and wide; cavity of the beaks rather shallow and subangular; nacre white, tinted with salmon color in the cavity of the beaks, and iridescent.

*Remarks.*—It is to be regretted that a single specimen only should be described from, and this without the soft parts. This is a very distinct species, and is perhaps

most nearly allied to *M. Spillmanii*, herein described, but it cannot be confounded with that species. The color of the epidermis is totally different. It is rather more oblique, and not so much inflated. The undulations at the tips of the beaks differ from those of *Spillmanii*, being more concentric. Those of *Alubamensis* being few, coarse and nearly parallel with the plane of the dorsal line. The epidermis is bright and looks almost as if varnished. Young and perfect specimens may be found to be rayed, but the specimen before me has none on the sides; there are a few indistinct capillary ones on the posterior slope. The tooth of the left valve has not a natural appearance, being irregularly tuberculate and slightly duplicate, while that in the right valve is lamellar and obtusely pointed. The figure will be observed to be arcuate at the base, but this arises evidently from an injury. It will be observed that the lines of growth above are regular and have no emargination at the sides.

MARGARITANA SPILLMANII. Pl. 17, fig. 252.

Testâ lævi, obovatâ, supernè valdè inflatâ, posticè obtusè angulatâ, subæquilaterali; valvulis suberassis, anticè crassioribus; natibus prominentibus, tumidis, ad apices rugoso-undulatis; epidermidè vel rufofuscâ vel tenebroso-fuscâ, obsoletè radiatâ micante; dentibus cardinalibus parvis, tuberculato-compressis, in utroque valvulo singulis; margaritâ albâ et iridescente.

Shell smooth, obovate, very much inflated above, obtusely angular behind, subequilateral; valves rather thick, thicker before; beaks somewhat prominent, swollen, rugosely undulate at the tips; epidermis reddish or dark brown, obscurely radiate, shining; cardinal teeth small, compressed, tuberculate and single in both valves; nacre white and iridescent.

Proc. Acad. Nat. Sci. 1858, p. 138.

*Hab.*—Tombigbee River, near Columbus, Mississippi. Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. 1·5,

Length 2,

Breadth 3·7 inches.

Shell smooth, obovate, very much inflated above, obtusely angular behind, subequilateral; substance of the shell rather thick, thicker before; beaks somewhat prominent, swollen rugosely undulate at the tips; ligament rather short and dark brown; epidermis reddish or dark brown, obscurely rayed, shining, with very distant marks of growth; umbonial slope very much inflated and rounded; posterior slope wide, elliptical, flattish, with two raised lines from the tips to the posterior margin; cardinal teeth small, compressed-tuberculate and single in both valves; anterior cicatrices distinct, large and moderately impressed; posterior cicatrices confluent, very large and slightly impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell very deep and wide; cavity of the beaks rather deep and subangular; nacre white and iridescent.

*Soft parts.*—*Branchial uteris* occupied the whole length of the outer branchiæ.

and was charged with embryos and ova—there were no ova in the ovarium. *Branchiæ* large, somewhat thick, rounded below, inner ones much the larger, free one-third the length of abdominal sack. *Pulpi* long, oblique, subelliptical, united two-thirds down the posterior edges. *Mantle* rather thin, with a broad, thickened border. *Branchial opening* large, blackish within, with numerous, thickly-set, reddish brown papillæ. *Anal opening* large, blackish within, crenulate on the edges. *Anus* large and crenulate on the edge. *Super-anal opening* large, with a dark line on the inner edge, and united below; color of the mass whitish.

*Embryonic shell* light brown, subtriangular, has imperfect hooks.

*Remarks.*—I have several specimens of this fine species before me. It is very different from any heretofore described. In its great inflation on the umbonial slope, it reminds one of *Anodonta gibbosa*, Say. The cardinal teeth are like those of *M. Elliottii* (nobis). The undulations of the beaks consist of four or five, are subconcentric and well-defined. The margin is wide and reddish. In some specimens the color of the epidermis is, in transverse bands, of lighter and darker brown, the young being well rayed; the figure is from a male specimen. I have great pleasure in naming this fine species after Wm. Spillman, M. D., who has done so much to elucidate the natural history and geology of his State.

MARGARITANA ELLIPTICA. Pl. 18, fig. 254.

Testâ lævi, ellipticâ, subinflatâ, subæquilaterali, posticè obtusè angulatâ; valvulis tenuibus; natibus subprominentibus, ad apices subconcentricè undulatis; epidermide luteo-virente, glabrâ, nitidâ, perradiatâ; dentibus cardinalibus parvis, compressis, in utroque valvulo singulis; margaritâ cæruleo-albâ et iridescente.

Shell smooth, elliptical, somewhat inflated, nearly equilateral, obtusely angular behind; valves thin; beaks somewhat prominent, with subconcentric undulations at the tips; epidermis yellowish green, smooth, shining, very much radiated; cardinal teeth small, compressed, single in both valves; nacre bluish white and iridescent.

Proc. Acad. Nat. Sci. 1859, p. 113.

*Hab.*—Tombigbee River, Columbus, Mississippi. Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .7, Length 1.1, Breadth 1.9 inch.

Shell smooth, elliptical, somewhat inflated, nearly equilateral, obtusely angular behind and regularly rounded before; substance of the shell thin, diaphanous behind; beaks somewhat prominent, with a few subconcentric undulations at the tips; ligament rather short, thin and light brown; epidermis yellowish green, smooth, shining, with broad, green rays, and well defined, small, yellow ones over the whole disk, with distant, well marked lines of growth; umbonial slope somewhat raised and rounded; posterior slope raised into a small keel, color yellow, with numerous, small, wavy



green lines from the beaks to the posterior margin; cardinal teeth small, compressed, single in both valves and not crenulate; anterior cicatrices confluent, very slightly impressed; posterior cicatrices confluent and very slightly impressed; dorsal cicatrices placed on the inner and upper side of the cavity of the beaks; cavity of the shell rather deep and rounded; cavity of the beaks rather shallow and subangular; naere thin, bluish white, salmon color towards the beaks and iridescent.

*Soft parts.*—*Branchial uterus* not charged. In three mature specimens in alcohol, I could find no ova in the ovarium, but there seemed to be well formed ovisacks. *Branchiæ* very large, rather thick, rounded below, inner ones much the larger, united nearly half the length of abdominal sack. *Pulpi* rather wide, suboval, thin, united half way down the posterior edges. *Mantle* thin, with a broad margin; thickened at the edges, with blackish spots along the posterior margin on the exterior edges. *Branchial opening* rather large, with numerous, rather small, reddish brown papillæ. *Anal opening* rather small, reddish and maculate within, with numerous very small, reddish brown papillæ on the inner edges. *Anus* regularly crenulate. *Super-anal opening* small, united for some distance below and maculate on the outside. Color of the mass whitish.

*Remarks.*—I have seven specimens from Dr. Spillman—all adult. The one figured is the smallest and most perfect. In outline and general appearance, this species resembles *Anodonta undulata*, Say, and *Anodonta edentula* (nobis), = *Alasmodonta edentula*, Say, but it is more regularly elliptical than either of them, and there is a well-defined subtuberculous tooth in both valves, which is never found in both valves of the other two, and which really separates them generically from this shell. It is closely allied to *Margaritana Elliottii* (nobis), but is larger and not so cylindrical. The undulations on the beaks are also more concentric. The fine yellow, wavy rays are well marked in some specimens, as they pass through the green epidermis. The yellow color prevails on the anterior and posterior slopes. It is to be regretted that neither of the specimens, in alcohol, had charged *branchial uteri* that the character of that important organ might be detected and described.

MARGARITANA TOMBIGBÉENSIS. Pl. 18, fig. 255.

Testâ lævi, ellipticâ, inflatâ, posticè obtusè angulatâ, anticè rotundatâ, subæquilaterali; valvulis subtenuibus; natibus prominentibus, tumidis, ad apices rugoso-undulatis; epidermide vel tenebroso-olivâ vel nigricente, obsoletè radiatâ; dentibus cardinalibus parvis, compresso-tuberculatis; margaritâ albâ et iridescente.

Shell smooth, elliptical, inflated, obtusely angular behind, rounded before, sub-equilateral; valves rather thin; beaks a little prominent, swollen, rugosely undulate at the tips; epidermis dark olive, sometimes nearly black, obscurely rayed; cardinal teeth small, compressed, tuberculate; naere white and iridescent.

Proc. Acad. Nat. Sci. 1858, p. 138.

*Hab.*—Tombigbee River, near Columbus, Mississippi. Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. 1.4,

Length, 2,

Breadth, 3.1 inches.

Shell smooth, elliptical, inflated, obtusely angular behind, rounded before, sub-equilateral; substance of the shell rather thin; beaks a little prominent, swollen, rugosely and subconcentrically undulate at the tips; ligament short, thick and dark brown; epidermis dark olive, sometimes nearly black, obscurely rayed and with very distant marks of growth; umbonal slope very much raised and very obtusely angular; posterior slope broad, subcordate, with irregularly impressed lines from the beaks to the margin; cardinal teeth small, compressed-tuberculate; anterior cicatrices distinct, large and slightly impressed; posterior cicatrices confluent, large and very slightly impressed; dorsal cicatrices placed on the base of the cardinal tooth; cavity of the shell very deep and rounded; cavity of the beaks deep and wide; nacre white and iridescent.

*Soft parts.*—*Branchial uterus.*—All the four specimens received in alcohol seemed to be males—could find no ova. *Branchiæ* very large, free nearly half the length of the abdominal sack. *Palpi* small, subelliptical, united only at the upper part of the posterior edges. *Mantle* very thin, with a broad border. On the posterior exterior edges there is a dark, blackish line, separating occasionally into maculations, a character so common to the genus *Margaritana*.\* *Branchial opening* large, blackish, with small, brown papillæ on the inner edges. *Anal opening* rather small, blackish, with very small papillæ on the inner edges. *Super-anal opening* rather small, maculate on the outer edges, united below. *Anus* crenulate on the rim. Color of the mass whitish.

*Remarks.*—This is a well marked species not easily confounded with any other. Its proportional length with the transverse diameter is greater than any other of our species of *Margaritana*, and its beaks are more medial. It is remarkable for its regular elliptical outline and its obtruded anterior margin. The young have green rays over nearly the whole disk. The undulations of the beaks are coarse, and usually consist of four on each valve. The old individuals are much disposed to be imperfect about the region of the ligament, beaks and teeth.

#### ANODONTA KENNERLYI. Pl. 18, fig. 256.

Testâ lævi, ellipticâ, subcylindræâ, subventricosâ, valdè inæquilaterali, anticè subtruncatâ, posticè biangulatâ; valvulis tenuissimis, diaphanis; natibus vix prominentibus, ad apices exilissimè undulatis; epidermide luteo-olivâ, micante, ad margine striatâ, radiatâ; margaritâ cæruleo-albâ et valdè iridescente.

Shell smooth, elliptical, subcylindrical, somewhat ventricose, very inequilateral, somewhat truncate before, biangular behind; valves very thin, semitransparent; beaks

\* One specimen was maculate the whole distance to the upper end of the super-anal opening.

scarcely prominent, finely and closely undulate at the tips; epidermis yellowish olive, shining, striate at the margin, without rays; nacre bluish white and very iridescent.

Proc. Acad. Nat. Sci. 1860, p. 306.

*Hab.*—Chiloweyuck Depot, near Puget Sound, Washington Territory. C. B. Kennerly, M. D.

My cabinet and cabinet of Smithsonian Institution.

Diam. .8,

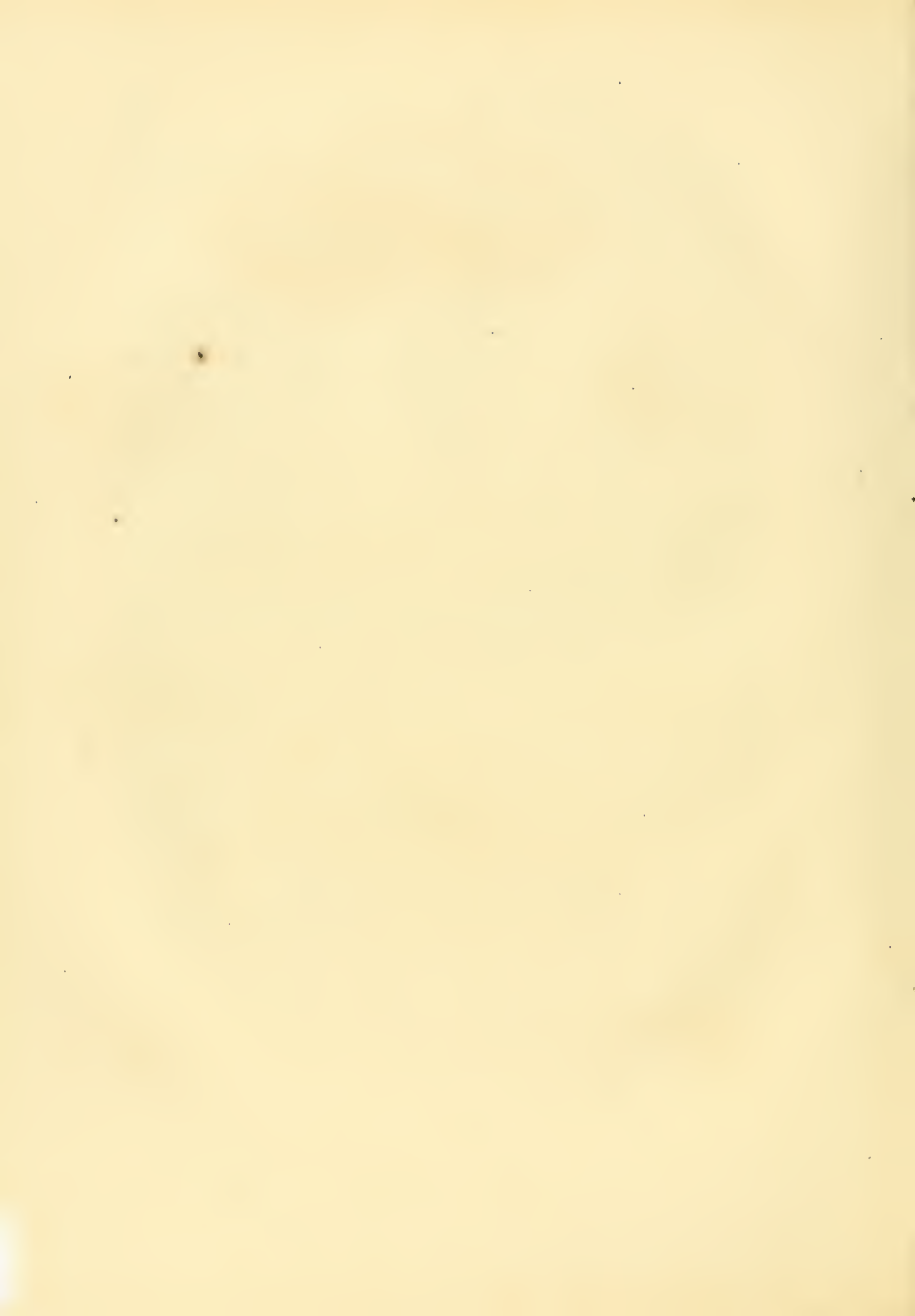
Length 1.2,

Breadth 2.6 inches.

Shell smooth, elliptical, subcylindrical, somewhat ventricose, very inequilateral, somewhat truncate before and biangular behind; substance of the shell very thin, semitransparent; beaks scarcely prominent, finely and closely undulate at the tips; ligament long, thin and light brown; epidermis yellowish olive, shining towards the beaks and striate towards the margin, without rays, with rather close marks of growth; umbonial slope slightly raised and subbiangular; posterior slope rather narrow, slightly carinate, with two indistinct rays on each valve from the beaks to the posterior margin; anterior cicatrices confluent and slightly impressed; posterior cicatrices confluent and very slightly impressed; dorsal cicatrices none perceptible; cavity of the shell rather shallow and wide; cavity of the beaks very shallow and rounded; nacre bluish white and very iridescent.

*Soft parts.*—*Branchial uterus.*—No ova in the branchial ovisacks, but ova were found in the ovarium. *Branchiæ* large, inner ones much the larger, curved below, free two-thirds the length of abdominal sack. *Palpi* small, subtriangular, united one-third down the posterior edges. *Mantle* very thin. *Branchial opening* very large, with numerous small, brownish papillæ on the inner edges, and lined with a dark brown band inside. *Anal opening* without papillæ, light brown on the edges, lined with a dark brown band inside. *Super-anal opening* very small, united for some distance below. Color of the mass dirty white.

*Remarks.*—Several specimens in alcohol were sent to me by the Smithsonian Institution. In outline it is near to *Ferussaciana*, (nobis), but it is rather wider and has not a green epidermis. It reminds one of *fragilis*, Lam., in the color of the epidermis, and the marks of growth, as well as the thinness of the valves, but it is more transverse, and is rather a smaller species. The anterior margin is disposed to be truncate, which is not the case with either of the above named species. I name this species after Dr. Kennerly, who accompanied the North West Boundary Survey under A. Campbell, Commissioner.



ART. III.—*Monograph of the Fossil Polyzoa of the Secondary and Tertiary Formations of North America.*

By WM. M. GABB and G. H. HORN, M. D.

In the following paper are included descriptions of all the known species of American Secondary and Tertiary Polyzoa. The large majority of these descriptions were taken from specimens either in the collection of one of the authors or of the Academy of Natural Sciences of Philadelphia. Where we are unacquainted with a species, we have given the author's description in full.

Particular credit is due to Mr. C. C. Abbott, of Trenton, N. J., for obtaining for us the fine mass of material, mentioned all through the paper as coming from near Mullica Hill, N. J. We are also indebted to Dr. A. L. Heermann for collecting some marl near Santa Barbara, Cal., which has yielded us over a dozen species.

We hope that the study of these beautiful little animals will now receive a start in this country, and that persons, having an opportunity, will collect the many unknown species which undoubtedly exist. We shall feel ourselves under many obligations to collectors who will supply us with any of the species in this paper, not described from specimens, or any that may be new, promising to make all due acknowledgments and, if desired, exchange for them.

No classification of the Polyzoa has been proposed that is entirely without objection. Perhaps the best one is that made by d'Orbigny, in *Paléontologie Française, Terrains Crétacés*, vol. 5. He there divides these animals into two orders—" *Bryozoaires cellulés*" and " *Bryozoaires centrifugés*." These two orders are characterized by the mode of increase of the cellules. In the first, the cellules arise from the sides or ends of preceding ones; in the second, they are arcuate and arise behind or at the base of the older ones. This division is fundamental, and we believe it to be of far greater importance than one founded on the shape of, or appendages to, the mouths of the cellules, as in the arrangement proposed by Johnston in his *British Zoophytes*, and, in the main, followed by Gray and Busk. Any classification, however, must be considered merely provisional until it can be ascertained to be correct by careful study of the animals; and there has not yet been a sufficiently thorough examination made of the animals of these two orders, or, as they will probably prove

to be, suborders, to enable us to determine definitely what division of them shall be made.

To return to the classification of d'Orbigny: Each of his two orders is divided into two suborders, called respectively "*Cellulinés radicellés*," "*Centrifuginés radicellés*," and "*Cellulinés*" and "*Centrifuginés empatés*." These are characterized by the colony in the "*radicellés*" being corneous or testaceous, entire or articulated, but always attached to submarine bodies by the intervention of corneous rootlets. The "*empatés*" are, on the contrary, always testaceous, always in one solid piece, never articulated, sometimes free, but, when attached, it is always by means of the same testaceous substance as that composing the colony or polypidom. So far the classification appears to be correct. The characters belonging to the collection of individuals are evidently of less value than those appertaining to the individuals themselves. Of the "*radicellés*" we have nothing to say at present. They are not represented by a single species in the following paper, and are rarely found fossil.

In the second suborder of the first order, the families are characterized by the absence or, when present, the number and position of "special pores," (vibracular or avicularial openings), by the presence or absence of fossets on the surface, and by the mouth being closed by a membrane or not. We cannot follow this author in all his divisions, believing that he has attached undue importance to some of these characters. The fact of the mouth being closed or not by an opercular membrane is certainly a much more important character than the presence or absence of fossets or rows of pores traversing the surface of the cellule, especially when we consider that many species of the *Escharidæ* and allied families have the surfaces of the cellules perforated by pores, differing only from the *Escharellidæ* in their being placed irregularly instead of in radiating or transverse rows. In fact, we have serious doubts whether the "special fossets" may not be represented, in some of the species, by mere depressed grooves, not at all perforating the surface walls of the cellule. For the above reasons we have united those families, the distinguishing characters of which are the presence of special fossets with the corresponding families not provided with these fossets, but retaining the other characters. We have, however, retained them as subfamilies, trusting that some facts may transpire to decide on the true positions of the species composing them.

We have, therefore, two divisions of this suborder, as follows:

I. *Cellulata non operculata*.

- |   |                             |
|---|-----------------------------|
| A. Without special pores near the opening, . . . . .  | Fam. <i>Escharidæ</i> .     |
| * Without pores or fossets arranged in transverse rows or radiating (special fossets of d'Orb.) . . . . . | Subfam. <i>Escharince</i> . |
| ** With special fossets, . . . . .  | " <i>Escharellince</i> .    |
| B. One pore to a certain number of the cellules, . . . . .  | <i>Phidoloporidæ</i> .      |

- C. One special pore to each cellule.
    - a. In advance of the opening, . . . . . *Escharinellidæ*.
      - \* Subfamilies as above, *Escharinellinæ* and *Porellinæ*.
    - b. Behind the opening, . . . . . *Porinidæ*.
      - \* Subfamilies *Porinincæ* and *Porellinincæ*.
  - D. Two or more pores around the opening, . . . . . *Escharellindæ*.
    - \* Subfamilies *Escharellinincæ* and *Eschariporincæ*.
  - E. Cellules composed of two chambers or stages superposed, *Steginoporidæ*.
- II. *Cellulata operculata*.
- A. Without special pores, . . . . . *Flustrellaridæ*.
  - B. One pore behind† the opening, . . . . . *Flustrellidæ*.
  - C. Two pores, (or more), . . . . . *Flustrinidæ*.

This classification is somewhat different from the modification proposed by Pictet, which has the appearance of having been founded only on the study of d'Orbigny's book, and not on experience in studying specimens, the only true way of obtaining a knowledge of any science. We wish to be understood that, while we consider the above arrangement far preferable to d'Orbigny's, we do not claim for it exemption from perhaps grave objections, to be modified by future experience. It must be remembered that the study of the Polyzoa is still in its infancy. It has only been within a few years that the true relations of these little beings have been determined, and little more than ten years have elapsed since the first important attempt was made to arrange them. Since then but two or three students have paid any considerable attention to them.

D'Orbigny studied them only with reference to the fossil species, and his arrangement of the corneous forms is eminently artificial; while other authors have paid little comparative attention to the fossils, thereby losing perhaps many important links which might be of great importance in connecting allied forms.

In regard to the classification of the Centrifuginates, we are not at all satisfied that the three divisions of d'Orbigny—the fasciculates, the tubulates and the foraminates—should not be united, as suggested by Pictet, under the name of "*Tubuliporides*." Many of the tubulates, for instance, those of the family "*Tubigeridæ*," have a distinctly grouped arrangement, as in the genera *Idmonea*, &c.; and among the foraminates there are several instances in which the cellules of certain species are fully as exsert as some of the tubulates. The cellules of *Multicrescis Ricordeana*, for example, as figured by d'Orbigny, are as prominent as those of our *Diastopora lineata*. We have not had an opportunity of studying this portion of the subject as fully as we could

† Our species *Reptoflustrella? heteropora* is either an exception to this rule, or should probably be considered the type of a new genus and family, the analogue of the *Escharinellidæ* among the non-operculates.

desire, and shall therefore defer to the opinion of d'Orbigny, based on perhaps the most extensive study of the subject ever yet undertaken.

The generic divisions are based mainly on the mode of growth of the colony. This is, as far as we are aware, a good distinction. The only deviation we have observed, is in the case of a colony of our species *Membranipora perampla*, in which three layers are superposed. This one instance, however, appears to be accidental, just as one species frequently encrusts another.

Fam. *ESCHARIDÆ*, d'Orb. 1851.

Subfam. *ESCHARINÆ*.

*ESCHARA*, Lam. 1801.

*Gen. char.*—Colony flattened, dichotomous, rarely lamellar, with cellules on both faces, arranged back to back, on each side of a germinal plate. Cellules simple, opening near the anterior end and of moderate size. No special pores nor fossets, although the top of the cellule is sometimes pierced by numerous irregular pores. This genus can be distinguished from all others having the same mode of growth of the colony, by the absence of special pores and fossets. From *Latereschara* it differs by the cellules being arranged in longitudinal rows and quincunx instead of lateral rows.

*E. DIGITATA*, Morton, Synopsis Cretaceous, p. 79, pl. 13, f. 8.

*E. digitata*, Lonsdale, Quart. Jour. Geol. Soc. London, vol. 1, p. 73, figs. c, d, g, (a and b?) *exclus.* e and f.

*E. digitata*, d'Orb., Prod. Pal. Strat. v. 2, p. 264, No. 1074.

Colony flattened, dichotomous, branching generally in the same plane. Cells hexagonal, arranged in quincunx, separated by a slightly depressed line; surface concave, especially towards the opening, which is slightly in advance of the centre. Opening rounded anteriorly, posterior edge straight and bounded by a delicate raised lip, sometimes with a small tooth in the centre. The anterior and posterior margins of the cells are straight, the anterior lateral margins curved outwards, and the posterior lateral margins are consequently concave. Abortive cells not uncommon, especially near the margins. The extreme edges of the branches are perforated by numerous small holes, apparently the openings of abortive cellules. We have never been able to detect ovarian vesicles after examining several hundred specimens. This species is by far the most abundant of the Cretaceous Polyzoa of New Jersey. We obtained nearly two cubic inches of specimens from less than a pint of the soft limestone from near Mullica Hill.

In the Quarterly Journal of the Geological Society of London, vol. 1, page 73, Lonsdale gives an extended description of this species, with several wood cuts. We fear that that he has inadvertently confounded two, or perhaps three, species under



this name. Figures *a* and *b* present characters which we have never been able to detect in *E. digitata*, notwithstanding the particularly favorable circumstances under which we have studied the species. The cells have a very distinct lateral arrangement, and the very large openings do not belong to the present species. We strongly suspect that it will prove to belong to one of the species of *Biflustra*, described below, and which has little in common with *E. digitata*, except that it grows in flattened branches. The very imperfect representation given at fig. *f* we believe must belong to our *Escharifora typica* of the same beds. This species has a mode of growth somewhat similar to the one under consideration, but the special pores which Mr. Lonsdale called abraded vesicles are always present in a definite number and with a fixed arrangement. It is surprising that such an acute observer as Mr. Lonsdale should have been betrayed into such an error.

The only variations we have observed in age are, that the dividing lines between the cellules are more distinct in young specimens, and as they become very old they become fainter, until, as is rarely the case, they are partially or wholly obliterated. We have never seen more than one row of cellules open at the top at once.

This species is most nearly related to *E. dichotoma*, Goldf., as remarked by Dr. Morton. It differs in the cellules being proportionally longer, with the opening smaller and much more elongated longitudinally, so as to be sometimes almost subquadrate. The broad grooves between the cells in Goldfuss' species are represented in Morton's by a fine impressed line. There are from seven to nine rows of cellules in an ordinary branch on each side.

*Locality and position.*—Yellow limestone of Timber Creek, and near Mullica Hill.

*E. TUBULATA*, Lonsd., Quart. Journ. Geol. Soc. v. 1, p. 528, figs. *a*, *b*.

*E. tubulata*, d'Orb., Prod. Pal. Strat. vol. 2, p. 397, No. 1175.

"Foliaceous; cells elongated, rows defined by a slight furrow, no marked separation between successive cells, surface slightly convex; mouth small, transversely oval, margin thickened; interior of cells, sides nearly straight; dorsal separation of opposite layers imperfect."

"The above characters were obtained from a specimen an inch in length and nine lines in width, but which give only more aged conditions of the coral. The cells, in their narrow lengthened form, resembled the tubuli of *Diastopora*; but the mouths were strictly in the plane of the outer surface, and there was not the slightest tendency to a free portion at the distal termination, or to an underlying at the proximal; the whole outer surface being at one level, and the back of the interior parallel to it. No clear indications of vesicles were noticed. In the most aged cells, occupying the lower portion of the specimen, the exterior was lozenge-shaped, or had an increased breadth, the longitudinal furrows were almost obliterated by the thickening of the surface, and the mouths were generally very much contracted and in some cases filled up. Every attempt to separate the dorsal surfaces in this and the two following species, (*E. petiolus* and *E. incumbens*), failed."

"Locality, Wilmington," [N. Carolina, Eocene White Limestone.]

The above is Lonsdale's description in full. We have never encountered this species, nor his *E. petiolus*, *E. incumbens*, nor *E. vimineu* of the same formation.

*E. tubulata* might possibly be confounded with our *E. texta*, but it differs in having the mouth large, with a distinct border and situated in the same place as the rest of the surface, while in our species the ends of the cell are depressed, and the mouth, which is very small, is placed in the deepest part of the depression. In *tubulata* the surface is almost even, while in *texta* each cellule is very convex in both diameters, but especially antero-posteriorly. "The cells of *tubulata* are also shorter and broader than those of *texta*."

*E. PETIOLUS*, Lonsd., Quart. Jour. Geol. Soc. vol. 1, p. 528.

"Foliaceous, springing from a stalk-like base; cells oblong, surface slightly convex, porous, bounded by a faint furrow, mouth longitudinally oval; sometimes a small triangular pit by its side; interior of cells lozenge-shaped; dorsal surface not separable; connecting foramina near the base of the lateral and terminal walls."

"No immature cells were observed, but in the youngest state exhibited the mouth had a projecting margin, which gradually disappeared in more advanced conditions; while in still older, the aperture was depressed, and in the most aged totally obliterated. Other changes, dependant upon age, consisted in the diminution and distinctness of the pores, and in the increased convexity of the surface, with a corresponding greater depth in the separating furrows. An exposed dorsal surface was traversed by fractured edges of the walls."

"Locality.—Eutaw," [South Carolina, Eocene.]

*E. INCUMBENS*, Lonsd., Quart. Jour. Geol. Soc. vol. 1, p. 529.

*E. incumbens*, d'Orb., Prod. Pal. Strat. vol. 2, p. 397, No. 1176.

"Foliaceous; cells oval, surface slightly convex, porous, boundary a very faint furrow, mouth round or transversely oval, notched in mature state, and margin slightly thickened; a round foramen sometimes on one side of the mouth; interior of cells, lateral walls slightly curved, terminal arched or nearly straight; dorsal surfaces not separable; gemmuliferous (?) vesicle large, semi-globular, resting on the next succeeding cell; connecting foramina near the base of side and terminal walls."

"In addition to the aggregate of differential characters, this species is distinguished by the large overlying gemmuliferous (?) vesicle. From the mode of blending with the surface on which it rests, this chamber might be mistaken for an irregularly developed cell; but its true nature was shown by the absence of distinct pores in the lamina forming the outer covering; by the great size and inclined position of the opening and by the true mouth of the cell being detectable within the chamber in its right position. In the oldest observed condition of the coral, the outer surface was greatly thickened, and the mouth of the cell was partially or wholly obliterated."

"Locality.—Rock's Bridge," [Eocene.]

*E. linea*, Lonsd., see *Escharinella linea*.

*E. ? VIMINEA*, Lonsd., Quart. Jour. Geol. Soc. vol. 1, p. 530.

*E. viminea*, d'Orb., Prod. Pal. Strat. vol. 2, p. 397, No. 1178.

"Foliaceous; cells elongated, surface convex, porous, mouth transversely oval, depressed, proximal edge a notched plate; occasionally one or two foraminated vesicles at the corners of the proximal margin; dorsal separation perfect, surface (dorsal?) ridged."

"This species was distinguished by the wicker-like character of the general surface. Mouthless cells were noticed among those in a mature condition. The aged cells presented a greatly thickened outer surface."

the boundary of the cell being defined by a deep continuous groove; the oval apertures were almost obliterated and the pores rendered indistinct."

"*Locality*.—Eutaw," [South Carolina, Eocene.]

From the phrase "occasionally one or two foraminated vesicles at the corners of the proximal margin," we entertain some doubt about the propriety of retaining this species in the genus *Eschara*, suspecting that these "foraminated vesicles" may really be special pores in connection with the opening of the preceding cellule, especially since these pores do occasionally appear to belong to the cellule in advance of the real one. This is rendered more probable from the fact that Mr. Lonsdale does not appear to have examined the interior of any of the cellules. However, not having seen the species, and the figure given being very unsatisfactory, we do not feel warranted in attempting to remove it.

E. TEXTA, n. s., fig. 1.—Colony either lamellar or in broad branches, (?) robust, somewhat tortuous. Cellules very long and narrow, arranged in pretty regular quin-cunx, but sometimes displaced by the excessive length of one cellule, separated by very distinct lines between the rows, but the upper surface between the cells in the same line is almost always continuous. Upper surface convex in both transverse and longitudinal diameters, but more especially so in the latter, so that the shorter cellules are high in the middle and with the ends much depressed; no apparent markings on the surface of the only specimen we have seen. Mouth small, semicircular or sub-quadrangle, with the proximal lip always straight; sometimes bounded by a delicate raised lip. The mouth is anterior, placed at the deepest part of the depression, and occupies only about half the width of the cellule. No ovarian vesicles were observed. Germinal plate and lateral walls thin, upper walls thick.

The alternate elevations and depressions of the cellular surface of this remarkable species give it, to the naked eye, very much the appearance of a woven fabric. The great length and the narrowness of the cellules assist the resemblance. We are not able to say positively whether or not this species is dichotomous, but believe not, since the only specimen we have seen is a triangular mass, about three-fourths of an inch long and about half an inch wide at the base. As we remark above, the length of the cellules is variable, the longest being almost twice the length of the shortest. This variation appears to take place generally in separate longitudinal rows, some rows being composed almost exclusively of long cellules and others of shorter ones. The cellules in the same row are not, however, always uniform. Internally the lateral walls are straight, and thinner than the terminal ones.

Under *Eschara tubulata* are some comparisons between that species and this. They are so different, however, that it will be almost impossible to confound them. We are acquainted with no other species approaching this.

From the Eocene white limestone, west of Charleston, S. C. Coll. W. M. G.

*E. OVALIS*, n. s., fig. 2.—Colony branching, branches rather narrow and robust, surface of branches convex. Cellules pyriform, in regular quincunx, somewhat elevated in front and at the anterior portion of the sides, so as to present an imbricating appearance, surface convex, with the distal and antero-lateral edge abruptly curved, and the posterior portion more flattened. Mouth small, round, somewhat variable in size, not terminal, and situated at the anterior end of a slight depression of an elongated oval form in the surface of the cellule. No ovarian vesicles were observed. The surface of the cellules appeared to possess no special ornamentation, but we are not prepared to say that younger and more perfect specimens may not exhibit them in some form.

Eocene of (?) Claiborne, Ala.

Related in the form of the cellule to *E. Blandina* and *E. Eurita* of d'Orbigny, more especially the latter, it can be at once distinguished from the first by the more pyriform shape of the cellule, more compressed colony, and by the mouth being small, round and placed in a depression; from the latter by the cellules being proportionally shorter, by the size and shape of the mouth, and in the narrow dichotomous character of the colony which in *Eurita* appears to be almost lamellar. Figure *c* represents the broadest form of the colony we have seen. The branches, having about the same thickness, are sometimes one-fourth narrower. We could detect no abortive cellules, even on the edges of the branches where they occur so abundantly in some other species, such as *E. digitata*, &c.

*E. ? FRAGILISSIMA*, n. s., fig. 3.—Colony very fragile, mode of growth unknown. Cellules in longitudinal rows and quincunx, separated laterally by a slight depression, produced by the meeting of the two convex surfaces, not separated anteriorly from the succeeding cellule. Mouth terminal, circular, bordered by a very delicate raised lip, and slightly elevated above the surface of the next cellule. Surface perforated by numerous minute, irregular pores.

This species is referred doubtfully to *Eschara* because we have never seen but the upper and side walls. It has more the appearance of *Eschara* than any other genus of the family. The walls are the most delicate we have ever seen in any testaceous polyzoon, and are still further weakened by the little cohesion of the rows of cells, so that the specimens are generally found in the shape of half a dozen cells only in contact. *Cellepora tumida*, d'Orb. (*Escharina*, id. Lonsdale) resembles this species in the general characters of the cellule, but may be distinguished by the cells being shorter, more convex and less profusely punctate, and in the mouth of the latter being always round, with no teeth or emarginations, while *C. tumida* has a notch in the proximal edge of the mouth and sometimes two teeth on the same side.

This beautiful little species is from the miocene marl of St. Mary's River, Maryland. Coll. W. M. G.

## LUNULITES, Lam. 1801.

Colony conical, circular or approaching it; fixed in the young state to a grain of sand or other substance, free when mature. Cellules like the others of the *Escharidæ*, all on the superior surface, arranged in radiating lines from the centre; interpolated rays always commence by an abortive cellule. Under surface concave and marked by radiating, irregular lines.

L. SEXANGULA, Lonsd., Quart. Jour. Geol. Soc. vol. 1, p. 531.

"Obtusely conical; cells hexagonal, in alternate rows, surface covered, raised near the distal extremity, depressed in the centre, a hemispherical tubercle frequently at the proximal end; mouth nearly central, transverse, very narrow; casts of interior of cells hexagonal, parallel to the convex and concave surfaces; concave surface casts of irregularly radiating punctured ridges and narrow furrows, the ridges traversed more or less regularly by a row of tubercles; interval between the convex and concave surfaces equal depth of cells."

"Locality, Wilmington," [N. C., Eocene.]

We are not acquainted with the above species. No figure is given.

L. DISTANS, fig. 4.

*L. distans*, Lonsd., Quart. Jour. Geol. Soc. vol. 1, p. 531, figs. *a, b, c*; *id.* d'Orb., Prod. Pal. Strat. vol. 2, p. 397, No. 1182.

Colony conical, sometimes flattened above, sometimes rounded; covered with cellules on the upper or convex surface in regularly radiating and in transverse lines. New lines always commencing by an abortive cellule. Cellules subquadrate to pentagonal, in which case the odd angle is in front, overlapping the succeeding cellule; this form, sometimes modified to a regular curve anteriorly, is the common form. The cellules are arranged, as stated above, in regular radiating lines, the longitudinal rows being much more intimately connected with each other than they are laterally. Between the cells laterally we find a row of pores, sometimes of an elongated fusiform outline and sometimes rounded posteriorly, and constricted near the middle. We shall notice these more fully below. The mouth of the cellule is somewhat anterior but not terminal; placed at the lowest part of the surface; round or subquadrate. Surface carinate parallel with its anterior and lateral outlines, sloping outwardly to the edge and inwardly towards the mouth, sometimes with an elevated portion, bounded by two radiating depressions, posterior to the mouth.

Casts of the interior of the cellules, on which Lonsdale founded the species, and which are by far most common, are characterized by rather long, tapering, oblique projections, showing the interior of the cellule and the cast of the outer walls; arranged in regular radiating rows, and in transverse lines, with, generally, distinct ridges between them. Sometimes they exhibit casts of the connecting pores between adjoining cellules. The intermediate pores seen on the surface are not visible from the interior. Under surface, of which we have only seen casts, is marked by deep

grooves, acute at the bottom, but rounded on the edges, between which are small pits having no determinate arrangement; these, of course in casts, are represented by corresponding elevations.

From *L. contigua*, this species can be distinguished by the very regular arrangement of the cellules, and by their being, in casts, rarely if ever overlapping or in any way hiding the others. In *L. contigua* they were so close together that the surface must present somewhat of a waved appearance. Lonsdale says of that species, cells in "rows parallel, not alternate," so that it must approach this very closely. We are not sure that we have encountered that species, although we have a specimen which corresponds with his description, except that for the cast the cells seem to have been in quineunx.

In regard to the openings laterally between the cellules, it appears more than probable to us that d'Orbigny, in his monograph of the fossil species, did not give them the attention they deserve, since while he uses the "special pores" as a means of separating his families in the suborder to which this genus belongs, he has placed under Lunulites, species both with and without these openings. More recently (1854) Busk, in the monograph of the species of the British Museum, (see *Brit. Mus. Catal. Marine Polyzoa*), has demonstrated that through these openings are protruded the vibracular appendages of the colony. These organs, with the avicularia, have proved to be of great use in classifying the recent species, and we conceive that the presence or absence of them, not less than their position in relation to the cellule, should be of generic value here.

The type of the genus *Lunulites* is *L. radiata*, Lam., and, as figured by Goldfuss, is provided with these intermediate openings, consequently, the above and the following species are true *Lunulites*. We propose, at no very distant period, to re-examine the whole subject, and believe that we will find sufficient reason for removing the true *Lunulites* from the family *Escharidæ*, together with some of the species of d'Orbigny's two genera, *Pavolumulites* and *Reptolumulites*. The remainder, having the same character of cellules, the same radiating, linear arrangement, always commencing by an abortive cellule, but with no vibracular openings, will still remain in this family.

#### L. INTERSTITIA, G. and H.

*Orbitolites id.* Lea, Contributions, p. 191, pl. 6, f. 204.

Colony circular, low, conical. Cellules arranged in regular radiating lines, with new lines occasionally interposed, always commencing by an abortive primo-serial cellule. They also form regular annular lines. The cellules are octagonal, usually somewhat elongated, the length being to the width about as five to three. The surface is unusually open, walls thick but simple, no ornamentation. There is a faint sign of division in the shape of an obsolete groove, sometimes visible between the

longitudinal rows of cellules, but the cells of the same row appear to be intimately united.

The vibracular cells are small, rhomboidal, one to each ordinary cellule and each one placed at the point of contact of four of the latter, encroaching on them, truncating their angles so as to make them hexagonal. Under surface, Mr. Lea says, "pores below numerous and very minute;" we have been unable to examine this side on account of the fragile nature of the only two specimens we have seen, both of which are firmly attached to the matrix.

From the Eocene of Claiborne, Ala.

This species appears to be the most rare of the four known at the above locality. It can readily be distinguished, even by the naked eye, by its larger size and the annular disposition of the cellules, which is more obvious, to the unassisted vision, than the radiating arrangement. The peculiar position of the vibracular (or "special") pores will distinguish this from all the other described species of discoidal polyzoa.

L. CONTIGUA, Lonsd., Quart. Jour. Geol. Soc. vol. 1, p. 533, figs. a, b, c.

"Conical, casts of cells cylindrical, short, oblique to the surface, opening round, rows parallel, not alternate, divided by thin plates, successive cells connected by foramina; concave surface broadly ribbed, closely indented; distance between the two surfaces slightly exceeding the depth of layer of cells; a series of shallow chambers between the rows of cells."

"This species resembled the last in the character of the cells, the connecting foramina, and the radiating plates; but it differed in the distance between the surfaces slightly exceeding the range of cells, and in the ribs of the concave cast being densely covered by minute points, sometimes blended together; no filaments similar to those which project from the equivalent portion of *Lunulites distans* were noticed."

We have not been able to identify this species among our specimens, and can only add that, from the above description, it appears to belong to the true *Lunulites* as restricted above.

"Locality, Wilmington," [North Carolina, Eocene.]

L. OBLONGA, Emmons, Geol. Report, N. Carolina, p. 312, figs. 252 and 253.

"Polypidom small, conical: cells arranged along a straight line from base to margin; open cells show that they are nearly quadrangular; the closed cells do not show an orifice; there is a simple film spread over the cells, and the margins are simple and unlike *denticulata*."

North Carolina, (Miocene?)

We only know of this species by the above description and worse figures.

#### SEMIESCHARA, d'Orb. 1851.

Colony in the form of a plate, lamellar, tortuous and occasionally tubular. Cellules only on one side, (the external surface of the tubular form), and on the opposite side we find a germinal plate, such as occurs between the two layers of *Eschara*. Cellules arranged in lines, sometimes with little regularity; consisting of two sorts, ordinary

and accessory. Ordinary cellules same as the common forms of the family; accessory cellules of a different form from the ordinary ones, sometimes placed at the beginning of a new line, sometimes intercalated with the ordinary form. Ovarian vesicles or ovicells sometimes occur. On the back the colony shows the lines of cellules.

Differs from *Eschara* in having the cellules on only one side, from *Cellepora* in being always free, and from *Semicelleporaria* in having but one layer instead of many, as in that genus.

S. TUBULATA, n. s., fig. 5.—Colony tubular, fixed by the base, from which arise rounded, dichotomous branches, somewhat flattened at the point where a new branch takes its origin, section at other points nearly circular. Externally surrounded by from eight to twelve rows of cellules, placed in regular quincunx. Young cellules convex, very distinct above, rounded and prominent; older cellules (and slightly worn specimens) not separated by any lines or concavities. Mouth, in perfect young cellules, circular and bordered anteriorly by a delicate lip, not elevated above the surface of its own cellule, but a little higher than the surface of the succeeding one; in old specimens the mouth is a mere perforation in the surface of the colony, sometimes with the surface slightly sloping towards it. Surface of young cellules almost plain, sometimes marked by a few punctations, especially towards the edges. In older cellules the surface is profusely punctate. The shape of the cellules is an elongated oval. This is only visible in the very young states. The interior face of the tube is irregularly striate or finely rugose transversely, and the separation of the cellule is very distinctly marked by impressed lines, which are gradually deepest at the points where the direction changes.

Besides the external obliteration of the separations of the individual cells, the only change produced by age observed by us was the more distinct punctation of the surface. We have noticed all the varieties of age on the same specimen.

*Locality and position.*—Claiborne, Ala. ? Eocene.

*Explanation of the figures.*—Fig. *a*, colony, natural size. Fig. *b*, magnified view, showing both exterior and interior. The cellules are about a mean between the youngest and oldest observed. Fig. *c*, transverse section. Sometimes this is very elliptical, and the two internal surfaces will form almost parallel lines.

#### HIPPOTHOA, Lam. 1821.

*H. irregularis*, G. and H., is a *Pyripora*.

*H. tuberculum*, Lonsd., is a *Pyriflustrella*.

#### CELLEPORA, Fabricius. 1780.

(Not *Cellepora*, Lam., 1801), *Cellepora* and *Discopora* (pars) Lam., 1816, *Eschara* (pars) Gmelin, *Escharina* and *Escharoides*, M. Edwards, (not *Escharina*, Roem., Reuss, Hagen.), *Marginaria* (pars) Roem., Reuss, *Lepralia*, Johnston.



Colony fixed, encrusting submarine bodies, composed of only one layer of juxtaposed cellules, arranged in quincunx, oval or hexagonal, convex, flat or concave on their surface, which is sometimes entire, sometimes cribrate. Mouth variable in form, of moderate size and placed in advance. No special pores, but provided with ovarian vesicles placed in advance of the mouth. Sometimes we find, in place of an ordinary cellule, an accessory cellule, always differing in a marked manner from the ordinary ones. Colony sometimes nearly circular, sometimes increasing only from one margin, so as to present an irregular form. The latter, with various modifications, is by far the most common mode.

This genus can be at once distinguished by its having simple cellules, without special pores or fossets, encrusting other bodies, always in only one layer.

*History.*—There has been so much confusion in the use of this generic name, that we deem it advisable to copy a condensed account of its history, which will also serve to point out its synonymy, from d'Orbigny's carefully prepared sketch given in his "Paléontologie Française, Terrains Crétacés," vol. 5, p. 390, *et seq.* The first distinctive name given to the genus was *Cellepora*, given by Fabricius in his *Fauna Greenlandica* in 1780. He then described six species under this name, only one of which does not belong to it, as now circumscribed. Pallas, in 1766, had confounded the genus with *Eschara*, *Flustra*, &c. In 1789 Gmelin, in his compilation of *Systema Naturæ*, retained Pallas' name, and added other species belonging to *Celleporaria* and *Semicelleporaria*. Esper went further, and in 1791 placed in *Cellepora* of Fabricius, besides the last two genera, *Idmonea* and *Eschara*. In 1801, Lamarck, rejecting the five species of Fabricius, took the sixth for his type, confining the genus to those species having many layers of cellules. Moll, in describing the species of the Mediterranean, gave them, with many other genera, under the name of *Eschara*. Lamaroux, in 1812 and 1816, took the five species as types and restricted the genus to the species with one layer. In 1816 Lamarck made his genus *Discopora* (including some true *Celleporæ*, with some with many layers and some other genera) and gave as the distinguishing characters that the cellules were in irregular quincunx and not salient. Lamaroux, in 1821, removed the many layered species of Lamarck from *Cellepora* to constitute his genus *Celleporaria*. Goldfuss placed only true *Celleporæ* in this genus. The *Cellepora* of Edwards, 1836, is the *Celleporaria* of Lamaroux, 1821. The former, at that time made of *Cellepora*, Fabricius, Lamaroux and Goldfuss, two new genera—*Escharina* for the species in which the cellules are horizontal in their mode of grouping, and *Escharoides* for the species in which the cellules are oblique or nearly vertical; he also retained *Discopora*, restricting it to the species in which the separation of the cellules is not distinct exteriorly. That these three forms merge into each other will be evident on examining a comparatively small number of species.

In 1840, Roemer gave to the *Cellepora* of Fabricius the names of *Discopora* and *Marginaria* when the cellules were not convex, and *Escharoïdes* the species with convex cellules, while he named *Escharina*, polyzoa entirely different from those of the same name of M. Edwards, and which include the present genera *Reptescharipora* and *Reptescharella* of d'Orbigny. In 1845, Reuss placed the *Cellepora* with the *Membranipora* under the name *Discopora*, and with *Marginaria*, which contained besides many other distinct genera, while he placed in *Escharina* several genera entirely different from those of Edwards. In 1851, Hagenow returned to the genus as defined by Fabricius, and placed as subgenera *Escharoides*, *Dermatopora* (which corresponded to *Membranipora* of Blainville) and *Marginaria*, in the latter of which he placed besides *Membranipora* and *Escharina*, which, like those of Roemer and Reuss, are entirely different from *Escharina* of Edwards. D'Orbigny, in 1839, in the "Bryozoaires de l'Amérique Méridionale," in 1847 in "Prodrome de Paléontologie Strat.," and on some of the earlier plates of "Paléont. Française," used Edwards' name *Escharina* for *Cellepora*.

The above will convey an idea of the apparently inextricable confusion into which the subject seemed to have fallen, and we are certainly indebted to that most indefatigable student Alcide d'Orbigny for setting it right. There is yet one point about which he says nothing. He does not, as far as we are aware, once refer to the name *Lepralia* of Johnston. This author, taking the many layered species to be the true *Celleporæ*, in other words, following the Lamarckian determination of the genus, founded a new genus, taking *Cellepora hyalina*, Linn., a common British species, for his type, and called it *Lepralia*.

We are not acquainted with this particular species, but after a careful study of all the figures and descriptions at our disposal, not only of the typical species, but of all the other *Lepraliæ*, we cannot find a single point on which a generic division can be based.

*C. tubulata*, Lonsdale, Quart. Jour. Geol. Soc. vol. 1, p. 70, is apparently either a *Heteropora* or a *Multicrescis*. Possibly it may prove to be the *M. parvicella*, G. and H.

*C. PROLIFICA*, G. and H.

*C. bilabiata*, G. and H., Proc. Acad. Nat. Sci. 1860, p. 366.

*C. bilabiata*, G. and H., Jour. Acad. Nat. Sci. 2d ser. vol. 4, p. 400, pl. 69, f. 21, 22.

Not *C. bilabiata*, Busk, 1854, Brit. Mus. Catal.

Colony encrusting, generally in elongated patches, composed of cellules arranged in irregular quincunx and in pretty regular lines. Mouth large, anterior, round or transversely oval, sometimes with the proximal lip straight: no thickenings or true lips. Surface very convex, elevated in the middle and slightly projecting towards the mouth, which opens obliquely forwards. Ovarian vesicles numerous, short, convex, wider than long and slightly emarginate at the oval margin. No surface markings were

observed, although they may exist, since the specimens, like most of those from this locality, are covered by a very delicate calcareous incrustation.

Only observed heretofore at Timber Creek, N. J. *Cretaceous*.

The figures given in Journal of Academy of Natural Sciences, will convey a very good idea of the species, except fig. 23, which would make it appear that the colony consisted of more than one layer. This is not so. The colony in this case is encrusting another of a different species, which does possess several layers. There is another point in the figure which is slightly incorrect. Three of the cellules are somewhat too short. They vary a little in length, but not to the extent there indicated.

It sometimes occurs that the crest or most convex portion of the cellule is abraded, so as to present an appearance of a foramen below the mouth. This was observed in a number of instances. Besides these characters, it may prove to be the case that a row of small pores will be found at the extreme edge of the cellule, indicating the line of separation. We are not able, from the material now before us, to decide positively on this point, but there are some appearances which render this probable. The prominent surface of the cellule behind the mouth, and the very constant ovarian vesicle, induced us to call this species *bilabiata*, but since this name has been used by Busk, we propose to substitute the name of *prolifera*.

*C. EXSERTA*, n. s., fig. 6.—Colony generally small and radiating, encrusting shells and other polyzoa. Cellules without any marked quincuncial arrangement, oval, very prominent, presenting the appearance of being attached by only a portion of their base, mouth terminal, large, round or transversely oval, pointing upwards and forwards, without any thickening or lip, but with the cellule slightly contracted around it so as to look somewhat barrel-shaped. No special markings on the surface.

This peculiar species can be at once distinguished by the exsert, irregularly placed cellules, giving to the colony, even to the naked eye, an unusually rough appearance.

We observed, in one instance, an appearance of an expansion or retroversion outwards of the lip; whether this is the normal condition of the mouth, or merely accidental, we are unable to decide, since we could not find it again in a number of colonies.

The colonies are generally small, showing but thirty or forty cellules, but we have a colony composed of cellules unusually small, amounting to perhaps over a hundred in number.

Not uncommon in the light grey marl of the Cretaceous, from near Mullica Hill. We have a very much worn colony encrusting an oyster from near Yazoo, Miss., which may prove to belong to this species, but there are no cellules well enough preserved to identify them certainly.

*C. carinata* G. and H. is a *Reptopora*, q. v.

For remarks on *Cellepora typica*, see under *Escharifora*.

C. JANEWAYI, n. s., fig 7.—Colony encrusting in very irregular patches. Composed of oval to hexagonal cellules arranged in pretty regular quincunx. Cellules convex, generally hexagonal, sometimes very much elongated posteriorly, in which case the proximal end terminates in a point, making the cellule pentangular; separated by a depressed line, caused by the meeting of the convex surfaces. Mouth terminal, subquadrangular, bordered by a lip, very slightly elevated and thickened, occasionally with a tubercle on the proximal margin encroaching on the outline of the mouth. Surface closely perforated by large rounded pores.

*Locality and position.*—We have seen but one colony of this species; it is encrusting an undescribed species of oyster from the Cretaceous formation, from “seven miles below Yazoo, Miss.” It is in the collection of one of the authors,\* and was presented to him by Dr. Janeway, U. S. A., formerly of Princeton, N. J., to whom we dedicate the species.

In some cases, the anterior margin of the mouth is absent. When this occurs, the lateral margins project forwards in two horn-like processes, the surface of the succeeding cellule appearing to serve as one of the orifice. This of course must be a fallacious appearance, due to the extreme tenuity of the proper cell wall on that side. When the tubercle, behind the apertures is abraded, it shows a perforation, but it is always entire in sheltered situations, thus proving that such a pore is only accidental.

The cellules are generally about half as wide as long, but in some instances we have observed them, three times as long as wide. The size and shape of the aperture seems to be very constant; we have seen but little variation.

We are acquainted with no species bearing a close resemblance to this, or with which it could be confounded.

C. PUMILA, n. s., fig 8.—Colony encrusting, composed of minute cellules, arranged in regular lines, but rarely in regular quincunx, which latter form, when it occurs, seems rather to be accidental. Cellules oval, convex, separated from each other by depressed lines. Mouth anterior, not always terminal, subquadrate in form; without any lip or thickening, but merely pierced in the substance of the surface. Ovarian vesicles not unfrequent; flattened, rounded, sometimes a little wider than the cellules to which they are attached. Abortive cellules common.

We have observed two colonies of this species, in both cases encrusting *Multicrescis parvicella*, G. and H. It is remarkable for the small size of the cellules, and the relatively small aperture. The cellules are always arranged in radiating rows. New rows commence by an abortive cellule, succeeded by one less than the usual size, and that followed by one attaining ordinary dimensions. Sometimes a cellule appears to have been so crowded by adjoining ones that it has not had room to develop itself. They appear, however, to retain pretty nearly the same shape, differing mainly in size.

\* Mr. Gabb.

The mouth generally opens upward, but occasionally it is seen pointing obliquely forward.

From the yellow, cretaceous limestone, Timber Creek, N. J.

C. CYCLORIS, n. s., fig. 9.—Colony encrusting, composed of cellules arranged in very irregular quincunx, with a radiating tendency. Cellules broadly oval, narrowed anteriorly, prominent, convex, separated by deep lines caused by the meeting of very convex surfaces. Mouth circular, bounded by an elevated, thickened rim, which is prolonged into a very prominent lip at the proximal side of the mouth, as in fig. 9, *b*, representing an ovarian vesicle in advance and the lip behind the mouth. Surface smooth. Ovarian vesicles numerous, small, broadly convex, and in every instance exhibiting their special mouths distinctly separated from the ordinary aperture of the cellule by a flat plate.

We have seen but one colony of this species. It is in the collection of the Acad. Nat. Sciences. It is encrusting a specimen of *Orbitolites Mantelli* from the Eocene (of Ala.?)

The very abrupt distal extremity of the cellules, the round mouth and the prominent lip at its proximal edge, will serve to distinguish this species. The colony from which the above description was taken consists of about sixty cellules. The first ten or twelve are arranged radiately around a common centre, while the remainder all start from the same side. Most of the cellules are smooth on their surface, but a few present asperities, due apparently to a deposition of calcareous matter.

C. INORNATA, n. s., fig. 10.—Colony encrusting, composed of cellules arranged in irregular quincunx and radiating lines. Cellules slightly convex, oval, separated by depressed lines. Mouth terminal, bounded by a delicate rim anteriorly which is not thickened; ovoid, broadest in advance, generally emarginate at its two posterior corners, variable in size and form, sometimes rounded-triangular with the base anterior. Ovarian vesicles small, not prominent, acuminate anteriorly. Surface plain or occasionally faintly undulated, undulations transverse when present.

The oval, plain, small cellules, with the mouth ovoid to subtriangular, occasionally emarginate at the angles, and produced at the middle proximal margin, will at once distinguish this unpretending little species. The ovarian vesicle is sometimes much broader than shown in the figure, sometimes attaining as great a width as the cellule itself.

We have seen but one colony. It is from the Eocene of Alabama, probably from the famous Claiborne locality. Coll. Academy.

C. TUMIDULA, d'Orb., Pal. For. p. 399, vol. 5.

*Escharina tumidula*, Lonsdale, Quart. Jour. Geol. Soc. vol. 1, p. 502, fig.

*E. tumidula*, d'Orb., Prod. Pal. Strat.

"Cells oblong; rows radiating, divided longitudinally by a furrow, but not separable mechanically; no transverse furrows between successive cells; surface slightly convex, with well defined, large, round pores; mouth circular, boundary slightly thickened, two small protuberances on the proximal edge, sometimes a small tooth on each side."

"But one condition of growth of this species was noticed." "The cells were in general regularly arranged with reference to the individual rows; but there was no uniformity of disposition as respected the whole surface. Their length was about one-fourth of a line, and breadth one-sixth. The interpolated, or additional series, sprung from the side of an oval termination; but from their mode of insertion they might be considered as having had an independent origin, or having been developed from gemmules. In every case, however, the first additional cell had been clearly derived from that in which the regular successive cell did not occupy the whole of the distal termination, their being in both instances, the same want of a distinct transverse separating line, while between the interpolated and the other pre-existing rows, the regular longitudinal furrow was continued. No signs of accessory foramina or of gemmiferous (?) vesicles were noticed."

"*Locality*.—Petersburg," Virginia, (Miocene.)

We are not acquainted with this species, except through the description given above, and a wood cut. The cellules appear to be oblong, with their sides parallel; surface pierced sparsely by rounded pores; mouth large, occupying the whole of the distal portion of the cellule and with a thickened edge or lip, sometimes emarginate at the proximal edge.

C. FORMOSA, Tuomey and Holmes, Pliocene of South Carolina, p. 12, pl. 4, fig. 6.

"C. incrustans; cellulis ovatis, immersis, æqualibus, subquincuncialibus, vel sine ordine depositis, poris minimis cinctis; ore magno, rotundo."

"Incrusting; cells ovate, immersed, equal, somewhat quincunx or disposed irregularly, surrounded by a row of minute pores." (Mouth large, round.)

"The distinguishing character of this beautiful species is the row of pores bounding the cells; on the sides of the cells the pores are in double rows and seen obliquely, giving the cells the appearance of serial arrangement. Vertically the cells are separated by a single row of pores. This regularity is only observed when there has been no interference, for on other portions of the same specimen both the cells and pores are irregular. The mouth is large and but slightly raised."

We are not acquainted with this species, nor with any other described for the first time in the above work. From the figure given, it appears to resemble somewhat our species *C. Janewayi*, but it differs in the cellules being broader, with a larger mouth, not bounded by a distinct lip, and in the punctations on the surface being confined to a row along the edge, as in *Reptocelleporaria umbilicata*. From the latter species it can, however, be at once distinguished by the absence of the "special pores" behind the opening, and in not consisting of more than one layer.

This species, with the others in the above work, are quoted as Pliocene.\* The locality is Darlington District, S. C.

\* In regard to the use of the terms Pliocene and Miocene in this country, it will probably be found on more careful examinations, that there is no real division existing between the two so-called formations. A striking proof of this will be found in the concise table given by my friend Prof. Holmes, in the above work. In speak-

## C. TESSELLATA, Tuomey and Holmes, Pliocene of South Carolina, p. 13, pl. 4, f. 7.

"C. *incrustans*; cellulis minimis, subglobosis, depressis, quincuncialibus, interstitiis impressis; ore minimo, constricto."

"Incrusting; cells small, somewhat globular, flattened, quincunx, with the boundaries between the cells defined by an impressed line; mouth small, contracted, slightly lipped; a small closed tubercle on the sides of the cells, which is sometime conspicuously open."

"The depressed globular form and great regularity of arrangement distinguishes this species."

"Giles Bluff, Pee Dee River." "Pliocene."

The extreme breadth of the cellules, making them almost square (according to the figure) will serve to distinguish this species in the absence of almost every other character.

## C. RADIATA, T. and H., Pliocene of South Carolina, p. 13, pl. 4, f. 8.

"C. *incrustans*; cellulis ovato-oblongis ventricosis, subimbricatis, radiantibus, quincuncialibus; ore rotundo."

"Incrusting; cells oval-oblong ventricose, radiating, quincunx."

"This fossil is found in irregular patches, consisting of a single layer of cells on the surface of other fossils. Near the proximal edge of the mouth, which is not at all thickened, there is a small tubercle which is generally perforated, showing under the microscope a minute foramen."

"*Locality*.—Goose Creek, S. C." "Pliocene."

## C. DEPRESSA, T. and H., Pliocene, South Carolina, p. 14, pl. 4, f. 9.

"C. *incrustans*; cellulis depressis, ellipticis, quincuncialibus; ore rotundo, prominulo, labiato, tuberculoso."

"Incrusting; cells depressed, elliptic, quincunx; mouth circular, slightly prominent, margined, tuberculose."

"The cells are much flattened, somewhat indistinct, and separated by a depressed line. The mouth is small and depressed, with the lip slightly raised and thickened. On each side of the mouth there is a minute tubercle.

Occurs with the preceding. The sides appear to be parallel, and the top of the cellule sloping upwards from its proximal margin to the proximal margin of the aperture, which, from the figure, seems to point upwards and forwards.

C. URCEOLATA, n. s., fig. 11.—Colony composed of large cellules, disposed in radiating lines and irregular quincunx. Cellules oval, very convex, depressed posteriorly, elevated anteriorly so as to present an imbricating appearance. Mouth circular, terminal, looking slightly forwards; bordered by a large collar-like lip, thinnest and lowest anteriorly, elevated at the proximal corners and depressed in the middle of the

ing of the numerous beds of sands and clays overlying the Eocene, from New Jersey to Carolina, he speaks of Mr. Conrad having referred them to the Miocene, because he found in them about fourteen per cent. of living species. He then gives a table showing the per centage of living forms, in beds characterized in the main by the same series of fossils, in four States, as follows:—

New Jersey has 13 per cent.; Virginia, 18 per cent.; North Carolina, 34 per cent.; South Carolina, 42 per cent. Thus showing, as far as we have the means of knowing at present, that the same beds, or more likely beds of the same group, in one place are, according to the now generally received rules, miocene in one locality and pliocene in another.—W. M. G.

proximal margin, but not emarginate; presenting the appearance of the mouth of a pitcher when viewed from before; the edge adjoining the mouth on that side slopes inwards somewhat, thus heightening the resemblance. The proximal edge of the lip, furthest from the mouth is elevated above, and overhangs somewhat the surface of the cellule. Surface minutely and closely punctate, but not perforate (?).

*Locality and position.*—From the Miocene marl, of New Jersey, encrusting a specimen of *Ostrea percrassa*, Con. Coll. W. M. G.

This magnificent species, of which we have only seen a single colony, resembles in the shape of the cellules, *C. radiata*, T. and H. It can be at once distinguished, however, by the peculiar, pitcher-shaped mouth. The mouth of *C. radiata*, is simple and the cellules are broader.

Sometimes, though rarely, the anterior margin of the mouth degenerates to a mere line, but the lip-like character of the posterior margin is always more or less persistent. We are not able to detect any actual perforations of the superficial crust as in *C. Janewayi*; the punctations appearing to be merely minute depressions of the surface. They appear to be evenly and regularly distributed over the whole surface, except the lip, which is smooth. No abortive cellules nor ovarian vesicles exist in the specimen before us.

*C. CALIFORNIENSIS*, n. s., fig. 12.—Colony encrusting in irregular patches. Cellules arranged irregularly; oval to rounded hexagonal, prominent in the middle. Mouth anterior, almost terminal, semi-circular to oval or subquadrate; proximal edge usually straight; bounded by a slightly raised, but not thickened lip, best developed anteriorly, not always present posteriorly. Surface much elevated about the centre of the cellule, sometimes with a distinct tubercle, from which the surface slopes in all directions. Around the edge is a row of large pores, not always, however, encircling the mouth. Besides these there is usually a row of smaller ones behind the mouth, and at times the whole surface of the cellule is perforate. From Santa Barbara, Cal., considered to be Miocene, by Mr. Conrad.

The very elevated centre of the cellule in this species is its strongest distinguishing character. There is never a distinct pore at this point, although, we have frequently observed a perforation of irregular shape, the result of attrition.

In some colonies, the surface is perfectly intact except the marginal row of pores, in others it is punctate, but not perforate, while at other times it is strongly cribrate. All of these characters can sometimes be observed in the same colony.

We are indebted to Dr. A. L. Heermann, for this and the other California species, collected by him several years ago, and placed in the Museum of the Academy of Natural Sciences of Philadelphia.

*C. BELLEROPHON*, n. s., fig. 13.—Colony encrusting, testaceous, composed of cellules juxtaposed, placed irregularly. Cellules short, without any obvious separation



superiorly, except a slight undulation of the surface. Surface coarsely perforate by large irregular pores placed close together; anteriorly prolonged into a large trumpet shaped tube. This tube is inclined upwards and forwards, is expanded at its extremity, around the mouth, and the lower portion, for from one to two-thirds of its length, is marked by impressed striæ having a spiral tendency. The lateral and terminal walls are thin and perforated by very distinct connecting pores.

*Locality*.—With the preceding, encrusting *Idmonea Californica*. Rare. The tubulate mouths of this species gives it a striking resemblance to *Entalophora punctata*, but it can be distinguished by the fact that it is encrusting, while the latter is in dendroid branches. The very exsert mouths might lead one to suppose that this beautiful little Polyzoon was a centrifugate, but we are satisfied that the cellules arise from the sides and ends of the preceding ones, and not from behind them, as is the case in the latter order. The tubes sometimes are almost decumbent on the surface of the succeeding cellule, but usually rise at a slight angle. There is no thickening around the mouth.

#### REPTOCELLEPORARIA, d'Orb. 1851.

Colony testaceous, encrusting submarine bodies, never raising in free plates or branches, but composed of numerous layers superposed. Cellules, same as in *Cellepora* and other *Escharidæ*. Ovarian vesicles not uncommon.

Differs from *Cellepora* in having many layers superposed, instead of only one; from *Celleporaria* in that, while composed of numerous layers, it is always encrusting, never rising into dendroid branches.

R. ASPERA, n. s., fig. 14.—Colony encrusting usually composed of from four to twenty layers, sometimes presenting a knotted or coarsely tuberculose surface. Cellules oval to rounded hexagonal, placed irregularly, but with a tendency to a general arrangement in one direction in the same neighborhood, convex and very prominent on the surface, separated by deep irregular depressions. Mouth anterior, not terminal, semi-circular to subquadrate, with the angles rounded, sometimes elongated, but usually with the proximal edge straight or curved outwardly, and always with the greatest diameter placed transversely. Surface of the cellules marked by a small number of large rounded elevations placed irregularly, and with those nearest to the edge elongated so as to present between them grooves, resembling remotely the fossets of the *Escharellidæ*. These grooves are continued all round the edge of the cellule, and at their extremities we can generally observe a small pore, piercing the crust.

From the cretaceous of Timber Creek and near Mullica Hill, N. J. The pores around the edge, placed in distinct grooves, at first caused us to hesitate in placing this species in the above genus; but on a more thorough examination, we are convinced that they are no more like the "special fossets" of d'Orbiguy, than are the

similar pores of *Multiporina umbilicata* or those seen scattered over the whole surface many species of *Eschara*, *Cellepora* and other genera.

The tuberculation over the surface of the cellules was only observed in a few instances in very sheltered localities, but since most of the specimens examined by us were worn, we were unable to detect it in the majority of cases. We have no doubt, however, but what it will be found to be a constant character. We seldom observed more than a half dozen of the rounded tubercles on a single cellule.

R. INFORMATA, d'Orb., Pal. Fr., vol. 5, p. 422.

*Cellepora informata*, Lonsd. Quart. Jour. Geol. Soc., vol. 1, p. 505.

*C. informata*, d'Orb., Prod. Pal., vol. 135, No. 2560.

*R. informata*, Tuomey and Holmes, Pliocene, S. Carolina, p. 15, pl. 4, f. 11, 12.

? *R. informata*, Holmes, Post Pliocene, South Carolina, p. 6, pl. 1, f. 5.

Colony encrusting, irregularly botryoidal, many layers. Cellules arranged irregularly, normally elongated, sides rounded slightly, but nearly parallel; when crowded they vary very much in form, being sometimes quadrangular, and even wider than long, while in the normal state the proportions of length to breadth are about as 4 to 3. Mouth terminal, circular, in the same plane as the upper surface, surrounded by a slightly thickened lip, generally notched at the proximal margin. Surface of the cellule convex, closely and minutely punctate, except just about the middle, where the surface is elevated into a slight tubercle, visible only on very perfect cellules. Ovarian vesicles large and globular, occurring profusely on some specimens, entirely absent on others; surface punctate.

Miocene, Petersburg, Va., and South Carolina.

The form figured by Prof. Holmes in his Post Pliocene of South Carolina, seems from its mode of growth hardly to belong to this species, but since he does not figure the cellules in that case, we can form no definite opinion. Under the description of *R. quadrangularis* (with which species, we are unacquainted) will be found Lonsdale's account of the differences of the two species, which seem to be closely related. In addition to the characters given above, we might mention that we have never noticed the mouth oval as Lonsdale says it sometimes occurs. The proximal end of each cellule is somewhat lower than the distal end of the preceding one, so that the mouth, which is terminal, is generally a little higher than the adjoining surface of the succeeding cellule. When, as sometimes occurs, the small tubercle of the surface of the cellule, is worn away, there is a perforation left that might be mistaken for a "special pore." When two or more superimposed layers are broken through, they present a somewhat columnar appearance, but not distinct enough to mislead the most careless observer.

R. QUADRANGULARIS, d'Orb., Pal. Fr., vol. 5, p. 423.

*Cellepora id.*, Lonsd. Quart. Jour. Geol. Soc., vol. 1, p. 508. *Id.*, d'Orbigny, Prodrome Pal., vol. 3, p. 136, No. 2562.

"Encrusting; cells disposed in concentric layers around numerous centres, no regularity respecting the position of the distal extremity; form quadrangular, bounded by a depressed line, surface very slightly convex, minutely foraminated; not uniformly in the same plane as the exterior of the cell, round, large, margin in general not raised nor thickened, sometimes notched on the proximal edge, occasionally on one side of the mouth a large pyriform opening to a gemmuliferous (?) walls of cells not separable mechanically; vertical fracture concentrically laminated; connecting foramina near the base of the walls numerous."

"This coral agrees with the two preceding (*Reptocelledoraria informata* and *Multiporina umbilicata*) in the general Eschera-like characters of the cells, in the variable position of the distal extremity, in exhibiting no changes or external thickenings dependent on age, and in the situation of the supposed gemmuliferous vesicle or chamber; but it differed in the walls not being separable mechanically, fractured surfaces displaying almost constantly the interior of cells arranged in concentric layers, and not irregular columns detachable singly: also in the oval aperture having a less uniformly persistent position with respect to the surface plane of the cells, being in some instances terminal, and it resembled in its general characters much more nearly those of the mouth of *Cellepora pumicosa*.

This fossil attained considerable dimensions, one botryoidal mass being  $4\frac{1}{2}$  inches in width, and 3 in height; and with the exception of the small *Balanis* around which it was encrusted, and a central cavity, it consisted of concentric polype-strata enveloping the botryoidal centres. The individual layers had, however, a limited range. The cells when unaffected by irregularities of surface, had a nearly quadrangular outline; and the mouth was in the centre of the distal extremity, if unaccompanied by a gemmuliferous (?) vesicle; but if that structure occurred, it was situated on one side. Many mouthless cells were noticed, both with and without the vesicle; but the irregularity of development which prevented the formation of the oval aperture, did not apparently interfere in any manner with the perfect conformation of the opening of the supposed reproductive chamber. Indications of the progressive mode of constructing the cells were not observed; nor, as already stated, were there any signs, either on the surface or subjacent layers, of marked changes or thickenings attendant upon age. In some cases the mouths had apparently been contracted or filled up, but they were generally open; and obliteration of the pores, where it occurred, was probably due chiefly to the infiltration of calcareous matter."

R. SIMILIS, d'Orb., Pal. Fr., p. 423.

• *R. similis*, Tuomey and Holmes, Pliocene, South Carolina, p. 16, pl. 4, f. 13, 14.

*Cellepora similis*, Lonsdale, Quart. Jour. Geol. Soc., vol. 1, p. 559.

*C. similis*, d'Orb. Prod. Pal., vol. 3, p. 136, No. 2563.

"Lobed or convoluted; cells globular, confusely aggregated, surface not foraminated, more or less traversed by reticulated or radiating ridges; mouth large, circular, terminal; a large hood-shaped projecting gemmuliferous vesicle."

"This coral possessed all the leading characters of typical species of the genus, (*Cellepora*, Lam, not Fabr., see observations under that genus—G.) and it resembled *C. pumicosa*, in the form of the cells and in the confused mode of aggregation; and in that species radiating ridges near the junction of the cells may also occasionally be detected, but to a much less extent than in the fossil under consideration. The leading distinction between the fossil and recent polyparians consisted in the perfect vesicle of the former, when exhibited in sheltered places, not having a long spinous process; and there were other minor peculiarities, as the total absence of a transverse plate near the bottom of the aperture."

Prof. Holmes says, "This species is easily distinguished from the preceding (*informata*) by the more even and less verrucose surface of the masses. The whole is covered by little elevations, which rarely become mammillary. The absence of pores, when viewed

through a lens, separates it readily from *R. informata*. Miocene, ("Pliocene" Holmes) Virginia and South Carolina.

*R. umbilicata* d'Orb. (*Cellepora*, *id.*, Lonsd. is a *Multiporina*.)

*R. GLOMERATA*, n. s., fig. 15.—Colony composed of many superposed layers of cellules. Cellules placed irregularly; oval, convex, separated by depressed lines. Opening anterior or nearly central, round to subquadrate, simply pierced, not bordered by a few round pores, near the margin, sometimes only posterior to the mouth, at others, surrounding it and occasionally scattered over the surface. Dividing walls thick, separated.

The above description was taken from two, much worn, colonies, hardly showing more cellules than those figured. On all the cellules, we observed, near the mouth, and invariably behind it, a subquadrate, oval, or semilunar depression, in one instance, appearing to have been bordered by a wall, perhaps the remains of an arched vesicle. We could detect no connection between this depression, and the interior of the cellule. Owing to the worn condition of the specimens, we may have omitted some of the specific characters; but the short, oval, very convex form of the cellules will distinguish this species from any yet known.

*Locality*.—Vicksburg, Mississippi, Eocene, associated with *Oligotresium Vicksburgensis*.

Sub-Fam. ESCHARSELLINÆ, d'Orb. 1851.

ESCHARIFORA, d'Orb. 1851.

Colony sometimes encrusting in its earlier age, afterwards rising in free plates or compressed branches, with cellules on both faces, separated by a median germinal plate. Cellules of two kinds,—*ordinary* and *accessory*. Ordinary cellules placed in longitudinal lines and quincunx, opening small or of moderate size, placed in the centre of the cellules and surrounded by a number of fossets, or of pores performing the function of special fossets. The accessory cellules differ from the ordinary ones in the form of the aperture, which usually exposes the greater portion of the cellule.

It will be observed that we have modified the description of this genus in one important particular. We have observed a character, not altogether new in the mode of growth of the polyzoa. In other words, the following species, like the genus *Diastopora*, sometimes encrusts for a considerable distance before rising from the encrusted surface. In this case the cellules are placed in two series back to back, while in *Diastopora* they are in only one layer.

*E. TYPICA*, G. and H., fig. 16.

*Cellepora typica*, G. and H., Proc. Acad. 1860, p. 366.

*C. typica*, G. and H., Jour. Acad. 2d s. vol. 4, p. 400, pl. 59, f. 27—29.

Colony encrusting; sometimes in patches nearly an inch across, in its early age;

afterwards rising in free flattened branches, generally branching all in the same plane, sometimes tortuous. Ordinary cellules broadly oval, form visible only in the youngest portions of the colony, in ordinary adult colonies the surface being uniform. Mouth rounded anteriorly, straight on its proximal margin; immersed, with the sides abruptly sloping, and a slight rim at the inner edge. Sometimes at the proximal edge a tooth-like process, which is occasionally bifid at its extremity; in one instance we noticed another tooth springing from the anterior lateral margin and directed towards the centre. Accessory cellule observed in only one instance, substituted in the place of an ordinary one, and differing in having the aperture larger, very elongate and narrow at the distal extremity. In this case the immersed character of the mouth, and the small rim immediately bounding it, are better exhibited on account of the larger size of the opening. The special fossets in this species are represented by five tubulate pores, one placed in advance and the other four at the angles of the oval opening, not always at regular intervals. The surface of the colony is slightly undulated, and generally depressed towards the mouths of the cellules.

From the Cretaceous, Timber Creek, Mullica Hill, and in one instance, the specimen first described, from the upper portion of the second division of the Cretaceous following the divisions in the Geological Reports of New Jersey; the Timber Creek beds belonging to the highest division.

The first described specimen of this species shows no signs of the tendency to a free portion of the colony, and the pores surrounding the mouth having been almost obliterated, we considered it a *Cellepora*. Having since procured a large number of specimens, some in a very perfect state of preservation, we are able, happily, to determine the true position of this most remarkable form. One specimen in our possession places the identity of the encrusting and free portions beyond a doubt, since it shows, as represented in figure *c*, the surface sloping up on both sides, uniting, with a germinal plate between them, and rising prominently from the surface of the encrusting plate. When we add to this the fact that in the most minute structural detail both forms agree precisely, there can be no reason for doubting their identity.

In broad specimens we have noticed that the quincuncial arrangement of the cellules is modified, so that lines drawn across the intersecting rows of mouths are curved outwardly instead of being perfectly straight.

#### ESCHARELLA, d'Orb. 1850.

Colony resembling *Eschara* in its mode of growth, composed of cellules arranged back to back and in longitudinal lines and quincunx. Cellules of two kinds—ordinary and accessory. Ordinary cellules have the mouth in advance, exposing but a small portion of the interior; behind the mouth are placed special fossets, arranged radiately

in rows, or composed of radiating rows of small pores. Accessory cellules rare, larger than the others and open throughout their length. Ovarian vesicles frequently occur.

The special fossets *behind* the mouth will distinguish this genus from *Escharifora*, where they are placed around the mouth, which is central. The presence of the fossets and the entire absence of special pores separate the genus from *Eschura*, *Escharella*, *Eschurine-la*, *Porina*, &c.

E. MICROPORA, n. s., fig. 17.—Colony composed of robust, flattened branches, with cellules all round. Cellules elongated oval, narrowed posteriorly, arranged in very regular quincunx. Mouth circular, opening obliquely upwards and outwards: bordered by a prominent thickened, lip-like expansion, projecting very much from the surface of the cellule, and sloping down to it; middle anterior edge of the lip absent, so that the proximal end of the succeeding cellule appears to slope into the mouth. The outline of the lip is U-shaped externally, and the upper surface is abruptly truncated. When the lip is abraded, as is represented in one instance in the figure, the whole anterior end of the cellule seems to be depressed. Surface of the cellule ornamented by two rows of minute pores, slightly elongated transversely, arranged in about eleven pairs opposite each other, and with a few at the proximal end of the cellule uniting the two rows. Ovarian vesicle short, globular, broadly emarginate at the oval margin, and with the accompanying cellule much broader than those not provided with such an appendage.

From the Eocene (of Ala.?)

The rough, rasp-like surface of well preserved specimens, and the elongated cellules, round mouths and small fossets of all, will at once characterize this pretty little species. We usually find about nine or ten rows of cellules visible on one side. Those on the edges are as perfect as the others, and we noticed no abortive nor accessory cells.

#### REPTESCHARELLA, d'Orb. 1851.

Colony composed of one layer of cellules, arranged in contact with each other, encrusting submarine bodies. Cellules of only one sort, provided with the mouth in advance and with a variable number, according to the species of transverse or radiating "special fossets," always behind the mouth. Distinguished from *Distansescharella* by the cellules being always in contact. Bears the same relation to *Escharella* as *Cellepora* does to *Eschura*.

R. CAROLINENSIS, n. s., fig. 18.—Colony composed of a single layer of very small cellules, irregularly grouped, occasionally, though rarely, in quincunx, and not in longitudinal lines. Cellules convex, broadly oval, sometimes distorted so as to be twice as long as wide, or with one side nearly straight or angular. Mouth terminal, varying from circular to transversely oval, bordered by a slightly raised lip of uniform

thickness, with the proximal edge occasionally merging into the surface of the cellule. Behind the mouth are from five to seven pairs of fossets radiating from one point, placed at the bases of deep rounded excavations, opposite each other and at times crossing the whole surface of the cellule so as to unite. Sometimes there is an odd terminal fosset. We could detect no other ornaments on the surface.

This rare species is founded on a single colony encrusting the type of *Eschara texta*. The specimen is from the Eocene white limestone, from west of Charleston, S. C.

The remarkably small size and irregular mode of aggregation of the cellules will distinguish *R. Carolinensis* from all known species. The cellules are not more than an eighth of the size of those of the *Eschara* to which they are attached. The latter are about .04 of an inch in length.

*R. HEERMANNII*, n. s., fig. 20.—Colony encrusting in irregular patches. Cellules placed without any definite arrangement; oval to elongated subquadrate in form; distinctly divided by deep depressed lines. Mouth terminal, semicircular to oval or subquadrate, bordered by a raised lip, often absent at the proximal edge; anteriorly thickened and covered by about five prominent, perforated tubercles. Surface convex, marked by five or six pairs of very depressed grooves, usually radiating, sometimes extending across the whole cellule. At the lowest part of each groove is a row of small pores. Ovarian vesicles large, round, prominent, and without any ornamentation.

From Santa Barbara, Cal. Miocene.

The peculiar mouth of this pretty species will at once distinguish it. In the form of the cellules it resembles somewhat *R. Carolinensis*, but the cellules are usually more regularly oval. The mouth of the latter species is plain. We take pleasure in dedicating such a beautiful species to our friend Dr. Heermann, to whom students of Natural History are indebted for many rare and valuable specimens, the result of his assiduous collecting.

*R. PLANA*, n. s., fig. 19.—Colony irregular, encrusting. Cellules oval, arranged without any regularity. Mouth transversely oval or reniform. Always rounded in advance, often encroached on in the middle of the proximal edge; bordered by a slightly thickened, elevated margin. This margin is broad, and in the middle of the proximal portion it is marked by a projection or lip, quite prominent. Along the middle of the lip, in the direction of the longitudinal diameter of the cellule, is a small prominence or tubercle, often extending into the mouth, producing the reniform shape of the mouth. The rest of the margin is marked by a median groove, sometimes a row of punctations, extending around the mouth, never crossing the tubercle or lip. In a few instances we have noticed the mouth perfectly plain, being merely perforate. The surface of the cellule is rather gibbous but not grooved. The "special fossets" are represented by five or six pairs of rows of minute pores. These pores are not placed in

furrows as in the preceding species but are almost level with the rest of the surface, which is, at most, merely undulated.

Locality, with the preceding.

The ornamentation of the mouth and the very plain surface distinguish this species. It appears to be rare. We have observed but a single specimen, which, however, is well characterized. There is one ovarian vesicle on the specimen. It is nearly as long as an ordinary cellule, very convex, strongly carinate in the middle, longitudinally and with the surface plain.

#### PHIDOLOPORIDÆ, (*New Family*,) G. and H.

A certain number of the cellules only provided with special pores. Opening of moderate size and not closed by a membrane in the living state.

This family is related both to the *Escharidæ* and the *Escharinellidæ* and *Porinidæ*. We believe that its true position should be immediately after the *Escharidæ*. Three genera, belonging to this family, are already known. Two of them are here described for the first time. The third, *Selenaria* of Busk, (Catalogue of British Museum, Polyzoa, part 2,) is characterized by having vibraicular pores placed at intervals over the colony, which is discoidal as in *Lunulites*. The pores in this genus are attached to cellules, differing from the others by having no oval opening, and in being ornamented differently from the ordinary cellules. The only species yet known is recent, *S. maculata*, Busk, *loc. cit.* (*Lunulites id.*, Busk, Voyage of the Rattlesnake.)

#### PHIDOLOPORA, (*N. G.*,) G. and H.

Colony as in *Retepora*, composed of free, anastomosing branches, with the cellules only on one face. Cellules provided with a "special pore" or vibraicular (?) opening on the surface of the cellule, behind the mouth. This genus resembles *Retepora*, but can be distinguished by the scattered special pores over the surface of the colony.

P. LABIATA, n. s., fig. 21.—Colony composed of rounded or compressed branches, frequently anastomosing. Cellules only on one face; not separated externally, or at most separated only by very faintly depressed lines. Mouth rounded, proximal lip deeply notched. Surface without ornament, gently undulating and usually depressed around the mouth. Special pore, when present, placed on the surface of the cellule, in or near the median line, and some distance behind the mouth; bordered by a prominent lip and opening upwards and forwards. Ovarian vesicles small, nearly hemispherical, unornamented and placed directly in advance of the mouth. Back of the colony plain or showing at times very faint undulating lines, exhibiting the divisions of the cellules.

*Locality*.—Santa Barbara, Cal. Miocene. Not rare. The special pores have no



definite arrangement with relation to each other. Sometimes every cellule on a branch will be found to be provided with one, at others, they are hardly as numerous as shown in the figure. The ovarian vesicles are equally uncertain in their arrangement. We frequently find branches without a single one, and on one specimen, nearly as large as the one figured almost if not quite every cellule is provided with its ovicell. These two appendages do not seem to have at all interfered with each other. Sometimes a cellule will be provided with both, at other times, neither is present.

#### OLIGOTRESIUM, (*N. G.*) G. and H.

Colony discoidal, free; convex above, concave below; cellules on the convex or upper surface; arranged in radiating rows, with new rows occasionally interpolated. New rows commence by an abortive cellule. Opening of moderate size. A certain number of cellules are provided with a vibracular cellule, or "special pores" placed laterally, between the rows of ordinary cells.

This genus differs from *Lunulites*, in that a certain number of the cellules are provided with vibraculæ. From *Selenaria* it is distinguished by the vibracular cell being small and placed between the rows of ordinary cellules, while, in the latter genus, the vibracular cell replaces an ordinary one.

O. VICKSBURGENSIS, G. and H., fig. 22.

*Lunulites id.*, Con. Proc. Acad. Nat. Sci. Phila., vol. 3, p. 296. *Id.* Jour. Acad., vol. 1, p. 127.

Colony discoidal, of exceeding variable convexity, varying from almost flat to higher than broad. Cellules on the upper or convex surface, arranged in radiating lines; interpolated lines always commencing by an abortive cellule. Cellules subquadrate, irregular in form and size, anterior margin convex, posterior, concave; always separated by an impressed line. Surface regularly concave. Mouth central to anterior, never terminal; large, oval to subquadrate, promixal margin usually straight. A small raised lip sometimes encircles the mouth, occasionally only a portion of it, and at other times is entirely absent.

There is a vibracular cell, usually oval or fusiform, with an opening of variable shape, attached to each alternate cellule in the longitudinal lines, and placed at the side or a little in advance, always in the line between the rows of cellules. This cell is only placed with reference to the ordinary cellule to which it is attached, irrespective of the position of adjoining cellules in the neighboring series.

Under surface marked by irregular radiating depressed lines, not always continued to the edge of the colony. Between these lines the surface is convex and coarsely granulate.

From the "Upper Eocene," Vicksburg, Miss.

Fam. *ESCHARINELLIDÆ*, d'Orb. 1851.

Sub-fam. *ESCHARINELLINÆ*.

*ESCHARINELLA*, d'Orb. 1850.

Colony entire, testaceous, fixed by the base, from which rise branches or compressed plates with cellules on both sides, placed back to back and arranged in quincunx or longitudinal lines. Opening placed in advance, moderate in size and not operculate. A special pore placed invariably in advance.

With all the other characters of *Eschara*, it differs by the presence of a special pore in advance of the opening; in *Porina*, the pore is behind, and in *Escharinella* there are two.

*E. MURALIS*, n. s., fig. 23.—Colony composed of flattened, rather narrow branches, with from four to eight rows of cellules on each side. Cellules quadrangular, sometimes with the ends truncated, so as to be hexagonal. Surface convex smooth, more depressed at the proximal than at the distal extremity. Mouth terminal, sometimes round anteriorly with the posterior margin straight, sometimes subquadrate; often with a tooth at the middle proximal margin. Cellules, when perfect, and not in the more advanced stages, separated by a distinct wall which expands anteriorly and encircles the special pore, which is small round and placed close to the mouth.

From the Cretaceous from near Mullica Hill, N. J.

The figure represents the cellules unusually narrow, and the wall should be more ragged.

When the surface is worn, or in old specimens, this wall disappears, and with it the convexity of the cellule, in which case it resembles the worn specimens of *Escharifora typica*, the mouths of the cellules being both of the same general shape, and the present species presenting pits or depressions over the surface. The more perfect specimens of each are, however, very distinctly characterized.

? *E. LINEA*, G. and H.

*Eschara id.* Lonsd. Quart. Jour. Geol. Soc., vol. 1, p. 530, fig.

"Foliaceous; cells oval or oblong, sometimes bordered in completely by a slightly raised line; surface nearly flat, very porous; mouth transversely semioval, margin thickened, notched or plain on the proximal edge; occasionally a foramen on one side of the mouth penetrating obliquely towards a corresponding chamber at the distal angle of the interior of the cell; dorsal separation perfect, surface ridged or flat."

"The above characters were only obtained from older conditions of the coral. The raised lines were, in portions of the specimens, prominently developed, but in others were entirely wanting. In some cells connected with the general surface, as to indicate that they belonged to the species, the covering was much less porous, and in a few instances smooth or solid, while the mouth, and adjacent vesicles, occasionally two in number, were much more prominent. These variations had been apparently produced by curvatures in the

growth of specimen. The pores differed in size and form, sometimes assuming the character of distinct round foramina. No connection was traced between the obliquely penetrated vesicle and the small chamber at the angle of the cell; but occasionally a distinct arched solid layer ranged from the opening of the vesicle to the distal angle of the cell."

"*Locality*.—Entaw," (South Carolina, Eocene.)

We are doubtful of the true generic relations of this species. The pores, placed aside of the mouth, but connected with a chamber at the anterior end of the cellule, would seem to indicate a relationship with the *Escharinellidae*, but Lonsdale mentions an occasional second pore, which would also relate it to the *Escharillinidae*.

The species differs from *E. muralis* in its having the sides of the cellules almost parallel, and in the pore in the latter species being very small and placed immediately in advance of the mouth.

#### ENNALLIPORA, (*N. G.*) G. and H.

Colony testaceous, composed of many superposed layers. Cellules arranged in longitudinal lines or quincunx. Opening moderate in size, placed anteriorly and always provided with one special pore, situated in the succeeding cellules of each longitudinal series, in advance of the mouth, but alternately to the right and left hand side.

The unique arrangement of the pore in this genus will at once distinguish it. We cannot ascertain positively, the manner in which the colony commences its growth, but believe it to resemble *Celleporaria* and *Multescharinella*; that is, it rises from the surface to which it is attached, in a free plate or branch, over which the succeeding layers are encrusted.

It may be, however, that the only specimen before us, which is regularly clavate in form, is encrusting a tube of *Serpula* or some other slender body. If this is the case, the genus is most nearly related to the decumbent forms. From *Multescharinella*, this form is separated by the position of the special pore, which in the above genus is always placed directly in advance of the mouth.

*E. QUADRANGULARIS*, n. s., fig. 24.—Colony as described above. Cellules quadrangular, often irregular, from being crowded, separated by a distinct raised wall; placed in longitudinal lines, frequently changing their direction. Oral opening round, subquadrate or ovoid, situated in the median line, but at variable distances from the anterior end of the cellule, though always in advance of the centre. Surface convex, sloping upwards from the edge to the mouth which is always at the highest point. Behind the mouth is occasionally a somewhat prominent elevation of a triangular or oval form. The mouth is at times bordered by an almost imperceptible depressed line, producing the appearance of a lip. The edges of the cellule are pierced by a few irregular pores, at times continued as faint radiating grooves on the surface.

The special pore is placed alternately at the right and left hand, distal angle of the cellule, in each longitudinal series. It is bordered by a distinct, thickened lip, narrowest at the end near the mouth.

From the Miocene; Petersburg, Va.

The only colony we have seen is of an elongated, pyriform shape, covered with large regular elevations, over which the cellules run without changing their course. There is a hole on one side which may be the cavity left by a tube of a *Serpula*, over which the colony is encrusted, or it may have been caused by some boring animal. If the latter is the case, it will probably prove that the genus is erect in its mode of growth. We are inclined to this opinion because of the very regular form of the colony. Whether the pyriform or clavate shape is peculiar to the species, we cannot determine until we see more specimens. It is probable that the species retains more or less of an approximation to the form.

Subfam. P O R E L L I N Æ, d'Orb. 1851.

DISCOPORELLA, d'Orb. 1851.

Colony discoidal, fixed in its young state generally to a grain of sand, which becomes eventually imbedded in the testaceous substance of the colony. Cellules on the upper surface only, which is convex, the lower surface is concave and radiately striate. Cellules arranged in radiating lines and quincunx; surface pierced by regular transverse or radiating fossets placed posteriorly to the mouth. Mouth anterior, a special pore placed always before the mouth.

This genus can be distinguished from all the other free discoidal forms by the cellules possessing regular fossets piercing the surface of the cellule, and by the presence of a pore in advance of the mouth.

D. DENTICULATA, G. and H., fig. 25.

*Lumilites denticulata*, Con., Sill. Jour. vol. 41, p. 348.

*L. depressa*, Con., *id.*

*L. denticulata*, Lonsdale, Quart. Jour. Geol. Soc. vol. 1, p. 503. *Id.* d'Orb., Prod.

Pal. vol. 3, p. 136, No. 2578. *Id.* Emmons, Report Geol. N. Car., p. 311, figs. 248, 249. *Id.* Tuomey and Holmes, Pliocene S. Car. p. 11, pl. 4, f. 1—5. *Id.* Holmes, Post. Pl. S. Car. p. 6, pl. 11, f. 4.

? *Discoporella umbellata*, Emmons, (not d'Orb.), Rep. N. Car. p. 312, figs. 254, 255.

Colony discoidal, outline varying from circular to elliptical, upper surface convex, sometimes half as high as wide and at others very depressed; under surface concave, nearly parallel with the superior face. Cellules subhexagonal, variable in form, arranged in an oblique quincunx, separated by a prominent, angular, thickened wall projecting considerably beyond the surface of the cellules, ending in a sharp crest and

sloping, sometimes a little convexly, to the edge of the cellules. Mouth anterior, sub-square, with the sides curved outwardly. A special pore, which has sometimes been taken for the true aperture, is always placed in advance of the mouth, sometimes encroaching considerably on the proximal margin of the succeeding cellule. Surface of the cellule, when in its normal state, pierced by three pairs of "special fossets" and one odd one at the proximal end, making seven, placed at regular intervals behind the mouth. In young cellules, and probably at times as the result of injury to the specimen, we find the surface plate absent, and in its place only the bases of the processes between the fossets, leaving the surface of the cellule open and merged into the mouth. Under surface marked by irregularly undulating impressed lines, sometimes dichotomous, with the surface between them generally minutely pustulate.

From the Miocene. Appears to occur everywhere in this formation, from New Jersey to South Carolina. Prof. Holmes quotes it as occurring in the Post-pliocene.

We place Dr. Emmons' determination of *D. umbellata* as a synonym, believing that on further examination it will be found to be the form of this species described by Mr. Conrad under the name of *L. depressa*. The latter form is undoubtedly the same as *denticulata*, since we have not only had the privilege of studying Mr. Conrad's types of both the so-called species, but have, by the assistance of a number of other specimens, been able to trace the variations between them.

The special pore, with the minute chamber at its base, called by Mr. Lonsdale the "gemmuliferous (?) vesicle," is somewhat variable in form. Its mouth varies from circular to crescentic, in which case the convexity points indiscriminately to the right or left. It is generally surrounded by the boundary walls of the cellules, which is merely pierced in the surface of the cellule and has no special boundary or lip.

The special fossets piercing the surface of the cellule are always arranged in pairs, generally placed opposite each other, except the odd one at the posterior or proximal end, which is usually the largest, being sometimes almost an equilateral triangle.

It is somewhat remarkable that only the imperfect forms of the cellules should have been heretofore described, when in Mr. Conrad's types some perfect cellules are apparent, and Mr. Lonsdale seems to have seen them also, since he says "mature cells covered."

In some cases, in old cellules the fossets and mouth are nearly or entirely obliterated, but this is of rare occurrence. It is much more common to find merely the denticulated margin. When the surface of the colony is much worn, so as to obliterate the crest of the dividing walls, the cellules seem to be arranged in nearly radiating lines, the quincuncial appearance being hidden by the much more obvious one of the linear arrangement. On close examination of more perfect specimens, however, we find that both modes occur simultaneously.

Fam. *PORINIDÆ*.

## Subfam. P O R I N I N Æ.

## REPTOPORINA, d'Orb. 1851.

Colony encrusting, testaceous, consisting of only one layer of cellules, arranged in longitudinal lines and quincunx, more or less regular. Cellules juxtaposed, more or less distinct, variable in form; opening anterior, provided with one special pore behind.

Resembles *Cellepora* and *Reptescharella*, but distinguished from the former by the presence of a special pore, and from the latter by its being behind instead of in advance of the mouth.

## R. CARINATA, G. and H.

*Cellepora carinata*, G. and H., Proc. Acad. Nat. Sci. 1860, p. 366.

*C. carinata*, G. and H., Jour. Acad. vol. 4, 2d ser. p. 400, pl. 69, f. 24—26.

Colony encrusting, composed of cells arranged in regular quincunx. Cellules elongated hexagonal, with the proximal end narrowest; sides straight. Mouth anterior, oval to subquadrate, proximal margin straight to concave, (sometimes a tooth in the middle?) and not of the form indicated in the figure quoted above, which is the appearance presented when viewed from behind and not from above. The aperture points anteriorly. Cellules carinate in the middle, rarely rounded, the carination reaching its highest point, a little posterior to the mouth, from which point the surface slopes to the oval margin.

Just below the apex, and in advance of it, will be seen a small special pore. In protected positions this pore opens directly in advance, but when the surface has been in the slightest degree abraded, it is exaggerated in size and opens superiorly. The cellules are separated by a slight wall, similar to that seen in our species *Escharinella muralis*.

This species can be at once distinguished from all the others found in the same formation, by the elongated hexagonal cells, the mouth pointing anteriorly, the pore behind the mouth, the carinated, or as it sometimes occurs, the broadly globose surface and the walls arising between and bounding all the cellules.

R. EUSTOMATA, n. s., fig. 26.—Colony irregularly encrusting. Cellules closely juxtaposed, not regularly arranged. Mouth terminal, transversely elliptical to semicircular or subquadrate, bordered by a raised lip, plain or absent at the proximal margin, marked anteriorly by from seven to ten small perforated tubercles, giving the edge a serrated appearance. Special pore tubulate, arising from the surface of the cellules either on the right or left side, most generally on the same side in all the cellules of the same colony. Surface punctured by pores of variable size, not always perforate. The surface of the tube of the special pore appears to be always intact.

*Locality*.—Santa Barbara, Cal. Miocene.

The position of the special pore in this is remarkable. It is placed invariably behind the mouth, arises from the lateral third of the cellule and may be either on the right or left hand side. Occasionally two contiguous cellules show the pore on different sides, though this is rarely the case. The ovarian vesicle is moderate in size, placed, as usual, immediately in advance of the mouth, and is semiglobular and entirely without ornament.

#### MULTIPORINA, G. and H.

Colony testaceous, encrusting submarine substances, composed of numerous superimposed layers, always attached by their whole under surface and never rising in free plates or branches. Cellules having the general characters of the family grouped irregularly. Mouth terminal or nearly so, and having one special pore placed behind it.

Resembling *Reptoporina*, this genus differs from it in always having in adult colonies numerous layers superimposed instead of consisting of a single layer. In other words, it bears the same relation to *Porina* and *Reptoporina* as *Reptocelleporaria* does to *Eschara* and *Cellepora*.

#### M. UMBILICATA, G. and H., fig. 27.

*Cellepora umbilicata*, Lonsd. Quart. Jour. Geo. Soc., vol. 1, p. 507. *Id.*, d'Orb. Proc., vol. 3, p. 136, No. 2561.

*Reptocelleporaria umbilicata*, d'Orb. Pal. Fr., vol. 5, p. 423.

Colony composed of numerous layers, encrusting shells, branches and other submarine substances, in such a manner as to entirely hide their original form; generally taking on a very nodose or tuberculose appearance. Cellules, irregular both in size and shape, arranged without order, and with the central and anterior portion generally a little elevated. No distinct division between the cells externally. Mouth placed anteriorly but not always terminal, transverse, varying from semilunar to subquadrate, but always without sharp angles; border apparently thickened, slightly elevated, especially at the proximal margin a special pore is placed about half way between the mouth and the proximal end of the cellule. Surface marked by a row of pores at the extreme edge of the cellule; and sometimes by a few pores scattered over the rest of the cellule.

Between the mouth and the special pore, generally two, sometimes three, and rarely but one of these small pores will be seen. We observed no ovarian vesicles.

Miocene, Petersburg, Va.

Lonsdale says that the border of the mouth is not thickened. We have observed in several well marked instances, decided thickening not only surrounding the mouth, but extending down the middle of the cellule so as to reach and sometimes to form a border to the special pore. In some cases this thickening is a little exaggerated, thus

producing the tubercle noted by Lonsdale, "below the proximal lip." The two pores mentioned by him are sometimes represented by three and sometimes by but one. When this tubercle is worn off it leaves an irregular pore sometimes transverse, sometimes longitudinal and not rarely oblique. Although there is no external division between the cells, strictly speaking, still their outline can be easily determined by the rows of pores always being at the extreme edge of the superficial plate separated internally only by the lateral walls. This species resembles in its mode of growth and general appearance, *Reptocelleporaria informata*, but a glance at the cells will distinguish them. The latter species has the cells large, convex, prominent and with the aperture large and round.

Fam. *ESCHARELLINIDÆ*, d'Orb. 1851.

Sub-fam. *ESCHARELLININÆ*.

*REPTESCHARELLINA*, d'Orb. 1851.

Colony encrusting, composed of only one layer of cellules arranged in longitudinal lines and quincunx, juxtaposed, flat or convex. Mouth generally terminal, round or oval, sometimes salient, provided with two special pores.

Differs from the other encrusting species, provided with only one layer, by the presence of two special pores and the absence of fossets. From *Semiescharella*, it is distinguished by being attached by the whole surface, instead of being free.

*R. PROLIFERA*, n. s., fig. 28.—Colony encrusting; cellules arranged in quincunx, and in radiating lines from a central group of two or three cellules, somewhat smaller than the rest, but perfectly developed in all their structural details. Form of the cellules oval, elongated, convex, slightly more elevated at the distal than at the proximal end; separated from each other, laterally, by very distinct lines, caused by the meeting of the convex surfaces, and anteriorly by the elevation of the distal extremity above the proximal extremity of the succeeding cellule. Mouth rounded subquadrate to circular, bordered by an abrupt, but little thickened lip, which also encircles the special pores, which latter are somewhat elongated longitudinally and placed immediately abreast of the oval aperture on each side. Surface of the cellules, smooth. Ovarian vesicles numerous and small, subglobular, rounded anteriorly and emarginate at the oval margin.

From the Cretaceous, near Mullica Hill, N. J.

We have seen but two or three colonies of this very characteristic species, and in every instance they exhibit a radiating discoidal tendency, as perfect as the encrusted surface would permit. The new lines, interpolated between older ones, commence in all cases by a full sized, perfect cellule; we noticed no abortive cellules. The ovarian vesicle is small and narrower than the cellule. The special pores, generally elongated longitudinally, are often narrower at their anterior extremity.



This species differs materially in the form of the cellules from any heretofore described, resembling more nearly *Reptescharella ovula*, d'Orb.

R. DISPARILIS, n. s., fig. 29.—Colony encrusting. Cellules closely juxtaposed, arranged without any definite order; variable in form and size; normally rounded hexagonal, but most generally distorted by contact with adjoining cellules. Mouth rounded in advance, straight behind; bordered by a prominent raised lip which continues as a dividing wall around the cellule; at each proximal angle of the mouth is often a small tubercle arising from the lip. Surface plain, slightly convex in the middle and below the level of the dividing wall. Two elongated narrow special pores are found immediately behind the mouth on the surface of the cellule close to the dividing wall.

*Locality*.—Santa Barbara, Cal. Miocene.

We have observed but two large well preserved colonies of this neat little species, in each case encrusting another Polyzoan. It resembles in the general plan of the cellules, *Escharinella muralis*, but the mode of growth, the number and position of the special pores, and the much later geological formation, cannot fail to distinguish them.

We observed no abortive cellules, nor ovarian vesicles.

? R. HEERMANNII, n. s., fig. 30.—Colony encrusting. Cellules irregularly arranged, oval or elongated in form; juxtaposed, convex, often nearly flat. Mouth terminal, transversely elliptical to nearly semi-circular; proximal edge usually the straightest; bordered by a slightly raised lip. Surface minutely punctate or perforate. Special pores always present, placed behind the mouth near the sides of the cellule but variable in number, being always one, sometimes two. These pores are placed obliquely, and bordered by a prominent raised lip. Ovarian vesicle round, prominent and punctured like the surface of the cellule.

*Locality*.—Santa Barbara, Cal. Miocene.

The variable number of the special pores will probably entitle this species to rank as a distinct genus. Sometimes in the same colony we find two present on a cellule; on the next, only the right hand one is present, and perhaps the next exhibits only the left hand one. There is no particular arrangement of the cellules so provided.

R. CORNUTA, n. s., fig. 31.—Colony encrusting, cellules agglomerated, only in one layer; quadrangular in form; sides nearly parallel, sometimes slightly curved. Mouth terminal, round to transversely elliptical, often bordered by a very small lip; proximal lip deeply notched. Special pores abreast of, or in advance of the mouth, placed at the ends of somewhat conical tubes arising from the distal angles of the cellule, and looking almost directly forwards. Surface broadly convex and coarsely punctate. The connecting pores, between the cellules are large and few in number. We noticed but one lateral one, invariably placed near the proximal end of the cellule

and almost at the bottom of the side wall. No abortive cellules, nor ovarian vesicles were observed.

*Locality*.—Santa Barbara, Cal. Miocene.

The curious quadrangular form of the cellules and the tubulated special pores will sufficiently distinguish this species. It does not seem to be common.

The tubes of the special pores are often curved at the inner side, presenting much the appearance of horns. This character, always more or less constant, has suggested the specific name. There is often a depression, extending completely across the surface of the cellule, immediately below the mouth.

Subfam. ESCHARIPORINÆ, d'Orbigny. 1851.

ESCHARIPORA, d'Orb. 1851.

Colony and cellules exactly like *Escharella*; cellules pierced by the same transverse or radiating fossets behind the mouth, but provided in addition with two or more special pores surrounding the oral opening. Most frequently these pores are only two in number and placed one on each side of the mouth, always being independent of the ovarian vesicle. Accessory cellules rare.

The "special pores," on which M. d'Orbigny placed so much stress, and it seems deservedly, in his classification of the Polyzoa, it appears, from the researches of Busk and others, are not at all connected with the reproductive function, as supposed by the first named author, but seem to have been the openings through which the vibracula or avicularia, or both, were supplied with their motive and other organs. For a good description of these two classes of appendages, we would refer the reader to the appendix to Mr. Busk's very able papers on the Polyzoa of the British Museum, in the catalogue of that institution.

E. DISTANS, n. s., fig. 32.—Colony apparently in a tortuous anastomosing series of plates, robust, cellules on both faces. Cellules small, elongated, often acuminate at the proximal end; placed in longitudinal lines and quincunx apparently separated longitudinally, sometimes to the extent of the length of a cellule; the lines are laterally very near together, and occasionally, though rarely, the ornamented portions of two cellules are found without any apparent depression between them. Mouth small, round, oval or subquadrate; generally bordered by a thickened raised lip, which is usually continued around the portion of the cellule containing the "special fossets," generally disappearing towards the proximal end. Surface of the cellules continuous, the division being marked by a gentle concavity, or not at all distinguishable, and with the more central portion marked by five pairs or more of fossets. Special pores elongated, oblique, placed abreast of the mouth, and surrounded by the same rim. Ovarian vesicle large, elongated, rounded anteriorly, generally constricted near the

mouth and marked above by an impressed circle or ellipse, circumscribing a large almost hemispherical portion covering nearly the whole of its surface.

From the Cretaceous of Timber Creek, N. J. Rare.

This peculiar species can be distinguished by its very curious ovicell, and by the fact that the portion of the true cellule, pierced by fossets, does not, in most cases, cover the whole cellule; thus causing the appearance that the cellules are separated, as in *Mollia* and some other genera. On examining a broken surface, we can trace the dividing walls of the cellules, which are thin and in contact. The superficial fossets are nearly ten in number, often there is a terminal one, and occasionally we find an odd one interpolated on one side. They are very often not placed directly opposite each other in pairs. Sometimes the margin bounding the cribrate portion of the surface is very abrupt internally, and merges so insensibly into the smooth portion of the surface outwardly, that no line of division can be drawn, and the middle part of the cellule appears somewhat sunk below the level of the surrounding parts.

As to the mode of growth, we believe it to be in plates, because the specimen we possess seems to be too broad for the ordinary dichotomous form, and, in addition, there is a smaller piece attached at an acute angle, in the usual manner of the anastomosing of broad plates.

E. ABBOTTII, n. s., fig. 33.—Colony in a plate (?). Cellules large, oval, generally in lines and irregular quincunx; sometimes there is a slight space between the cellules, most elevated at the edge of the cellules and depressed between them. Mouth round to subquadrate, bordered by a thickened lip, most prominent at the distal and lateral margins, and continued around the "special pores." These pores are oblique, widest at the proximal end, tapering anteriorly, and are placed aside of or a little behind the mouth. Surface of the cellule flat, sometimes a little sunk: rarely bordered by a rim, and always pierced by about seven pairs of fossets, the last one or two pairs of which are radiating.

The large broad oval cellules of this species, generally in contact with each other, and marked by at least seven pairs of fossets, will distinguish this pretty species from any other yet known in this formation. The cellules resemble somewhat our species *Reptescharipora marginata*, but the aperture is smaller, the cellules are closer together, and there are always in this species two more pairs of fossets than in the latter. We have seen no ovarian vesicles.

From the Cretaceous, near Mullica Hill, N. J. Two small fragments are all we have seen of this pretty species. We dedicate it to Mr. C. C. Abbott, to whom we are indebted for this and many other new forms.

E. IMMERSA, n. s.—Colony in large, thick, tortuous, anastomosing plates. Cellules on both sides; elongated oval, with the sides parallel. Mouth occupying the whole width of the *obvious* portion of the cellule and one-fourth to one-fifth of its

length rounded in front ; proximal edge usually straight. Surface of the cellule sunk very distinctly below the level of the surface of the colony, and marked by about five or six pairs of transverse fossets, reaching almost to the middle of the cellule, leaving a narrow, median, imperforate line. Special pores numerous, exact number not determined ; placed in advance of and around the mouth.

One large colony of this species, from Timber Creek, N. J. Cretaceous.

The mass is nearly four inches long, by two wide and nearly two high. The plates are tortuous and anastomose frequently and at all angles. The cellules are very distinct to the naked eye, placed in regular quincunx, and the cribrate portion deeply immersed. The real boundary of each cellule is regularly hexagonal, elongated, sometimes to such an extent as to become quadrangular ; the dividing wall is thin and the cellules are always in contact. We could not determine satisfactorily whether the mouth is absolutely terminal or not. We believe, however, not. The special pores amount in number probably to six, and are placed in the intermediate elevated portion, surrounding the mouth in advance, and as far back as its proximal corners, if not to some distance beyond. We could not ascertain all the details of this species, since the specimen is much weathered.

The peculiar, immersed character of the cellules of this species, and the numerous special pores, make it one of the best characterized species we have seen.

We have another very pretty, robust species, with elongated cellules, the mouth transversely oval, and the two pores placed in advance ; from the Eocene of South Carolina. The only specimen we have seen is too much worn for description.

#### \* PLIOPHLCEA, (*N. G.*) G. and H.

Colony composed of free plates or branches, composed of more than two layers of cellules ; commencing by two layers, placed back to back, on each side of a median, germinal plate as in *Eschara* and *Escharipora*, and afterwards, encrusted by an unlimited number of other layers, not always placed regularly. Cellules as in *Escharipora* ; usually placed in regular lines and quincunx, with the oval opening in advance, surrounded by two (or more?) special pores, and with the surface pierced by special fossets.

We have proposed this genus to receive a well known species, described by Dr. Morton as *Flustra sagera*. It bears the same relation to *Escharipora* as *Celleporaria* does to *Eschara*, and is another illustration of the remarkable fact that most of the forms of one family in this sub-order are reproduced in all the other sub-orders.

P. SAGERA, G. and H., fig. 34.

*Flustra id.*, Morton, Synopsis, p. 79, pl. 13, f. 7.

*Escharina id.*, Lonsd. Quart. Jour. Geol. Soc., vol. 1, p. 71. *Ill.* d'Orbigny, Prod. Pal. Strat., vol. 2, p. 263, No. 1063.

*Reptescharinella id.*, d'Orb., P. F., vol. 5, p. 429.

Colony sometimes in broad tortuous plates, sometimes in narrow dichotomous branches, composed in its very young state of but two layers of cellules, placed back to back, a true *Escharipora*, but almost immediately followed by several succeeding layers. Cellules elongated oval, generally in regular quincunx and always in close contact all round, sides usually straight, sometimes, especially in the later layers, quite convex. Mouth terminal, small, round to subquadrate, narrowest at the proximal end, where it is occasionally, abruptly constricted, lip simple. Special pores two, minute, placed at the distal angle of the cellule, and sometimes surrounded by a delicate thickening, at other times simply pierced. Surface marked by seven or eight pairs of very minute, but elongate, transverse fossets. Ovarian vesicle large, as broad as the cellule, not prominent, usually overlapping the proximal end of the succeeding cellule, and broadly emarginate at the oral edge.

The variable mode of growth of this species is worthy of notice. Morton described the lamellar variety. This was also the form noticed by Lonsdale. We have it abundantly from near Mullica Hill, N. J., in thick, tortuous anastomosing plates, with a wholly different appearance from Dr. Morton's specimen, and which we should have considered as another species, were it not for the identity of the cellules. Another widely different form occurs at both localities. It is rather broad, flattened branches, probably anastomosing by their edges in nearly the same plane, somewhat after the manner of *Retepora*. The second, third, and subsequent layers, are not always conformable in direction of the cellules with the first. This is most obvious in the dichotomous varieties, when, sometimes, the lines of cellules in successive layers, are at right angles.

We have counted, in one case, nine layers in a transverse section. The only constant character in this species, as will be seen from the above observations, is the cellule. This, however, will serve at once to distinguish it. It will be well to mention, that only on well preserved specimens can we detect the transverse fossets.

From the Cretaceous of Timber Creek, and Near Mullica Hill, N. J.

#### REPTESCHARIPORA, d'Orb. 1851.

Colony composed of a single layer of cellules arranged in longitudinal lines and quincunx, always encrusting by its whole under surface. Cellules provided by two or more special pores around the mouth, and with the surface posterior to the mouth pierced by numerous fossets arranged in opposing pairs.

With cellules like in *Escharipora*, this species can be readily distinguished by its being always encrusting and composed of but a single layer.

R. MARGINATA, n. s., fig. 35.—Colony composed of a single layer of encrusting cellules. Cellules placed in regular lines and in pretty regular quincunx, sometimes slightly separated; form oval, rarely with the sides approaching a straight line.

Aperture large, subquadrate, angles rounded, and placed at the end of the cellule; bordered by a raised and slightly thickened lip, which usually encircles the rest of the cellule, and the special pores. These pores are two in number, elongated, oblique and placed abreast of the mouth. Surface marked by about eleven fossets, those at the proximal end disposed radiately. These cover the lateral two-thirds of the cellule, leaving the middle third solid. Ovarian vesicles subglobular, and encroached on at the mouth so as to be broadly, and sometimes deeply emarginate.

With cellules resembling *Escharipora Abbottii* in form, this species can be distinguished by its being encrusting, by the greater size of the mouth, and the fewer "special fossets."

From the Cretaceous, near Mullica Hill, N. J. One specimen, Coll. W. M. G.

We have another species from the same locality, but the only specimen we have seen, is too imperfect to characterize.

#### *FLUSTRELLARIDÆ*, d'Orb.

#### BIFLUSTRA, d'Orb. 1852.

Colony composed of free compressed branches, cellules on both sides, placed back to back. Opening occupying the greater portion of the cellules, closed in the living state by a membranous operculum, through which the mouth is pierced. Mouth closed by a movable lid. Cellules in longitudinal lines and quincunx, juxtaposed.

With the same mode of growth as *Eschara*, this genus can be at a glance distinguished by its Membranipora-like cells.

B. TORTA, n. s., fig. 36.—Colony composed of very compressed branches, usually twisted, rarely in the same plane for more than a quarter of an inch. Cellules arranged in longitudinal lines and usually in quincunx. About six to ten rows on each side of the branches, although we have in one case counted twenty just below a bifurcation. Cellules closely juxtaposed; elongated oval anteriorly, contracted and afterwards dilated posteriorly, and straight or slightly emarginate at the proximal edge. Opening elongated oval, variable in form and size, occasionally subquadrate, sometimes slightly narrowed posteriorly, either more or less than half the surface of the cellule, no lip or margin, simply pierced in the substance of the cellular wall and placed at the lowest part of the surface. Surface smooth, concave, elevated at the anterior and antero-lateral margins into a rounded or acute edge, a little higher than the posterior portion of the surface of the adjoining cellules. From this edge the surface slopes inwards toward the mouth. Behind the mouth the surface is generally marked by two radiating depressed lines, running from the proximal corners of the mouth to the corresponding corners of the cellule, between which is a rounded elevation, not as high, however, as the anterior end of the preceding cellule.

The accessory cells appear to be ordinary cellules undeveloped, and are not always placed immediately in advance of an ordinary cellule. They are about two-thirds of the ordinary size, not closed above, by a testaceous covering, but have the anterior edge very much produced, thin and overhanging, and about as high as the length of the aperture. We have noticed but one broken ovarian vesicle, which is placed in advance of the cellule to which it belongs, appears to have been semiglobular and overlaps the proximal surface of the succeeding cellule, reaching to the edge of the aperture.

We think this is the form figured by Lonsdale under the impression that it was the immature state of *Eschara digitata*, in figures *a* and *b*, (see remarks under that species.) The form is very constant; very compressed, twisted branches with large oral openings arranged in distinct longitudinal lines. The young state of *E. digitata* never presents the open character of cellules such as we see in this species. Besides, the form of the cellule is very distinct.

The form of the cellules is generally pretty constant, but in a few instances we have noticed extraordinarily elongated forms, produced apparently by the neighboring cellules having crowded the deformed one so that it had no space for development except anteriorly. The cellules, which we have termed accessory, differ from the ordinary ones in being smaller, and in having the anterior end developed into a prominent overhanging lip. Being usually placed in advance of ordinary cellules, we at first supposed them to be the ovarian cells, but on discovering the remains of one of the latter organs we are obliged to change the opinion. What the function of this curious modification of the cellule is, rests with students of the recent forms to determine by examination of living specimens. We have not yet encountered them among living species.

Common at Timber Creek and near Mullica Hill, N. J., in the Cretaceous.

B. DISJUNCTA, n. s., fig. 37.—Colony compressed, composed of robust cells, placed back to back in a somewhat alternating manner, and very loosely connected by the backs and laterally. The cells of the same longitudinal series are intimately connected by a fusion of the testaceous substance. Cells hexagonal, placed in regular longitudinal rows and in quincunx. Opening terminal, oval, somewhat variable in form and with the basal wall of the cell sloping upwards, blending with the surface in such a manner as to obliterate nearly or entirely the anterior margin of the opening. The aperture occupies about two-thirds of the anterior part of the cellule. Surface plain, slightly rounded inwards around the mouth and outwards at the constriction between the cells in the same longitudinal line.

Found with the preceding.

The slight adhesion laterally and by the backs of the cellules renders it difficult to ascertain the mode of growth of this species. The specimen figured, and another series

of three very imperfect cellules, are all that we have seen of the species. It is, however, so distinct that we do not hesitate in describing it. We could detect no markings on the surface, and believe that none exist.

SIPHONELLA, Hagen. 1851.

FLUSTRELLARIA, d'Orb. 1852.

Colony testaceous, arising in free plates or branches, cellules only on one side, back plain, or exhibiting only the backs of the cellules. Cellules variously arranged. Opening occupying the greater part of the surface.

Having the same cellules as *Biflustra*, *Membranipora*, &c., this genus is readily distinguished by having cellules on only one side and in never encrusting other bodies. It bears the same relation to *Biflustra* as *Semieschara* does to *Eschara*.

S. MULTIPORA, n. s., fig. 38.—Colony free, (arranged in a tube in the only specimen we have seen) cellules outside, back, or inside of the tube showing the outline of the cellules. Cellules oval, juxtaposed, placed in irregular quincunx. Opening larger, occupying nearly the whole surface of the cellule; usually of the same shape as the cellule, sometimes having the proximal end wider than the distal end. Cell walls convex or flattened; marked by a variable number of pits often surrounded each by a distinct elevation or wall. The mouth is sometimes constricted by a small rim, parallel with the ordinary wall, placed inside of, and below it. This rim is ornamented in the same manner as the larger one.

*Locality*.—Santa Barbara, Cal. Miocene.

We have seen but one specimen of this species. It is a tube of about .10 inch long and .08 in diameter. The characters of the species are well marked and cannot well be mistaken.

DISCOFLUSTRELLARIA, d'Orb. 1851.

Colony testaceous, discoidal, convex above, concave below, composed of cellules arranged in regular radiating lines, each commencing by an abortive cellule. Cellules rounded or angular, opening large, cavity profound. The concave or lower side is marked by irregular lines, indicating the lines of cellules.

Related in its external form to *Trochopora*; the arrangement of the cellules in radiating lines, each commencing by an abortive cellule, and the cellules not forming annular lines would distinguish this genus, even if we were not to examine the lower surface, which in *Trochopora* is rendered flat by being filled up by a fibrous structure.

*Discoflustrellaria* bears the same relation to *Biflustra*, as *Lunulites* does to *Eschara*.

D. BOUEI, G. and H.

*Lunulites id.*, Lea, Contr. to Geol., p. 189, pl. 6, fig. 1, 2.

Colony discoidal, conical, cellules arranged in regular radiating lines, new lines being



occasionally interpolated, always commencing by an abortive cellule. Surface of the cellules presenting an imbricated appearance by the elevation of the distal end of each above the proximal portion of the succeeding one. Cellules subquadrate, usually rounded in advance, profound, opening large, subquadrate, oval or straight behind and rounded in advance, occupying nearly the whole surface. Margin raised and convexly rounded or acute. Under surface of the colony nearly flat to deeply concave, marked by lines towards the edge, indicating the rows of cellules, centre smooth or papillate.

Between the rows of cellules are rows of vibracular cells, one vibracular opening to every ordinary cellule. These openings are small, elongated and variable in form.

Claiborne, Ala. Eocene. Common.

#### CUPULARIA, Lam. 1821.

Colony discoidal, fixed in the young state, afterwards free; orbicular, convex above, convex below; composed of cellules regularly placed in quincunx, without forming lines and without abortive cellules. Cellules rounded or angular, broadly open, merely separated by a common wall. Concave face marked by radiating, irregular lines and pores.

This genus bears the same relation to *Discoflustrellaria* as *Stichopora* does to *Lunulites*. It can always be recognized by its discoidal form, cellules only on the upper or convex surface, arranged in quincunx, without forming lines and without abortive cellules.

#### C. DISCOIDEA, G. and H.

*Orbitolites id.*, Lea, Contr. to Geology, p. 192, pl. 6, f. 205.

Colony free, discoidal, attached in the young state usually to a grain of sand. Upper surface convex, lower surface concave. Cellules subhexagonal, arranged on the upper surface, in irregular quincunx, showing a tendency to form oblique radiating lines. Opening elliptical, sometimes slightly irregular, placed in the centre of the cellule and occupying about four-fifths of its surface. Borders between the cellules elevated into sharp angular ridges which are common to all the cellules. From this ridge, the surface slopes towards the mouth, which is surrounded by a very delicate rim, not always present, however.

Under surface marked by irregular radiating lines, with new ones occasionally interposed and branching from the old one. Between these lines are numerous large rounded pores piercing the lower wall and entering the cellules. These pores are so placed that there are generally two rows in each space between the radiating lines.

From Claiborne, Ala. Eocene.

HETERACTIS, (*N. G.*) G. and H.

Colony discoidal, convex above, concave below; beginning by one cellule, succeeded by two, one placed exactly opposite the other. These continue to develop in a straight line, but more rapidly in one direction than in the other, so as to form a straight median line, from which the rest of the colony is developed, throwing the original cellule far from the centre. New lines are developed at all angles from the first in a radiating manner. Sometimes there is a second line formed by the bifurcation of the first, at others it commences near what is to be the middle of the adult colony, and occasionally it occurs that a new line is interpolated between these two. New lines commence when arising from the median one, by a fully developed cellule, the interpolated lines sometimes commence by an abortive cellule.

The cellules are always placed in straight lines; the opening is large, and was undoubtedly close by a membrane in the living state. There is a vibraular opening placed aside of each cellule, between the rows, exactly as in the true *Lunulites*. The under sides of the colony is marked by lines corresponding with the lines of cellules and is coarsely punctate but not perforate.

We place this genus provisionally in the *Flustrellaridæ* of d'Orbigny for the same reason that we have retained the genus *Lunulites* in the *Escharidæ*. We propose, as soon as we conveniently can, to examine the subject of the vibraular openings with a view of ascertaining the value in relation to the classification of the Polyzoa, and hope to be able before long to express a decided opinion on the subject. Time will not permit us to do so at present.

H. DUCLOSII, G. and H., fig. 39.—The only species.

*Lunulites id.*, Lea. Contributions to Geology, p. 110, pl. 6, fig. 203.

Colony slightly convex above, concave below, outline irregularly oval generally, sometimes regularly elliptical.

Cells arranged as described above. Form of the cells oval, variable, rounded in advance, straight on the proximal edge or encroached on by the preceding cell; anterior and lateral edge somewhat elevated. Surface almost wholly occupied by the aperture, which is of varied form, dependent on the form of the cellule; normally it is elliptical, but this form is rather rare, it varies in every manner from that to subquadrate. Between the rows of cellules is a depressed space, through which are pierced the vibraular openings. These are sometimes elongate and rounded at the two extremities, sometimes acuminate at one or both ends, and often constricted in the middle.

The under side is characterized by very irregular lines, marking the backs of the rows of cellules, and covered by a few large irregular pits.

From the Eocene of Claiborne, Ala.

The low convex form of the colony with its one or two median rows of cellules and

the other rows arising at all angles from a right angle to almost parallel, will at once distinguish this pretty and unique form.

PYRIPORA, d'Orb. 1847.

Colony encrusting, composed of pyriform cellules placed in longitudinal and lateral rows, always separated by a more or less extended pedicle, and never in contact laterally. Cellules arising by a narrow or filiform pedicle, from the front or sides of preceding ones. Shape usually pyriform or fusiform. Opening large and occupying the greater part of the anterior portion of the cellule. Distinguished from *Hippothoa* by the size of the opening, which in the living state is closed by a membranous operculum.

P. IRREGULARIS, G. and H., fig. 40.

*Hippothoa*, *id.*, G. and H., Proc. Acad. 1860, p. 366. *Id.* G. and H., Jour. Acad. 2d ser. vol. 4, p. 400, pl. 69, f. 18—20.

Colony encrusting, composed of robust pyriform cellules, branching longitudinally and at various angles, both from the ends and sides of preceding cellules, sometimes simultaneously. Cellules broadly pyriform, pedicle short and robust, widening rapidly, so as occasionally to make the cellule almost elliptical. Mouth large, elliptical, anterior, not terminal, and with its edge all in the same plane, sometimes bordered posteriorly by a slightly elevated lip, not thickened. Walls thin and without any ornamentation.

This species resembles remotely, in the shape of its cellules, the *Hippothoa simplex*, d'Orb., but is proportionately not half so long, and the large oval aperture places it in a separate genus. We have had the opportunity of examining a large number of specimens, and find it very often encrusting *Eschara digitata*. Colonies seldom show more than twenty or thirty cellules, and a dozen is much nearer the usual number.

From the Cretaceous of Timber Creek, N. J., and near Mullica Hill.

MEMBRANIPORA, Blainv. 1834.

Colony testaceous, encrusting, composed of a single layer of cellules. Cellules juxtaposed; opening occupying the greater part of the cellules, closed by a membrane pierced by the mouth in the living state. Ovarian vesicles not uncommon, usually small.

M. ABORTIVA, n. s., fig. 41.—Colony encrusting. Composed of cells of an elongated pyriform to a suboval shape, arranged irregularly. Cells rounded to acuminate anteriorly, sometimes elongated posteriorly, occasionally truncated. Aperture occupying about half the cellule; nearly terminal, often acuminate in advance and wide behind, at other times nearly elliptical.

In some instances we have observed it constricted, almost to obliteration by a

calcareous plate, perhaps the membrane changed by a deposit of lime. This plate is flat, except in the middle, where there is a thickened rim, bounding a very small mouth. Surface of the cellule rounded, most elevated behind the aperture, from which point the surface slopes in all directions with a gentle curve. The aperture is placed at the base of a slight depression, and is sometimes bounded, especially at the proximal side, by a faintly thickened lip. Between the cellules, and without any regular arrangement, are placed, in most colonies, large numbers of abortive cellules, of the same shape as the larger ones. In some colonies these abortive cells are full as numerous as the normal ones, and only in a very few instances have we observed colonies to be entirely without them. When the latter is the case, the normal cellules are much more regular in size and in arrangement.

Common in the Cretaceous limestone of Timber Creek, and near Mullica Hill, N. J.

*M. PERAMPLA*, n. s., fig. 42.—Colony composed of encrusting cellules, very large, distinctly visible to the naked eye, disposed in an irregular quincuncial order; variable in shape, usually rounded in advance and frequently encroached on laterally and posteriorly by neighboring cellules. Edge somewhat elevated, surface sloping inward on all sides towards the aperture, which is large and irregular. No ovarian vesicles were observed. Sometimes behind the orifice is a regular depression, parallel with its margin.

Near Mullica Hill, N. J. Cretaceous.

The above description was taken from a single specimen. There are several others before us, resembling this in most of their general characters, but with the cellules oval to subhexagonal, often separated by a distinct impressed line, with the orifice large and elliptical. We believe them to belong to this species, but cannot so refer them positively. The latter form has sometimes a raised lip behind the aperture, as shown in one cellule of our figure. This, with the fact that the cellules are of the same size, and that the aperture is somewhat variable, has induced us to suspect their specific identity. They are, at least, very closely related.

*M. PLEBIA*, n. s., fig. 43.—Colony composed of encrusting cellules generally arranged with a tendency to radiating lines, and in irregular quincunx. Cells elongated to pyriform, separated by distinct depressed lines, sometimes widening so as to form small open spaces. Opening occupying the whole cellule, walls very narrow, without any markings, appearing to overhang the internal cavity very little if at all. Sometimes the proximal edge is slightly widened and concave, at other times it is a little convex. Ovarian vesicles not uncommon; small, convex in front, but slightly elevated and occasionally with an obsolete longitudinal carina. At times we find the cellules separated longitudinally, and a small abortive cellule placed between them.

From near Mullica Hill, N. J. Cretaceous.

The poverty of this unpretending little species, in distinctive characters has suggested the name we propose for it. The very thin annular walls, simply rounded, without any markings, at times crowded, at other times distinctly spaced, but always distinctly separated, will distinguish it.

We have observed one colony, in which each cellule was provided with its ovarian vesicle, and in another, we could not find a trace of even a broken one. What we call abortive cellules above, may prove to be vibracular openings, though we cannot make out any distinct arrangement; they are sometimes numerous and close together at other times entirely absent.

*M. SEXPUNCTATA*, n. s., fig. 44.—Colony encrusting, composed of large elliptical to irregularly pyriform cellules, placed irregularly, in contact and often crowding each other. Aperture of the same shape as the cellule and occupying nearly its whole surface. Walls convex, slightly constricted about the aperture, overhanging the interior; marked by a variable number, but usually six pits or depressions, occasionally surrounded by a minute rim. Ovarian vesicles small, overlapping the succeeding cellule, surface unknown.

From the American tertiary; either Eocene or Miocene; probably the latter; locality unknown.

We have seen two colonies, or probably parts of the same colony encrusting an undetermined, many-layered species of a Polyzoon; to which is also attached the only specimen, we have seen, of our species *Reptoflustrella tubulata*. It is in the Museum of the Academy of Natural Sciences, Philadelphia.

*M. SPECIOSA*, G. and H., fig. 45.

*Membranipora speciosa*, G. and H., Proceedings Acad. Nat. Sci., 1860, p. 567.

Colony encrusting in irregular patches, composed of elongated, oval cells, often crowded out of their normal shape. Cells arranged in longitudinal lines and in somewhat irregular quincunx, often assuming a transverse arrangement; aperture occupying the whole of the surface, cell walls plain, angular at their edge or slightly rounded. Interior of the cell, regularly concave, with the sides of the concavity reaching almost to the top of the walls; in new cellules the germinal plate only is seen. This germinal plate often extends for a considerable distance beyond the colony (half an inch) and is marked by irregular longitudinal lines, frequently bent suddenly in an oblique direction and then continued longitudinally as before. Between the cellules are frequently open angular spaces, caused by the inaccurate apposition to the cellules.

From Chiriqui, Central America, probably Miocene. Encrusting a specimen of *Obeliscus Evansii*, Gabb. Coll. W. M. G.

This is the only species in which we have ever seen such an enormous extension of the germinal plate. In this instance, its greatest length equals or exceeds the longest

diameter of the mass of cellules. Whether the character is constant with the species, remains to be seen. All we have seen of the species is on a single shell encrusting in two or three patches. It seems to be rare, since in examining over a hundred shells from this locality we only found the one specimen from which this description is taken.

*M. CALIFORNICA*, n. s., fig. 46.—Colony encrusting, cellules arranged in lines, not always in regular quincunx. Cellules pyriform, sometimes continued behind, often abruptly truncated. Opening large, occupying two-thirds or more of the cellules; varying from rounded triangular to oval, usually narrowest in front, never sharply acuminate. Surface sometimes rounded about the oval opening, at others carinate, midway between the aperture and the margin of the cellule, from which line the surface slopes downwards, convexly in both directions. Behind the opening the surface is convex, often narrow. No abortive cellules nor ovarian vesicles were observed.

This species resembles in some of its characters, *M. abortiva*, but independently of its belonging to an entirely different geological formation, it is distinguished by the cellules being proportionally shorter and the aperture being much larger. The cellule is not so convex, and the walls around the aperture partake to some extent of the characters of a thickened lip, being abruptly descending behind the mouth, before the convex portion of the surface is reached. We noticed in one cellule, a constriction of the aperture, or a solidification of the membrane similar to that exhibited in *M. abortiva*, but in this case, the mouth was not margined by the little lip, and the surface was closely marked by concentric lines.

*Locality*.—Santa Barbara, Cal. Miocene.

*M. BARBARENSIS*, n. s., fig. 47.—Colony irregularly encrusting. Cellules regularly oval, juxtaposed. Opening of the same shape as the cellule, occupying nearly the whole surface. Margin simple, plain, slightly convex exteriorly, ending abruptly at the inner margin.

*Locality*.—Santa Barbara, Cal. Rare.

We can add nothing to the above description. The specimen consists of a mere series of oval or elliptical rings, without markings or ornamentation of any sort as will be seen by the figure.

#### FLUSTRELLIDÆ.

#### FLUSTRELLA.

Colony in free branches, cellules all round. Cellules placed in longitudinal lines or quincunx; never in more than one layer. Opening large and provided with one special pore.

This genus can be distinguished from *Biflustra* by the presence of the pore and from *Escharinella* and *Porina* by the large opening.

*F. CAPISTRATA*, n. s., fig. 48.—Colony in round or oval branches, with about eight or ten longitudinal rows of cellules, often with a pretty distinct transverse arrangement. Cellules subquadrate, placed in contact. Opening large, oval, bordered by a thick prominent lip; lip usually approaching, at its proximal edge, the distal edge of the preceding one, but always with a distinct groove between them and sometimes a space, half as long as the width of the cellule. Surface of the lip at times regularly convex, occasionally sharp at its outer margin, from which the surface slopes to the edge of the aperture. Special pore, prominent, oval, placed at the upper, right hand corner of the aperture and bordered by an independent raised margin. Occasionally the pores are so arranged as to continue a raised line from the border of one aperture to that of the other, thus causing the appearance of a raised line bounding the longitudinal rows of cellules. This is especially the case when the cellules are crowded.

From the Cretaceous, near Mullica Hill, N. J. Very rare.

*F. CYLINDRICA*, n. s., fig. 49.—Colony in cylindrical or oval (?) branches with (in the only specimen before us) six longitudinal rows of cellules arranged quincuncially. Cellules divided superficially into two parts; the anterior portion is convex and oval, with its greatest diameter longitudinal. In the centre of this part, is pierced the aperture which varies from circular to oval, and occupies the median third of the surface. The posterior part is flat and is covered by a labiate process, quadrate in outline, depressed behind and elevated in advance; superiorly it is truncated so that the opening looks forwards and upwards. This posterior part is nearly or quite as large on the other. No special markings, no ovarian vesicles nor abortive cellules were observed.

From the Cretaceous, near Mullica Hill, N. J. Only one specimen, showing about three cellules longitudinally, was obtained.

We had some doubt in referring this species to the above genus, not being fully satisfied of the true relations of the labiate process, covering the proximal half of the cellule. It is distinctly perforate anteriorly, and being situated in the position occupied by the "special pore" of this family, it probably performed the same function. The oral aperture also seems to be unusually small. Were we to consider the oval portion as constituting the whole cellule, it would not be out of proportion, but this can hardly be, since, were that the case, the cellules would be widely separated. Unfortunately, we have not the means at hand, of solving these questions, since to do so would necessitate the destruction of the only known specimen of the species.

#### REPTOFLUSTRELLA, d'Orb.

Colony testaceous, encrusting, composed of one layer of cellules. Cellules arranged in radiating or longitudinal lines and usually in quincunx. Opening large, closed by a membrane in the living state: provided with a "special pore," usually placed behind the opening.

From *Membranipora* and *Reptoflustrina* this genus is distinguished by its special pore, and from *Reptoporina* and the other encrusting genera, provided with special pores, it can be separated by its wide aperture.

? R. HETEROPORA, n. s., fig. 50.—Colony encrusting in irregular patches. Cellules in a single layer, placed with but little regularity, but with a tendency to radiating lines; elongate, acuminate anteriorly, broadly truncate behind. Opening sub-triangular, with the sides convex, often approaching an oval in very long cellules. Surface regularly convex, bordered anteriorly and laterally by a slightly elevated, rounded edge, usually becoming obsolete as it approaches the proximal end of the cellule. Special pore placed *in advance* of the opening, small and round. No ovarian vesicles were observed. Old cellules are closed over by a continuation of the surface wall totally obliterating the aperture. In this case the "special pore" is also generally obliterated, merely showing a slight depression.

From the Cretaceous, near Mullica Hill, and from Timber Creek, N. J. Rare.

The peculiar position of the special pore in this species, would probably entitle it to rank as a distinct genus from the following one, if not as the type of a new family, if we follow the classification adopted by d'Orbigny, and which, as far as relates to the testaceous Polyzoa, seems to be the best one yet proposed. In this classification, the number and position of these openings, called by him "special pores," determine the families of this suborder. The family *Flustrellidæ* is characterized in his synopsis as being provided with "une seule pore en arrière de l'overture." There is, we conceive, as wide a difference between this species and the following as exists between the *Escharinellidæ* and the *Porinidæ*, but we prefer, for the present, to leave the matter as it is, until more material shall have accumulated, when, should it be deemed advisable to separate the two forms, we would suggest the generic name *Acrotrema*, making the genus, necessarily, the type of a new family—*Acrotremidæ*.

R. TUBULATA, n. s., fig. 51.—Colony encrusting in a single layer. Cellules in longitudinal and radiating lines and in pretty regular quincunx; subhexagonal to subrhomboidal in form, rounded anteriorly. Opening anterior, not terminal; sub-triangular to oval; latter form rare. Surface smooth, convex, elevated just behind the mouth, from which point arises a prominent tubular pore. This tube is inclined upward and forward, often overhanging the proximal edge of the mouth.

With *Membranipora sexpunctata*. Locality and geological position unknown.

The prominent special pore, placed close to the mouth, will at once characterize this pretty little species. We regret that the label belonging to this specimen has been misplaced. It is probably, however, from the Virginia Miocene.

We observed no abortive cells, nor ovarian vesicles.



## PYRIFLUSTRELLA, d'Orb. 1851.

Colony encrusting, composed of pyriform cellules arising by a somewhat elongated pedicle from the ends or sides of preceding cellules, never in contact laterally. Opening large, and, in living specimens, closed by a membranous operculum. Behind the opening we always find a special pore.

This genus differs from *Pyripora* by the presence of the special pore, and from *Hippothoa* both by this character and by the large aperture, closed in the living state by a membrane.

P. TUBERCULUM, d'Orb. Pal. Fr., vol. 5, p. 570.

*Hippothoa id.*, Lonsd. Quart. Jour. Geol. Soc., vol. 1, p. 527.

*Pyripora id.*, d'Orb. Prod. Pal. Strat., vol. 2, p. 396, No. 1167.

"Cells pear-shaped, variously arranged; connecting tubuli generally short or wanting, rarely long; membranous aperture large, oval; solid surface of walls smooth, convex; a minute tubercle near proximal extremity of aperture." (Lonsd.)

The large aperture removes this species undoubtedly from the genus *Hippothoa*, but from Lonsdale's description it seems that the mark below the mouth, in his illustration, is a tubercle. We follow d'Orbigny in placing it in the present genus, thinking it much more probable that the "tubercle" may prove to be a tubulate pore. We have unfortunately never seen the species and cannot consequently decide.

Lonsdale mentions, in some observations on the species, that in some cases he has observed the membrane has been "partially or wholly obliterated" evidently meaning, by a deposition of calcareous matter, some of the cellules in his figure being thus represented. The shape of the cellule is very similar to our *Pyripora irregularis*, but it differs in the pedicle at the proximal extremity of the cellule being much more robust.

## Ord. II. POLYZOA CENTRIFUGINATA.

Cellules arising behind the preceding ones and below their mouth.

## Subord. I. C. RADICELLATA.

Colony attached by corneous rootlets to sub-marine bodies. *Not represented.*

## Subord. II. C. AGGLUTINATA.

Colony attached to sub-marine bodies by the same testaceous substance as that of the colony or polypidom. No articulations. Colony always in one solid piece.

## Div. 1. C. OPERCULATA.

Cellules closed by an operculum.

Fam. *ELEIDÆ*. d'Orb.

Cellules without accessory or intermediate pores.

## RETELEA, d'Orb.

Colony composed of broad plates, anastomosing at their ends and from their surfaces, in such a manner as to form a large plate fixed at its base. The surfaces of these smaller plates are placed at or near right angles to the faces of the larger plate. Cellules arranged on both faces of the laminae, back to back, opening usually triangular.

The increase of the plates takes place, at the same time, from the extremities and backs of the plates.

Differs from *Elea* in being reticulate, and in the mode of increase of the plates, which in the latter genus takes place only from the extremity.

R. *OVALIS*, n. s., fig. 52.—Colony composed of numerous, somewhat tortuous plates, anastomosing irregularly and frequently, forming a thick, robust mass. Cellules placed in very regular quincunx; opening oval or elliptical, slightly variable in form; closed in old cellules by a flat inornate operculum, separated from the rim of the mouth by a slight depression or ring. The space between the mouths is usually regularly depressed. Sometimes there is a faint sloping upwards of the surface below the mouth to its proximal end.

This species is not rare in the grey friable limestone of the Cretaceous, from near Mullica Hill, N. J.

It is not common at Timber Creek. All the specimens are injured by a very perceptible deposit of minute calcareous crystals over their surface, while other species are rarely so covered, even when found in the same mass of matrix. The small, rather tortuous plates of this species distinguish it from all the other fossils of the New Jersey deposits. The figure conveys a very good idea of the form in which it occurs. In the Mullica Hill limestone, it has a peculiar red or pinkish color, shared by one or two other of the polyzoa and some shells. The other fossils never show it. The elongated oval cellules and their depressed interspace render this a very distinct species.

## Div. II. C. FASCICULATA.

Cellules tubular, fasciculate, united in salient bunches or groups.

- |   |           |                     |
|---|-----------|---------------------|
| a. Cellules without accessory or intermediate pores | . . . . . | <i>Fascigerida.</i> |
| b. Cellules with intermediate pores                 | . . . . . | <i>Fasciporida.</i> |

Fam. *FASCIGERIDÆ*.

## FILIFASCIGERA, d'Orb.

Colony filiform, encrusting, cellules arranged in fascicles, placed only on one line, disposed regularly never scattered.

Encrusting like *Reptofascigera* and *Lopholepis*, this genus is distinguished from the first by the fascicles not being in two lines and alternating, nor placed irregularly as in the second.

F. MEGAERA, fig. 53.

*Id.* d'Orb.

*Tubulipora id.*, Lonsdale, Quart. Jour. Geol. Soc. Lond., vol. 1, p. 69.

Colony very minute, encrusting, filiform. The attached portion is very much flattened, highest in the middle and sloping convexly to the edges. Cellules fasciculate, three or four in a bundle, club-shaped at the top, in one instance bifurcate. The tube rises at nearly a right angle from the body, sometimes inclined a little forwards. There is often a slight constriction of the decumbent portion of the colony, in advance of the fascicule of cellules.

This species is rare. We have only observed two small colonies from Timber Creek, N. J. Cretaceous.

Lonsdale seems, from his figure to have studied a worm specimen. Both of ours show the extremities of the tubes in several instances.

Fam. *FASCIPORIDÆ*.

## FASCIPORA, d'Orb.

Colony testaceous, entire, arising from a fixed base, from which arise free dichotomous branches. Cellules fasciculated, fascicules placed at the extremities of the branches. The accessory or "intermediate" pores covering the sides of the branches, usually much more distinct than the true cellules.

The isolation of the groups of cellules at the extremities of the branches, instead of their being confluent, at the edge of a meandriform plate separates this genus from *Fasciporina*. The tubular cellules on the walls of the branches, instead of perforations, distinguishes it from *Corymbosa*.

F. AMERICANA, n. s., fig. 54.—Colony composed usually of robust clavate branches, sometimes slender and tortuous. Cellules collected into well defined bundles at the extremities of the branches, often crowded. Fascicles convex above; dividing walls between the cellules distinct. Lateral tubes prominent, exsert, often arranged in regular longitudinal lines with well marked spaces between them; rarely so close together as represented in the figure. Opening round. These tubes are often reduced

by attrition to mere round or elongated oval openings with a distinctly marked margin. The space between the tubes is often undulated.

*Locality*.—Mullica Hill and Timber Creek, N. J. Cretaceous.

This species bears some resemblance to *F. Pavonina*, d'Orb., but can be distinguished by the more robust clavate branches, never flattened; by the lateral tubes being less prominent and by their being shorter and more scattered. The figure represents them too numerously.

### Div. III. C. TUBULATA.

Cellules isolated, distinct, tubulate and salient.

#### Fam. TUBIGERIDÆ.

Cellules grouped in transverse lines, no intermediate abortive cellules, no special nor intermediate pores to the cellules.

#### SPIROPORA, d'Orb.

Colony cylindrical, testaceous, composed of straight, dichotomous branches; cellules arranged in annular or spiral lines around the branches forming but a single series to a line. Cellules often exsert.

The peculiar, simple rings of cellules distinguish this genus from *Peripora*, in which the lines are composed of more than a single row of cellules.

*S. CALAMUS*, n. s., fig. 55.—Colony small, cylindrical, covered by annular rows of rather large cellules with about eight cellules in a ring. Cellules probably exsert. Between the cellules, longitudinally, is a prominent rib.

*Locality*.—Timber Creek, N. J.

The above description is from a single worn specimen, but since it is the only species of the genus yet found in this country, and is undoubtedly different from those heretofore described, we venture to name it. The only character that we can point out, with certainty, is the longitudinal rib between the cellules. In one place we noticed a cellule far from the regular annular line, apparently indicating a tendency to a somewhat spiral arrangement. We also believe that the cellules were fully as exsert as most of the species figured by d'Orbigny.

It seems most nearly allied to *S. annulata*, d'Orb., but the rows of cellules are proportionally closer together, the number of cellules, in a row, is smaller and the mouths of the cellules were probably more distinct and less regularly placed. The last two characters are badly represented in the figure, but it is on account of the worn condition of the specimen.

## IDMONEA.

Colony composed of free branches, usually anastomosing laterally. Cellules arranged on one face only, in transverse lines, often interrupted in the middle, and composed of but one range of cellules to the line. Back plain or striate.

This genus often forms large flabelliform or tortuous colonies, arising from a common base. It is distinguished from *Clavitubigera*, by the latter being always in a clavate mass; from *Bitubigera* by the cellules being in single rows, while in that genus there is more than one row of cellules in each transverse series.

I. CONTORTILIS, Lonsd., Quart. Jour. Geol. Soc., vol. 1, p. 68.

*Crisisina id.*, d'Orb. Prod. Pal. Strat., vol. 2, p. 265, No. 1103.

*Idmonea id.*, d'Orb. Pal. Fr., vol. 5, p. 729. *Id.*, Gabb, Catalogue Cretaceous; Proc. Acad. Nat. Sci., 1859.

*Retepora*, Morton, Synopsis Cretaceous, p. 79.

Colony composed of narrow, flattened rarely cylindrical branches, freely anastomosing, often contorted. Cellules placed on one side, not in very regular lines, often scattered indiscriminately, rarely in regular rows; lower part of the cellules distinguishable usually by a slight undulation, upper part free exsert, cylindrical and inclined slightly forwards; sometimes there is a considerable space on a branch without a cellule. Back of the colony flattened, when perfect, marked by very coarse transverse striae, curved anteriorly in the middle, only reticulated as described by Lonsdale in somewhat worn specimens. When the cellules are somewhat distantly placed, the upper surface also exhibits the transverse lines, though faintly.

*Locality*.—Timber Creek, N. J., and near Mullica Hill. Cretaceous. In this species, the cellules have a much less regular transverse arrangement than usual in the genus. It has been well figured by Lonsdale.

## I. MAXILLARIS.

*Idmonea id.*, Lonsdale, Quart. Jour. Geol. Soc., 1, p. 523, 1845.

*Crisisina id.*, d'Orb. Prodr., 2, p. 397, 1847.

“Branches forked, oval, thickness considerable; rows of tubulate openings short, alternate, mouths in contact; no central dividing ridge; tubuli very long; reverse surface semi-oval, traversed by longitudinal lines, connected by minute cross lines.”

“Viewed in front, this coral resembled a Maestricht fossil, considered by Goldfuss as a young condition of *Idmonea gradata* (Petref. Corrigenda, p. 244. *Retepora disticha*, p. 29, tab. 9, f. 15, *a, b*), but it differed essentially from mature specimens of that species, and from Goldfuss's figures, just cited, in the plan of bifurcation, as well as in the great length of the tubes and the form of the branches. From Lamouroux's typical species (*I. triquetra*, Exp. Method., p. 80, tab. 79, f. 13—15), and some tertiary species of similar form, it was conspicuously distinguished, not merely by the rounded outline of the reverse side, but also by its great thickness.”

"The bifurcations occurred at irregular distances, sometimes equalling  $3\frac{1}{2}$  lines, and without any prominent precursory increase in width; the branches also exhibited nearly their full dimensions from the very points of divergence, springing upwards after a short curve almost vertically. The portion occupied by the tubular openings formed but a small part of the circumference of the branch; and when a fragment was placed horizontally and sideways with the rows of apertures upwards, the latter bore some resemblance to a series of teeth in a maxillary bone. The mouths were generally limited to three in each row, the outermost being the smallest. The great range of the tubuli explained apparently the considerable dimensions of the reverse portion, the interior of the branches consisting almost wholly of tubes of one character, but decreasing in sides from point to back."

"The whole of the reverse surface exhibited white longitudinal lines, with interspaces much less in width than the diameter of the tubuli. Their true nature was not ascertained, but it was believed that they were not the walls of the capillary tubes, similar to those which constitute the reverse side of old specimens of *Hornera*, as they occasionally united, and the interspaces were crossed by irregular filaments. No exterior thickening or change dependent upon age was noticed; and a fixed dorsal surface seen in some species would prevent it is presumed all marked alterations on that side, as it is difficult to conceive that polypes generically identical should possess in certain species a complicated series of vessels, requisite for developing a considerable additional surface, and want it in others."

"Locality.—Wantoot, South Carolina." [Eocene.]

We are not acquainted with this nor the following species.

#### I. COMMISSENS.

*Idmonea id.*, Lonsdale Quart. Jour. Geol. Soc., vol. 1, p. 524, 1845.

*Crisisina id.*, d'Orb. Prodrome 2, p. 397.

"Branches forked, triangular; rows of tubular openings extended nearly to the dorsal surface; no medial ridge or furrow, but an intermingling of mouths; range of tubuli limited; reverse or dorsal surface irregular in outline."

"In the triangular form of the branches, this fossil resembled the tertiary species found at Hautville and Grignon, and figured as well as described by De France or Milne-Edwards, under the names of *Idmonea gradata* and *I. cernopus* (De F., Atlas Dic. Sc. Nat., pl. 45, f. 5.; Milne-Edw., Recher. sur les Polyp., Mém. sur les Crisie, &c., pp. 24, 23, pl. 12, f. 3.): but it differed in the central blending of the tubular openings; in this character there was a certain amount of agreement with the recent species of Dr. Milne-Edwards, *I. transversa* (sp. cit., pl. 9 and 3,) but in the mode of branching, and form of the branches marked differences were presented."

"The reverse surface indicated apparently the irregular effects of extraneous agency, and not an uniformity of contour, as in the preceding species. In some fragments the flattening was complete, but the surface was unevenly impressed; in others, though the triangular form was retained, the reverse side was slightly convex, and in one case partly flat, partly rounded."

"Locality.—Rock's Bridge." [Eocene.]

#### I. CALIFORNICA, fig. 56.

*Id.*, Con., Proc. Acad. Nat. Sci. 1855, p. 441.

Colony composed of dichotomous branches, probably not anastomosing, of variable width, often much flattened. Cellules placed on the upper surface in irregular oblique lines, obliquity sometimes forwards from the centre, often backwards, at other times the direction changes in the same lines, and not unfrequently we find a group of cel-

lules without any definite arrangement. Cellules usually separated laterally by a faint depression, with their surfaces transversely striated; anterior end abruptly bent forwards, so as to stand nearly at a right angle with the branch. Opening circular, not unfrequently closed partially or wholly by a testaceous plate, placed just inside the margin of the mouth. Back of the colony transversely and irregularly striate, often marked by faint longitudinal lines.

*Locality*.—Santa Barbara, Cal. Miocene.

This species is described from Mr. Conrad's original specimens. It is readily recognized by the flattened branches, prominent cellules, with the spaces between their mouths depressed, and the apparently entire absence of anastomosis. We have examined a large number of specimens without finding any traces of it. There is considerable variation in the width of the branches as shown by figures *a* and *b*. In the narrow form the cellules are usually arranged with much less regularity. This is so striking at times that we were at first inclined to consider them two species. Further examination, however, satisfied us of their specific identity.

#### SEMITUBIGERA.

Colony in a free plate, meandriform or tubular; cellules on one side; external, when tubular; arranged in rows, usually with more than one series of cellules to a row. Back, or insides of tubes, covered by an epithelium. This genus, as characterized by d'Orbigny, always has two or more rows of cellules in each series. The species before us shows, occasionally, two cellules abreast of each other, but this is of very rare occurrence. We do not feel warranted in separating it on that ground, and if we did, would either have to place it with *Idmonea*, with which genus it seems less nearly related than with the present one, or form a new genus to receive it; neither of which alternatives do we consider necessary. It occurs in plates, often like *Semitubigera lamellosa*, figured by d'Orbigny, and since the biserial arrangement does sometimes occur, though very rarely, we place it here. Were we to consider it uniserial, on account of the preponderance of that character, it is certainly as distinct from *Idmonea* as *Semischara* is from *Retepora*.

S. TUBA, n. s., fig. 57.—Colony usually in short, cylindrical or compressed and variously carinate tubes, sometimes in tortuous plates. Cellules on one side, externally, when tubular, arranged in rows having a transverse or radiating tendency, rows anastomosing, bifurcating or ending abruptly, rarely entire. Cellules, as remarked above, usually uniserial; rarely, for a distance of two or three cellules, biserial. Rows narrow, prominent, ending abruptly at the margin. Back and inside of tubes covered with a heavy epithelium, longitudinally striate and transversely corrugate.

*Locality*.—Santa Barbara, Cal. Miocene.

Fam. *SPARSIDÆ*.

Cellules not grouped, scattered or regularly spaced.

## ENTALOPHORA.

Cellules placed all around regular cylindrical or compressed branches. Never more than one layer of cellules, which are regularly placed. Centre of the branches filled with germs of cellules.

From *Clavisparsa* this genus is distinguished by being in branches instead of a clavate mass. *Cavaria* was separated by Hagenow on probably a false character. He says that the interior of the branches is hollow or filled with transverse septa. *Melicertites* can be distinguished by the cellules never being tubular, opening usually triangular and closed in old cellules, with a testaceous operculum.

*E. QUADRANGULARIS*, n. s., fig. 58.—Colony composed of quadrangular branches, rounded on the corners. Cellules arranged on the four faces; bounded below by a prominent lip, in advance, merging into the surface of the branch. Lip emarginate on both sides of the middle, leaving a median labiate projection, sides sloping upwards to the surface of the branch.

*Locality*.—Timber Creek and probably near Mullica Hill, N. J. Cretaceous.

Only two specimens were seen, the largest of which is but .15 inch in length. One of them resembles the Mullica Hill fossils, though it may be, like the other, from Timber Creek. Still, these two deposits are so closely related, if not identical, that it will, in all probability, be found hereafter at both localities.

*E. CONRADII*, n. s., fig. 59.—Colony cylindrical, cellules all round, tubular, probably somewhat exsert, arcuate, arranged alternately, separated by distinct depressed lines. The visible portion of each tube is about as long as the transverse width of the branch. The end of the branch shows regular concentric germs of new cellules. We counted three rows in our best specimen. At the origin of a new branch the colony is somewhat compressed.

From near Mullica Hill, N. J. Cretaceous.

We have seen but two specimens showing cellules as good as the figure and but two more of any sort. There can be no doubt but that the cellules were tubular, from the condition of the remains of the cellules, and they probably extended but little further than the upper part drawn. This has been a handsome little species, and we take pleasure in dedicating it to our friend Mr. Conrad, the pioneer of Tertiary and Cretaceous palæontology in this country.

*E. PROBOSCIDEOIDES*, G. and H., fig. 60.

*Tubulipora proboscidea*, Lonsd., Quart. Jour. Geol. Soc. vol. 1, p. 522, not *E. proboscidea*, (*Pustulipora proboscidea*, M. Edw.)

*Entalophora*, id., d'Orb., Prod. vol. 2, p. 397, No. 1191, and Pal. Fr. vol. 5, p. 780.



Colony composed of filiform dichotomous branches, surrounded by a few long tubular, scattered cellules. Cellules long, arcuate, placed irregularly, very exsert at the extremity; lower portion marked by a prominent swell on the surface of the colony, with depressions between the separate cellules. Surface of colony and of cellules to the extremity marked by numerous, irregularly placed striæ. Colony flattened and widened below the bifurcations.

From the Eocene, probably of Alabama.

This species was referred doubtfully to *Pustulipora proboscidea*, M. Edwards, on the strength of a worn specimen, by Mr. Lonsdale. It differs from that species in being less robust, with striate tubes placed wide apart; those of Edwards' species are always smooth and placed rather closely. Both belonging to the same genus, the species of M. Edwards must be called *Entalophora proboscidea*, that being the oldest species, and the one before us thereby becoming nameless, we propose the above appellation.

*E. PUNCTULATA*, n. s., fig. 61.—Colony composed of robust branches, usually separating at rather wide angles, covered with large, prominent tubular cellules. Cellules placed without order, sometimes crowded, at others considerably scattered; tubular, often curved, occasionally arising at an angle of about forty to fifty degrees from the surface of the branch. Generally with the embedded portion and even part of the free portion covered with punctations, varying from mere surface pits to complete perforations. The rest of the tube is striate longitudinally, striato-punctate or irregularly roughened. Ends of the branches filled with large numbers of germs of new cellules.

Common at Santa Barbara, Cal. Miocene.

The very rough free branches of this species, render it easily distinguishable to the naked eye. The details of the cellules resemble, in a remarkable manner, those of *Cellepora Bellerophon* from the same deposit. They can be distinguished, as remarked under the description of that species, by the latter being always encrusting and cellulate, while in this the interiors of the cylindrical branches are always filled with germs of centrifugate cellules. The striæ on the tubes of the *Cellepore*, seem to be always somewhat spiral, in this species they are, when present, longitudinal. The mouths of the tubes in the present species are rarely expanded. They often appear notched, probably the result of fracture.

#### DIASTOPORA.

Colony in its young state encrusting, afterwards rising in an irregular plate, often enrolled into a tube. Cellules on only one side, placed with greater or less regularity. Opposite side covered with an epithelium.

In its young condition this genus resembles *Berenicia*, but can be distinguished by the latter genus never rising from the encrusted surface. From *Discosparsa* it is separated by that genus being always in a more or less regular discoidal mass, attached by but one small point.

*D. LINEATA*, n. s., fig. 62.—Colony composed of a plate, often encrusting for a considerable distance, afterwards arising in an enrolled plate or tortuous, branched tube with thin walls. Cellules small, not very prominent, arranged with a quincuncial tendency. Immersed portion often distinctly rounded and bounded by a depressed line, sometimes with a median longitudinal rib and one or two lateral ones on each side. Free portion short, robust, bounding a small circular mouth. Behind the mouth the surface usually slopes regularly to the common surface of the colony. Back of the colony covered with an irregularly striate epithelial layer. The encrusted form always shows a germinal plate, a little in advance of the perfect cellules, or numerous partly formed cellules, never more than one layer.

Not rare, from Timber Creek and Mullica Hill, N. J. Cretaceous.

Approaches *D. regularis*, d'Orb., but differs in the mouths of the cellules being circular, in their being placed more regularly and in the usually striate or ribbed appearance of the surface. This latter character is variable. Sometimes the ribs are more prominent than in the figure, sometimes the only lines are the impressed ones between the cellules.

#### STOMATOPORA.

##### ALECTO.

Colony composed of ramose or meandering lines, with a single row of cellules; always encrusting. Cellules tubulate, mouths usually exsert.

From *Filifascigera*, this genus is distinguished by there being but a single mouth in each tube, and from *Protoscina* by having but a single row of cellules in a branch instead of two or more. The filiform, meandering or dichotomous form of the colony is very characteristic.

*S. REGULARIS*, n. s., fig. 63.—Colony encrusting, ramose, filiform, slightly convex, sides sloping gradually towards the edge, seldom if ever very abrupt; branches usually very regular. Cellules pretty regular in shape, widest usually just behind the mouth, narrowing gradually behind. Mouth tubular, inclined a little forwards, circular. There is no abrupt division between the cellules. Surface smooth or irregularly striate transversely.

From the Cretaceous of New Jersey; encrusting shells and other polyzoa. From *Filifascigera meyaera*, the only species resembling it, in this formation, it can be distinguished, even in worn specimens, by the presence of but one opening in the tube, instead of three or four.

#### Fam. CRISINIDÆ.

Simple cellules on one side, opposed pores on the other.

## RETICULIPORA.

Colony composed of branches, often much compressed, usually anastomosing. Cellules placed on the top and sides, "opposed pore" at the back. Cellules arranged in more or less regular transverse lines, no accessory pores.

Increase taking place from the extremity and on the sides of the branches. A median germinal plate running along the middle of the branches.

The absence of accessory pores distinguishes this genus from *Bicrisina*, the only nearly related form.

R. SAGENA, G. and H., Proc. Acad. Nat. Sci. Philada., 1860, p. 366. *Id.*, Journal Acad., vol. 4, p. 400, pl. 69, fig. 30, 31, 32.

Colony composed of broad branches, anastomosing irregularly. Branches, with the sides parallel or a little the widest at the top. Cellules crowded, large, subangular, dividing walls thick. Germinal plate distinct, but not prominent, surface adjoining it often rounded.

One specimen only is known to us. It is from Timber Creek, N. J., Cretaceous and is imbedded in such a hard matrix that we are unable to see all the characters in as satisfactory a manner as we could desire.

It resembles in its mode of growth, *R. Ligeriensis*, but differs in the cellules being crowded on all parts of the specimen, as far as we can uncover it.

R. DICHOTOMA, n. s., fig. 64.—Colony branched, probably not anastomosing. Branches sharp above, widening below, widest at or near the back, which is rounded. Cellules crowded near the upper edge, placed with an irregular transverse arrangement, scattered posteriorly. When the cellules are not crowded they are often bordered by a raised lip posteriorly. The back of the colony is pierced by a few scattered pores, some of which are bordered by a faint rim. Germinal plate thin, distinct, prominent at the upper margin, and visible in the section, almost as far down as the back of the branch.

One specimen only, from Timber Creek, N. J. Cretaceous.

The prominent germinal plate, narrow branch, probable absence of anastomosis and the shape of the transverse section of the branch, which is widest above, or at least parallel, in *R. sagena*, sufficiently prove this to be a distinct species.

We have another species, represented by two or three compressed, almost cylindrical branches, from the deposit near Mullica Hill, but they are too imperfect for description.

## BICRISINA, d'Orb.

Colony testaceous, composed of rounded, compressed or subquadrate branches. Cellules arranged in transverse lines on the sides and lateral portions of the top of the

branches. Each cellule provided with an "accessory pore" placed below the opening. Back pierced by "opposed pores."

The presence of the "accessory pores" distinguishes this genus from *Crisina*, and the transverse arrangement of the cellules separates it from *Hornera*, in which the rows are placed longitudinally on the branches as in *Cavea*.

B. ABBOTT, G. and H., fig. 65.

*Heterocrisina id.*, G. and H., Jour. Acad. Nat. Sci. Philada., vol. 4, 2d ser., p. 404, pl. 69, fig. 45, 46, 47.

Colony, small, composed of flattened, subquadrate branches. Cellules arranged in transverse lines on the sides, with the most anterior one largest, looking forwards or obliquely outwards. Lines usually alternating on opposite sides. Openings, when not worn, round; a small elongated pore below each opening, causing the appearance of flutings between them. Surface between the rows of cellules, excavated, concave, smooth. Back of the colony coarsely reticulated, with irregular pores scattered pretty closely.

Section of branch, showing numerous germs of cellules.

Common near Mullica Hill, N. J. Cretaceous.

The species was first described from a series of somewhat worn specimens, which misled us, in the generic characters. The anterior row of cellules was abraded in such a manner as to present oblique alternating rows. Having since obtained more perfect specimens, showing the unworn state of the colony, we are happily able to correct the unfortunate blunder thus made.

In most cases the rows of cellules are not directly transverse, but are inclined a little downwards. The anterior surface of the branches is usually excavated, and the branch is widest behind.

#### CRISINA.

Colony in free branches, bearing two rows of cellules, interrupted in the middle. No accessory pores.

Differs from *Filicrisina* in the two interrupted lines. In the latter genus, there is but one line of cellules without interruption. From the preceding genus, it is distinguished by having no accessory pores.

C. SERRATA, n. s., fig. 66.—Colony in flattened, filiform branches. Cellules arranged along the edge, prominent at its distal end, sloping downwards and inwards towards the proximal end. Opening circular, bordered by a thin, sharp rim, often projecting directly forwards at a right angle with the branch. Lateral edge of the cellule straight, convex or concave. Surface of the colony, anteriorly, carinate longitudinally in the middle, rarely convex, with the surface sloping towards the edge. Back regularly convex or carinate, more prominent than the front, often grooved between

the cellules. Anterior surface granulate or transversely and faintly wrinkled. In two cases we noticed a large body, probably an ovicell, of an elongated ovoid or sub-cylindrical form, arising in one case from the middle of the anterior face, and in the other instance from one side of the anterior surface, projecting upwards and forwards, as long as three cellules and coarsely granulate over the whole surface. They arise gradually and end abruptly. We could detect no natural opening, but through an accidental fracture in one of them we saw the interior surface, smooth and polished.

Common at Santa Barbara, Cal. Miocene.

This species can be readily distinguished by the filiform shape and serrate edge. The cellules are about .01 inch in length.

#### CAVEA, d'Orbigny. 1852.

Colony fixed by the base, dichotomous, cylindrical, when perfect presenting a dendroid appearance. Cellules placed in very regular longitudinal lines and quincunx around the branches, tubular, but slightly or not at all salient; anterior face below the opening, pierced by regular pores variable in number in different species, but generally arranged in two longitudinal lines.

Distinguished from *Clavicavea* by its dendroid form, and from *Entalophora* by the cellules always being provided with the fossets or pores below the opening. From *Heteropora* by being more slender, by the cells being arranged in very regular longitudinal lines, and by the entire absence of abortive cellules.

C. PRISCA, n. s., fig. 67.—Colony slender, dendroid, branches generally straight, surrounded by about a dozen lines of cellules. Cellules separated laterally by a distinct, acute, slightly waved ridge; placed in regular quincunx, sides formed of two straight lines meeting at a very obtuse angle about the middle of the cellule, so as to make it widest at that part, (immediately between the openings of the two adjoining cellules), and to make the cellule a very elongated hexagon with the ends curved. Anterior end of the cellule rounded and bordered by a raised lip, smaller than the longitudinal ridges; opening circular to slightly elliptical, when the greatest diameter is longitudinal; sometimes a faint lip at the proximal margin of the cellular opening. Surface of the cellules pierced by two longitudinal series of three pores each, placed at regular intervals.

We have some doubts as to the geological age of this fossil. It occurs abundantly in a light fawn-colored shaly limestone at Fort Belknap, Texas, associated with *Posidonia Moorei*, Gabb, *Spirifer cameratus*, Morton, and other mollusca of a decidedly Carboniferous aspect, resting on rocks of undoubtedly Carboniferous age, and below Cretaceous rocks. Dr. Moore thinks it probable that the rock may be more recent than the Carboniferous and composed of debris of rocks of that age. This idea appears tenable from the appearance of the rock, and more especially so since the genus *Cavea*

has never heretofore been known to occur below the Upper Green Sand, (Cenomanien), where only one species has been characterized, as far as we are aware.

#### CAVIDÆ.

Intermediate pores between the cellules; usually opposed pores on one side.

#### LICHENOPORA, Defr.

Colony discoidal, free. Cellules placed in multiserial radiating lines on one side, with numerous intermediate pores between the lines; opposite side covered with an epithelium, or germinal plate, without "opposed pores."

The presence of an epithelium and absence of "opposed pores" distinguish this genus from *Bicavea*. The fact of having a number of rows of cellules in each line separates it from *Discocavea*, in which the lines are uniserial. Its being free, instead of encrusting, distinguishes it from *Radiocavea* and *Stellocavea*, while from the discoidal forms of the *Tubigeridæ* it can be separated by having intermediate pores.

L CALIFORNICA, fig. 68. *Id.*, Con., Proc. Acad. Nat. Sci. Phila. 1855, p. 441.

Colony irregularly discoidal, sometimes twisted. Cellules arranged in not very regular, prominent, radiating lines often commencing or ending abruptly and with new ones interpolated. Two or three rows of cellules usually in each line. Cellules tubular, crowded, circular when not compressed. Central third of the colony depressed and occupied only by "intermediate cellules." These vary much in size and form, and generally have a regular concave margin, bounded by straight lines, with a rounded opening. Pores between the rows of cellules smaller, more crowded and less concave. Germinal plate extending prominently beyond the edge of the cellulate portion of the colony, and showing numerous germs of new cellules. Back of the colony concentrically striate and marked by fine radiating lines.

Rare. Santa Barbara, Cal. Miocene.

#### Div. IV. C. FORAMINATA.

Cellules simply pierced, not tubulate.

#### Fam. CAVIDÆ.

Openings of the cellules simple, not infundibulate. No intermediate pores.

#### REPTOMULTICAVA, d'Orb.

Colony encrusting, composed of many layers of cellules superposed. Cellules simply pierced, not tubulate. Cellular surface not ribbed nor marked by nodes without cellules.

This genus resembles several others, but can be distinguished by being always en-

crusting and composed of numerous layers. With similar cellules, and the many layers, *Ceriopora* is dendroid or branched, cellules all round; and *Semimulticava* is free with cellules on only one side.

R. CEPULARIS, G. and H., Proc. Acad. Nat. Sci. Phila. 1860, p. 367. *Id.*, G. and H., Jour. Acad. p. 401, pl. 69, figs. 33, 34, 35.

Colony encrusting in large masses, forming very irregular tubercles or nodes; composed of a large number of layers of cellules superposed. Cells angular, crowded, irregular, separated by prominent walls, sometimes with distinct depressed lines between them.

Only one specimen. Timber Creek, N. J. Cretaceous.

This is probably the largest species found in New Jersey. The colony described is over  $2\frac{1}{2}$  inches in one of its diameters.

#### Fam. CRESCISIDÆ.

Cellules and intermediate pores irregularly scattered.

#### CRESCIS.

Colony composed of compressed branches, cellules on both sides, placed back to back, with a distinct germinal plate between them. Ends of branches showing numerous germs of cellules. Numerous intermediate pores between the cellules.

This genus differs from *Heteropora* in the branches being compressed with a germinal plate, which is absent in that genus. From *Semicrescis* it can be distinguished by the cellules being placed on both sides of the branches, and in not having one side covered by an epithelial layer.

C. LABIATA, n. s., fig. 69.—Colony in flattened branches of variable width. Cellules on both sides, with generally a very marked germinal plate between the two layers. Cellules broadly arcuate internally. Opening small, circular, usually bordered by a small rim, often blended into the surrounding surface. Intermediate pores numerous, scattered and of variable size, sometimes possessing distinct mouths, representations of the cellular mouths in miniature. Scattered over the colony are found, without any definite arrangement, numerous labiate processes, which may have been connected with the reproductive functions. We can suggest no other use for them, and have been unable to ascertain, by breaking specimens, what connection they had with the subjacent cellules. The supposition that they were ovicells is the most probable one that has occurred to us. This is sustained by the fact that in old colonies, where the intermediate pores and even the mouths of the cellules themselves are closed by a heavy deposit of calcareous matter, these cups are still open, as represented in one of the figures. Worn surfaces show the intermediate pores very distinctly, and usually

an impressed ring, parallel with the mouth, surrounding it. In old colonies the position of the mouth is generally shown by a slight elevation.

Common in the Cretaceous near Mullica Hill, and found also at Timber Creek.

Some specimens of this species resemble our *Escharifora typica*, but can be distinguished by the above-mentioned labiate processes and by the circular mouths.

#### MULTICRESCIS, d'Orb.

Colony composed of free rounded branches, covered with many layers of cellules all round. Cellules scattered or placed at regular distances, with numerous intermediate pores placed between them.

With the same external appearance as *Heteropora*, this genus is distinguished by having numerous superposed layers of cellules.

M. PARVICELLA, fig. 70.

*Id.*, G. and H., Proc. Acad. Nat. Sci. Phila. 1860, p. 367. *Id.* G. and H., Jour. Acad. vol. 4, 2d ser. p. 401, pl. 69, figs. 36—38.

Colony in round irregular branches, often anastomosing, composed of several layers of cellules, (in one instance four were counted). Cellules placed at some distance apart; mouth bordered by a distinct, raised lip when perfect. Intermediate space perforated by numerous small rounded pores. In worn colonies it is at times difficult to distinguish the difference between these pores and the cellular mouths. The cellules sometimes show an accidental grouping.

Found, not very abundantly, both at Timber Creek and near Mullica Hill, N. J. Miocene.

M. TORTILIS, G. and H.

*Heteropora id.*, Lonsd. Quart. Jour. Geol. Soc., vol. 1, p. 501, fig. *Id.*, Holmes Pliocene, South Carolina, p. 16, pl. 4, f. 15, 16. (very good). *Id.*, d'Orb. Pal. Fr. Terr. Crét., vol. 5, p. 1070.

*Ceripora id.*, d'Orb. Prod. Pal. Strat., vol. 3, p. 150, No. 2787.

Colony in large round branches, sometimes widened and at others anastomosing, composed frequently of three or four distinct, easily separable layers. Cellules placed irregularly, and with large irregular intermediate angular pores filling up all of the intervening space. Walls thin; thickness very nearly uniform.

Common in the Miocene (Pliocene of Holmes) of Virginia and South Carolina.

This species resembles somewhat, in its mode of growth, *M. Michelini*, d'Orb., though the branches are usually more cylindrical. The extreme thinness of the walls both of the cellules and of the intermediate pores is its strongest distinguishing character.



*Doubtful Species.*

We have a specimen, presenting all the important surface characters of *Multicrescis parvicella*, but it is tubulate throughout, and we are not certain but that it has an epithelial layer internally. It is from near Mullica Hill, N. J., and is too small and imperfect for satisfactory study. Better specimens may prove it to be an undescribed species of *Semicrescis*.

Fig. 71.—Illustrates a minute encrusting form, not uncommon in the Cretaceous limestone of N. J. Some of the specimens resemble in their alternate dilations and constrictions, a *Hippothoa*. They are very irregular and sometimes are hardly or not at all constricted, representing an irregular flattered tube. No openings were observed.

On page 82 of his Synopsis of the Cretaceous formation, Dr. Morton indicates the existence of a "*Lunulite*" in the Cretaceous strata of N. J. We have not yet encountered it.

## "ALVEOLITES GLOMERATUS," Say.

This well known Polyzoon, belonging to an undescribed genus of the *Flustrellaridæ*, for which we propose the name *Pumiscaria*, is very common on the sea coast of New Jersey. We have seen a specimen, purporting to come from the Miocene of that State. This is, however, doubtful. The genus is characterized as follows:—

Cellules like those of *Membranipora*. Colony encrusting in many superposed layers, often forming enormous masses.

The species, on which the genus is founded, is one of the commonest on our coast, and sometimes forms masses five or six inches in diameter, around bunches of serpula or on shells. We have seen a mass, formed around a valve of *Ostrea Virginica*, which, on being sawed through its smallest diameter, showed perhaps a hundred layers.

[NOTE.—Since the writing of this Monograph, my coadjutor, Mr. W. M. Gabb, has been called to the post of Palaeontologist, to the State of California. In regard to the Santa Barbara and San Pedro deposits, he writes, "they are among the most recent deposits, almost all the species being still extant." "Instead of Post-Miocene they should be called Post-Pliocene." The correction having arrived too late to make the alteration in the whole text, the error has been allowed to remain in the later pages, and this method taken of making it known.—G. H. H.]



ART. IV.—*Descriptions of New Birds from Western Africa, in the Museum of the Academy of Natural Sciences of Philadelphia.*

By JOHN CASSIN.

I. TRICHOPHORUS CHLORONOTUS, Cassin.

*Trichophorus chloronotus*, Cassin. Proc. Acad. Philada. 1859, p. 43.

*Trichophorus chloronotus*, Cassin, Heine, Cabanis, Journ. vi. p. 432.

PLATE XXII. Fig. 1. Adult male.

Resembling *T. gularis*, Horsfield, and *T. calurus*, Cassin, but much larger. Feathers of the head wide and rather long, nuchal bristles long, bill strong, rather wide at base, curved, wings with the fifth quills longest. tail moderate, rounded, feathers of lower back and rump long.

Total length about  $8\frac{1}{2}$  inches, wing  $4\frac{1}{2}$ , tail  $3\frac{3}{4}$ , tarsus  $\frac{7}{8}$  inches.

Tail and upper coverts rufous, with a greenish tinge, and nearly all the tail feathers narrowly edged with greenish yellow. Head above dark cinereous or plumbeous; cheeks the same, with longitudinal lines of white. Upper parts of body fine olive green, tinged with yellow, especially on the rump. Quills brownish black, edged externally with olive green uniform with the back.

Throat white; breast with a wide transverse band of cinereous; abdomen, under tail coverts and under wing coverts greenish yellow. Bill bluish, with the edges of the mandibles nearly white; feet light yellowish.

*Hab.*—River Camma, Western Africa. Specimens in Mus. Acad. Philada.

This large species resembles, in some measure, *T. gularis* of Java, and also the species immediately succeeding *T. calurus*, of Western Africa, but I have failed to identify it with any other previously described. The cinereous or plumbeous color of the breast varies in shade in different specimens, but in all is sufficiently distinct, and usually forms a wide transverse band on the breast and upper part of the abdomen. The feathers of the head are broad, and probably partially erectile, and the curious *hairs* on the back of the head and neck are strongly developed.

Several specimens of this bird are in the Academy collection, all of which were purchased from Mr. P. B. DuChaillu, who stated that he obtained them on the River Camma, Western Africa. It is one of the largest and most handsome species of its group. The figure in our plate represents the adult male of the size of life.

2. *TRICHOPIHORUS CALURUS*, Cassin.

*Trichophorus calurus*, Cassin, Proc. Acad. Philada., 1856, p. 158.

*Trichophorus calurus*, Cassin, Hartlaub, Syst. der Orn. Westaf. p. 86, (1857.)

PLATE XXII. Fig. 3. Adult male.

General form of and somewhat resembling the preceding, but much smaller, also resembling *T. gularis*, Horsfield, and *T. caniceps*, Lafresnaye (of Java and Borneo), and about the size of the latter, but smaller than the former. Bill curved, bristles at base strong, nuchal bristles long, wing with the fifth quill longest, tail moderate, feathers on the head wide, feet rather small.

Total length (male) about 7 inches, wing  $3\frac{1}{2}$ , tail  $3\frac{1}{4}$  inches.

Throat white. Tail above and its upper coverts rufous, all the feathers more or less edged with yellowish green, under surface of tail lighter.

Head above dark ashy brown, cheeks lighter, each feather with a longitudinal line of white. Upper parts of body and wings yellowish olive green, under parts (except throat) greenish yellow, or nearly pure yellow in the middle of breast and abdomen, and much shaded on the sides with green of the same shade as the upper parts. Under wing coverts and inner edges of primaries greenish yellow. Bill bluish; edges of mandibles paler and nearly white; feet light bluish.

*Hab.*—Moonda and Camma Rivers, Western Africa. Specimen in Mus. Acad. Philada.

This species is very similar in form and color to *T. gularis*, Horsfield, from Java, and is strictly of the same generic group. It is smaller than that species, being about the size of a species labelled in the Acad. Mus. "*T. caniceps*, Lafres."

The figure represents the adult male of the size of life. Numerous specimens were received at the Academy in Duchailu's collections from the Moonda and Camma Rivers.

3. *XENOCICHLA NOTATA*, (Cassin.)

*Trichophorus notatus*, Cassin, Proc. Acad. Philada., 1856, p. 159.

*Xenocichla notata*, Cassin, Proc. Acad. Philada., 1859, p. 45.

*Trichophorus notatus*, Hartlaub, Syst. Orn. West Africa, p. 83, (1857.)

PLATE XXII. Fig. 2. Adult male.

Bill moderate, nearly straight, compressed, wing with the fourth and fifth quills longest and very nearly equal; tail rather long; feet moderate, or rather strong.

Total length (male) about  $7\frac{1}{2}$  inches, wing  $3\frac{1}{2}$ , tail  $3\frac{1}{2}$  inches.

A large spot of yellow in front of the eye. Head above, cheeks and entire upper parts of body rather dark olive green; under parts yellow, nearly pure on the throat and middle of breast and abdomen, and shaded with green on the sides. Wings and tail olive green, uniform with the beak. with the inner webs of feathers dark

brown. Three outer feathers of tail widely tipped with pale yellow. Inferior wing coverts bright yellow, primaries edged on their inner webs with pale yellow. Bill dark bluish, with the edges of mandibles and tip of lower mandible nearly white. Feet light (probably light reddish or flesh-color). Sexes very nearly alike.

*Hab.*—Moonda. Muni and Camma Rivers, Western Africa. Specimen in Mus. Acad. Philada.

This bird belongs to the same group as *Trichophorus canicapillus*, Hartlaub, and *Dasycephala syndactyla*, Swainson, and other species forming the genus *Xenocichla*, Hartlaub, to which group also the singular name *Bleda* has been applied. It does not closely resemble any other species known to us, and may be readily distinguished by the bright yellow spot in front of the eye.

Numerous specimens were received in Duchailu's collections, from whom the series now in the Acad. Mus. was purchased. The figure represents the adult male of the size of life.

#### 4. ALETHE CASTANEA, (Cassin.)

*Napothera castanea*, Cassin, Proc. Acad. Philada., 1856, p. 158.

*Alethe castanea*, Cassin, Proc. Acad. Philada., 1859, p. 43.

*Napothera castanea*, Cassin, Hartlaub, Syst. Orn. West Afr., p. 73, (1857.)

*Alethe castanea*, Cassin, Heine, Cabanis, Journ., 1860, p. 129.

PLATE XXIII. Fig. 1. Adult male.

About the size of *Napothera atricapilla*, of Sumatra, and somewhat resembling that species. Bill moderate, distinctly notched; wing with the fourth quill longest; tail long, wide, rounded.

Total length about  $6\frac{3}{4}$  inches, wing  $3\frac{1}{2}$ , tail  $2\frac{3}{4}$  inches.

*Adult Male.*—Top of the head with all the feathers light reddish yellow, at base tipped with dark rufous, forming a large partly concealed coronal spot of that color (reddish yellow). Front and obscure superciliary stripe dark rufous; cheeks, sides of the neck and sides of the body light cinereous. Upper parts of body reddish chestnut, inclining to fulvous, brighter on the back and rump; under parts white; under wing coverts white, tinged with cinereous. Quills brownish black, edged externally with chestnut, uniform with upper parts of body. Tail brownish black; outer feathers edged externally with reddish chestnut. Bill black; feet lighter.

*Younger Male.*—Generally exactly the same as the preceding, but with frontal and superciliary feathers brownish black, with longitudinal stripes of bright rufous. Superciliary stripe much more clearly defined than in more adult specimens. This plumage is first described by me as above cited, (Proc. Acad. Philada., 1856, p. 158.)

*Young Male.*—Upper parts dark brown, nearly black, tinged with rufous on the

rump, every feather having an oblong or oval central spot of light yellowish rufous, larger on the back and wing coverts, smaller and more narrow on the head. Under parts dull yellowish rufous, many feathers on the breast and sides edged with brownish black. Quills and tail feathers brownish black (without any spots). Not presenting any resemblance in color to the adult, but with the top of the head spotted like the second plumage described above as younger male.

*Hab.*—Countries on the Moonda and Camma Rivers, Western Africa. Specimens in Mus. Acad. Philada.

This bird is one of the few African forms intimately related to the Asiatic *Napothera* and allied genera. In general appearance it bears considerable resemblance to *N. atricapilla*, *N. coronata*, and some other species of the islands of Java and Sumatra, but appears to be generically distinct, and was accordingly so stated by us as above cited.

Our plate represents the adult male of the size of life. Numerous specimens were received in Duchailu's collections, from whom the specimens in the Acad. Mus. were purchased.

5. *HYPHANTORNIS CINCTUS*, Cassin.

*Hyphantornis cinctus*, Cassin, Proc. Acad. Philada., 1859, 133.

PLATE XXIII. Fig. 2. Adult male.

Resembling *H. tector*, but smaller, and with a wide transverse band or belt of chestnut color on the breast. Bill quite strong; wing with the first quill spurious, third and fourth longest and very nearly equal; tail moderate or rather short; legs and feet strong.

Total length about 6 inches, wing  $3\frac{1}{4}$ , tail  $2\frac{1}{4}$  inches. Female rather smaller.

*Adult Male.*—Head and throat black, which color ends in a point on the breast, and is succeeded by a wide transverse band or belt of dark chestnut; abdomen and under tail coverts yellow. Upper parts of body greenish yellow; feathers of the back and rump and upper tail coverts black at base; quills and upper coverts of wings brownish black, tipped and edged with yellow; tail uniform yellowish green, all the feathers edged with yellow. A narrow ring of chestnut on the neck behind, between the black of the head and the yellow of the back. Axillary feathers yellow; under wing coverts yellow, edged and tipped with black. Bill bluish black; feet light colored.

*Young Female.*—Head above yellowish green; throat, cheeks and line over the eye greenish yellow; upper parts of body greenish ashy brown, all the feathers edged with a paler shade of the same color; quills and wing coverts brownish black, edged with pale greenish yellow. Under parts dull ashy white, tinged with pale brownish on the breast; tibiae and under tail coverts pale yellowish white; bill light bluish brown, under mandible paler; feet light colored. Resembling the young of *H. tector* and other species.

*Hab.*—Countries on the Camma River, Western Africa. Specimens in Mus. Acad. Philada.

The present species is strictly of the same generic or subgeneric group as the common *Hyphantornis textor* of Western Africa, and resembles it also in colors and general appearance. It is, however, strongly characterized by the large space of chestnut color on the breast, which assumes the form of a wide pectoral belt or band, and is uniformly presented in numerous specimens. It is smaller than *H. textor*, and easily distinguished when in mature plumage, though the young resemble each other to some extent.

This bird seems to be related to *Pioceus collaris*, Vieillot, Nouv. Dict., xxxiv. p. 129; Ency. Meth., ii. p. 699; but that species is described as having the tail black and the breast rufous, which characters are not applicable to the species now described. It also is related to *Ploceus capitalis*, Lath., Gen. Hist., vi. pl. 94, but not intimately. This species is probably quite abundant in the countries above mentioned, and numerous specimens have been received at the Academy from Duchailleu and other collectors. The adult male is represented in our plate of the natural size.

6. SYCOBIUS RACHELIÆ, Cassin.

*Sycobius Racheliæ*, Cassin, Proc. Acad. Philada., 1857, p. 36.

*Sycobius Racheliæ*, Cassin, Hartlaub, Syst. Orn. West Afr., p. 265, (1857.)

PLATE XXIII. Fig. 3. Adult.

Rather smaller than *S. scutatus*, general form robust; bill strong; wing with the first quill spurious, third and fourth longest and nearly equal; tail rather short; feet moderate or rather strong.

Total length about 5½ inches, wing 3¼, tail 2 inches.

*Adult Male.*—Head above bright reddish orange, a paler shade of which extends on the sides of the neck. Throat and cheeks glossy black, which color encloses the eyes. Neck in front and breast bright orange red, immediately fading into bright yellow and extending on the sides further than on the middle of the breast. Entire upper parts of body, wings, tail and abdomen glossy black, which color runs into a point on the breast, (with yellow on each side.) Under tail coverts yellow. Under wing coverts black; bill bluish black; feet lighter.

*Young Male.*—Similar to the above, but with all the plumage duller colored, and the reddish orange of the crown mixed with black.

*Hab.*—Country on the River Muni, Western Africa. Specimens in Mus. Acad. Philada.

This is a very handsome and quite peculiar bird in its colors and general appearance, and is the only species of its group in which the colors of the breast extend

on the sides, as may be seen in some species of *Euplectes*, (for instance, *E. melanogaster*, Vieill., Ois. Chant., pl. 27.) On the neck the rich orange red is most distinct immediately next to and below the black of the throat, and rather abruptly fades into bright and clear yellow on the sides of the breast. Two specimens only were in Duchailu's collections, and were represented by him as having been obtained on the River Muni, as above stated.

This curious and interesting species properly belongs to a subgroup or subgenus more analogous to *Euplectes* than is typical *Sycobius*, and of which, perhaps, the old *Ploceus nigerrimus* is also a member. The last named bird was received abundantly in the various collections made by Duchailu, and is undoubtedly a common species in Equatorial Africa, though formerly rare in collections. All of the known species of *Sycobius* are in the Academy Museum, including *Sycobius Cassinii*, Elliot, which is an interesting and entirely substantial addition to this handsome group, made by one of our most talented and promising young ornithologists.



*New Unionida of the United States and Arctic America.*

By ISAAC LEA.

Since my last publication in the Academy's Journal, I have received a number of new species of *Unionida*, of which I published simple diagnoses in the Proceedings. I now offer them with full descriptions and observations, and with well characterized figures. They are generally of great interest, coming usually from distant waters, which are not easily attainable. To the Smithsonian Institution I am greatly indebted for the examination of all their species. Those from Arctic America are the first we have seen from the great lakes of that region.

## UNIO WARDII. Pl. 24, fig. 257.

Testâ tuberculatâ, subtriangulari, compressâ, subequilaterali, posticè et infernè emarginatâ, anticè rotundâ; valvulis crassiusculis, anticè crassioribus; natibus prominulis, ad apices rugosis; epidermide vel luteolâ vel luteo-virente, maculis triangularis indutis; dentibus cardinalibus subgrandibus, compressis sulcatisque; lateralibus sublongis, suberassis, obliquis rectisque; margaritâ argenteâ, interdum roseâ et iridescente.

Shell tuberculate, subtriangular, compressed, nearly equilateral, emarginate behind and below, round before; valves somewhat thick, thicker before; beaks slightly prominent and rugose at the tips; epidermis yellowish or yellow green, covered with triangular spots; cardinal teeth somewhat large, compressed and sulcate; lateral teeth rather long, rather thick, oblique and straight; nacre silver white, sometimes rosaceous and iridescent.

Proc. Acad. Nat. Sci., 1861, p. 392.

*Hab.*—Walhonding River, Ohio, J. C. Ward. Wassepinicon River, Iowa, Dr. Foreman. Coal River, Logan co., Va., Dr. Hartman.

My cabinet and cabinets of Dr. Foreman, Dr. Hartman and Mr. Anthony.

Diam. 1.2,                                      Length 1.9,                                      Breadth 2.6 inches.

Shell tuberculate, subtriangular, verging to quadrate, compressed, nearly equilateral, emarginate behind and below, round before; substance of the shell somewhat thick, thicker before; beaks rather prominent, rugose at the tips, ligament large and dark brown; epidermis yellowish or yellow green, with numerous green, angular spots, with well marked not very distant marks of growth; umbonial slope raised, broad, with a depression anteriorly and posteriorly, each causing an emargination at the margin; posterior slope rather narrow, raised into a carina and

nearly covered with rows of nodules; cardinal teeth rather large, compressed and sulcate; lateral teeth rather long, somewhat thick, oblique and straight; anterior cicatrices distinct, rather large and well impressed; posterior cicatrices confluent, large and slightly impressed; dorsal cicatrices placed under the plate and on the base of the cardinal tooth; cavity of the shell rather shallow and wide; cavity of the beaks deep and acutely angular; nacre silver white, sometimes rose color and iridescent.

*Remarks.*—I have four specimens before me. The largest was received many years since from Mr. J. C. Ward, with a doubt as to its being *metanever*, Raf. His note says, "I have two others in my collection, one much larger and the other smaller than this, besides which I have seen three others, *all of which possess exactly the same characteristics*. Is it not sufficiently distinct to erect it into a *new species*?" Within the last year I have, from three other naturalists, received three specimens from other habitats. These satisfy me that Mr. Ward's suggestion was correct, and I have great pleasure in dedicating it to my deceased friend, who was an ardent lover of nature and a liberal gentleman. The specimen from Mr. Anthony is marked "Tennessee," but Dr. Hartman, on seeing this specimen, thinks he recognises it as the specimen which he gave Mr. Anthony from the same habitat (Coal River, Virginia) with his own. They have precisely the same appearance, and there may have been some inadvertence as to the label from Tennessee. I have never received it from that State. It is very closely allied to *metanever*, Raf., and I have had great hesitation in separating it, but the absence of regular tubercles on the umbonial slope is a marked character and constitutes the chief difference. The outline is rather more quadrature, and it always is much more compressed. The specimen from Iowa has a pinkish tinge, very different from the silver white of the others. The arrow-headed marks are of the same form and green color as in *metanever*, but in all these specimens they are smaller.

UNIO HIGGINSII. Pl. 24, fig. 258.

Testâ laevi, obliquâ, ventricosâ, valdè inæquilaterali, anticè rotundatâ; valvulis percrassis; natibus valdè prominentibus, tumidis incurvisque; epidermide virido-olivâ, politâ, valdè radiatâ; dentibus cardinalibus magnis, crassis, erectis, crenulatis, in utroque valvulo duplicibus; lateralibus sublongis, percrassis subrectisque; margaritâ vel albâ vel salmonis colore tinctâ.

Shell smooth, oblique, ventricose, very inequilateral, rounded behind; valves very thick; beaks very prominent, swollen and incurved; epidermis greenish olive, polished, very much rayed; cardinal teeth large, thick, erect, crenulate and double in both valves; lateral teeth rather long, very thick and nearly straight; nacre white or tinted with salmon color.

Proc. Acad. Nat. Sci., 1857, p. 84.

*Hab.*—Muscatine, Iowa, Mr. Frank Higgins.

My cabinet and cabinet of Mr. Lesquareux, Columbus, Ohio.

Diam. 1·9,

Length 2·5,

Breadth 3·2 inches.

Shell smooth, oblique, much inflated, very inequilateral, rounded behind; substance of the shell very thick, somewhat thicker before; beaks very prominent, swollen, incurved and slightly undulate at the tips; ligament large and dark brown; epidermis greenish olive, polished, very much rayed, with very distant marks of growth; umbonial slope raised and rounded; posterior slope large, cordate, flattened, with three indistinct raised lines from the beaks to the margin; cardinal teeth large, thick, erect, crenulate and double in both valves; lateral teeth rather long, very thick, oblique and nearly straight; anterior cicatrices distinct, very large and very deeply impressed; posterior cicatrices confluent, very large and moderately well impressed; dorsal cicatrices placed over the centre of the cavity of the beaks and along the base of the cardinal tooth; cavity of the shell deep and rounded; cavity of the beaks rather deep and obtusely angular; nacre silvery white or tinted with salmon and iridescent.

*Remarks.*—I have seen but two specimens of this species, and they are both before me. One is evidently full grown, the other is only about one-third grown. The younger is of a fine salmon color in the cavity and the region of the teeth. This species reminds one of two very different species,—*ligamentinus*, Lam., and *ellipsis*, (nobis),—but it need not be confounded with either. The former is more elliptical, and, while it is very much of the form of the latter, it has a finer surface of epidermis and is more polished and fuller of greenish rays. It reminds one also of *orbiculatus*, Hild., but it is greener, has more rays and is more inflated, and has higher beaks. The younger specimen is covered with beautiful, closely-set green rays over the whole disk, and the tips of the beaks, being nearly perfect, shew a few very small indistinct undulations at the tips. I name it after Mr. Frank Higgins, who first procured it, and through the kindness of Mr. Moores it was sent to me.

UNIO VESTITUS. Pl. 25, fig. 259.

Testâ lævi, ellipticâ, compressâ, inæquilaterali, posticè obtusè angulatâ, anticè rotundâ; valvulis subtenuibus, anticè paulisper crassioribus; natibus prominulis; epidermide vel luteâ vel luteo-fuscâ, politâ, radiis obliquis viridis vestitis; dentibus cardinalibus parvis, compressis, acuminatis, crenulatis, in utroque valvulo duplicibus; lateralibus sublongis, lamellatis, subobliquis corrugatisque; margaritâ albidâ et splendidâ iridescente.

Shell smooth, elliptical, compressed, inequilateral, obtusely angular behind, round before; valves rather thin, a little thicker before; beaks a little prominent; epidermis yellow or yellowish brown, polished, covered with oblique greenish rays; cardinal teeth small, compressed, pointed, crenulate and double in both valves;

lateral teeth rather long, lamellar, suboblique and corrugate; nacre whitish and splendidly iridescent.

Proc. Acad. Nat. Sci., 1861, p. 393.

*Hab.*—Ogechee River, Georgia, Major Le Conte and J. G. Anthony.

My cabinet and cabinet of Mr. Anthony.

Diam. .6,

Length 1,

Breadth 1.5 inch.

Shell smooth, elliptical, compressed, inequilateral, obtusely angular behind, round before; substance of the shell rather thin, rather thicker before; beaks a little prominent; ligament small, thin and light brown; epidermis yellowish or yellowish brown, polished and nearly covered with oblique green rays, some broad and others almost capillary, with distant marks of growth; umbonial slope slightly raised and very obtusely angular; posterior slope narrow elliptical, raised into a carina, covered with numerous small rays; cardinal teeth small, compressed, acuminate, crenulate and double in both valves; lateral teeth rather long, lamellar, somewhat oblique and corrugate; anterior cicatrices distinct, rather large and well impressed; posterior cicatrices confluent, moderately large and slightly impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell rather shallow and wide; cavity of the beaks rather shallow and angular; nacre rich satin-like and splendidly iridescent.

*Remarks.*—I have two specimens before me and neither may be full grown. The larger is more perfect and has fine green rays nearly covering the disk to the margin. These are so strong that they are visible in the interior through the nacre, which is of remarkable beauty and brilliancy. The smaller and more imperfect one I have had in my possession for some years, but, although satisfied it was new, I still recognized it as young and imperfect. The better one from Mr. Anthony, which is figured, is an inch and six-tenths wide by one inch long, and may not be full grown. In outline it is almost exactly the same with *U. Boroughianus*, (nobis,) from South America, but is not quite so angular posteriorly and is more regularly rounded before. It reminds one also of a young *crassidens*, Lam., and *Forbesianus*, (nobis,) but it is more compressed and is not triangular in the outline as they both are.

UNIO NORTHAMPTONENSIS. Pl. 25, fig. 260.

Testâ lævi, oblongâ, valdè compressâ, ad latere planulatâ, posticè obtusè biangulari, anticè obliquè rotundatâ, valdè inæquilaterali; valvulis suberassis, anticè crassioribus; natibus prominulis; epidermide vel ochraceâ vel luteo-fuscâ, obliquè radiatâ; dentibus cardinalibus crassis, striatis, in utroque valvulo duplicibus; lateralibus prælongis, validis, corrugatis, subrectis lamellatisque; margaritâ vel albâ vel purpurecente vel salmonis colore tinctâ et valdè iridescente.

Shell smooth, oblong, very much compressed, flattened at the side, obtusely biangular behind and very inequilateral; valves somewhat thick, thicker before; beaks





*perplexus*, (nobis,) but, on looking over his specimens and examining them closely, he had "come to the conclusion that the shell in question is not a *perplexus*;" and he says, "it is common in the Wabash River, and found on the sand and gravel bars, but never in the mud. On the examination of the mature specimens, I no longer had any doubts of its being distinct from *perplexus* and *Rangianus*, to both which it is closely allied in outline. It may at once be distinguished from the former by its being devoid of tubercles, and from the latter by being more robust, more inflated and in being more quadrate. In the young state it closely resembles also *sulcatus*, (nobis,) being covered like that species with green capillary rays. Usually these rays are not so strong on the anterior portion as on the middle and posterior portion. It reminds one also of *turgidulus*, (nobis,) but it has not the angular umbonial slope, and the outline differs. The female has an expansion at the posterior margin more like that of *Rangianus* than *perplexus*. The undulations of the tips of the beaks are so small and imperfect as only to be observed with the microscope. I have great pleasure in naming this species after Mr. James Sampson, who has done so much to develop the natural history of the portion of Indiana where he resides.

UNIO MACRODON. Pl. 26, fig. 262.

Testâ lævi, triangulari, compressâ, subæquilaterali, posticè angulatâ; valvulis subcrassis; natibus subelevatis, ad apices minutè undulatis; epidermide luteolâ, striatâ; dentibus cardinalibus permagnis, subcompressis, elevatis, obliquis crenulatisque; lateralibus longis rectisque; margaritâ argenteâ et iridescente.

Shell smooth, triangular, compressed, nearly equilateral, angular behind; valves rather thick; beaks somewhat raised, minutely undulate at the tips; epidermis yellowish, striate; cardinal teeth very large, somewhat compressed, raised, oblique and crenulate; lateral teeth long and straight; naere silvery white and iridescent.

Proc. Acad. Nat. Sci., 1859, p. 154.

*Hab.*—Rutersville, Texas, Prof. C. G. Forshey.

Cabinet of Smithsonian Institution.

Diam. .5,

Length 1,

Breadth 1.7 inch.

Shell smooth, triangular, compressed, nearly equilateral, angular behind and obliquely rounded before; substance of the shell rather thick; beaks somewhat raised, with a few very small undulations at the tips; ligament rather short and thick; epidermis yellowish and striate; umbonial slope slightly raised and somewhat angular; posterior slope narrow and but slightly raised; cardinal teeth double in the left valve, very large, somewhat compressed, raised, oblique, crenulate, in the right valve single, not so large and more compressed; lateral teeth long, straight and rather thickened towards the end; anterior cicatrices distinct and deeply impressed; posterior cicatrices distinct and well impressed; dorsal cicatrices deeply impressed,

passing from the centre of the cavity of the beaks, obliquely, at the base of the cardinal tooth; palleal cicatrix well impressed; cavity of the shell shallow and rather wide; cavity of the beaks shallow and subangular; nacre silvery white and iridescent.

*Remarks.*—Two valves,—right and left,—belonging to different individuals, both bleached and nearly deprived of the epidermis, were all which were received from Prof. Forshey by the Smithsonian Institution some years since. I had been greatly in hopes of getting better specimens from the Professor to make a description from, but he has not, during the last year, been able to find others. Therefore, neither the description nor figure are as perfect as could be desired. It is remarkable for its outline, which will at once call to mind the form of many species of the marine genus *Tellina*. The most striking characteristic is the form, size and place of the cardinal teeth. In the left valve the tooth is very large and double, and the posterior half is the largest and is placed in part posteriorly to the point of the beak. In the right valve the cardinal tooth is single, more compressed and placed anteriorly to the point of the beak. The peculiarity in the form of these teeth causes the plate to be diminished to a mere line. The superior anterior cicatrix in one valve is distinct from the great one below, in the other valve it is nearly so. I have no doubt that they will be found in most specimens to be distinct. In both they are deeply impressed. It is to be greatly regretted the specimens were not in a better condition. The epidermis being much bleached and worn cannot be described with any degree of certainty; but there remains enough to satisfy us that it will be found in perfect specimens to be yellowish, probably straw yellow, and it may have some rays, but these valves do not display any sign of them. The beak of one valve has the remains of small undulations at the tip. It is nearest in outline to *U. crassidens*, Lam., but it resembles it in few other characters. The character of the cardinal and lateral teeth are totally different.

UNIO HEERMANNII. Pl. 26, fig. 263.

Testâ alatâ, lævi, ellipticâ, compressâ, valdè inæquilaterali, posticè obtusè biangulatâ, anticè rotundâ; valvulis subtenuibus, anticè irregulariter crassioribus; natibus prominulis, vix undulatis; epidermide luteo-fuscâ, micanti, eradiatâ; dentibus cardinalibus parvis, subconicis, crenulatis, in utroque valvulo duplicibus; lateralibus longis, lamellatis subrectisque; margaritâ pallido-salmoniâ, purpurecente et intensè iridescente.

Shell winged, smooth, elliptical, compressed, very inequilateral, obtusely biangular behind, round before; valves rather thin, irregularly thickened before; beaks a little prominent, scarcely undulate; epidermis yellowish brown, shining and without rays; cardinal teeth small, subconical, crenulate and double in both valves; lateral teeth long, lamellar and nearly straight; nacre pale salmon and purplish, and exceedingly iridescent.



*Hab.*—Medina River, Texas, A. L. Heermann, M. D.

My cabinet and cabinets of Academy of Natural Sciences and Dr. Heermann.

Diam. .8,                                      Length 1.6,                                      Breadth 2.5 inches.

Shell winged, smooth, elliptical, compressed, very inequilateral, obtusely biangular behind, round before; substance of the shell rather thin, irregularly thickened before; beaks a little prominent, scarcely undulate at the tips; ligament rather short and light brown; epidermis yellowish brown; light towards the beaks, shining, without rays, with well marked distant lines of growth; umbonial slope slightly raised and rounded; posterior slope raised into a wing, with two obscurely impressed lines from the tips to the margin on each valve; cardinal teeth small, somewhat conical, crenulate and double in both valves; lateral teeth long, lamellar and nearly straight; anterior cicatrices distinct, moderately impressed and rather large; posterior cicatrices confluent, large and very slightly impressed; dorsal cicatrices in a row above the centre of the cavity of the beaks; cavity of the shell shallow and wide; cavity of the beaks not deep, obtusely angular; nacre pale salmon and purplish, and exceedingly iridescent on the posterior half of the disk.

*Remarks.*—Several specimens were brought by Dr. Heermann, three of which I have before me, all of different ages. It is not easily confounded with any other species, and is more nearly allied to *alatus*, Say, than any other of our North American species. It is, however, by no means so high in the wing, is of a different outline, and a very much smaller species. In outline it is nearest to *generosus*, Gould, but it is not of so regular an ellipse, approaching, indeed, to oblongation. In the cardinal teeth they are totally different, those of *generosus* being long and lamellar, and being single in the left valve. In the youngest specimen the ligament is concealed, in the older ones it is apparent. The nacre of *Heermannii* is very remarkable. It is beautifully iridescent, and a purple hue generally pervades the disk, the cavity of the beaks taking on a salmon tint. The thickening portion of the cavity is irregular, but in each there is a ridge running obliquely from the cavity of the beaks to the basal margin, stronger in the oldest than in the youngest specimen. The undulations of the tips are so minute as scarcely to be observed. The lines of growth are well marked and distant. I name this after our fellow-member, Dr. Heermann, who has for many years been actively collecting and adding many valuable specimens in various branches of natural history to the collection of our Academy.

UNIO AUREUS. Pl. 26, fig. 264.

Testâ lævi, subtriangulari, compressâ, ad latere paulisper planulatâ, subinaequilaterali; valvulis subcrassis, anticè crassioribus; natibus subelevatis, ad apices acuminatis; epidermide aureâ, striatâ, obsolete radiatâ; dentibus cardinalibus crassis, erectis, striatis, in utroque valvulo duplicibus; lateralibus curtis et obliquis; margaritâ albâ et iridescente.

Shell smooth, subtriangular, compressed, a little flattened on the sides, somewhat inequilateral; valves rather thick, thicker before; beaks rather raised and sharp at the tip; epidermis golden yellow, striate and with obsolete rays; cardinal teeth thick, erect, striate, double in both valves; lateral teeth short and oblique; nacre white and iridescent.

Proc. Acad. Nat. Sci., 1859, p. 112.

*Hab.*—Texas, W. Newcomb, M. D.

Cabinet of Dr. Newcomb.

Diam. .6,

Length 1.1,

Breadth 1.5 inch.

Shell smooth, subtriangular, compressed, flattened a little at the sides, somewhat inequilateral; substance of the shell rather thick, thicker before; beaks rather elevated and acuminate at the tips; ligament short and rather thick; epidermis golden yellow, transversely striate, with a few small, indistinct rays and rather distant marks of growth; umbonial slope slightly raised and rounded; cardinal teeth thick, erect, striate, double in both valves; lateral teeth rather thick, short and oblique; anterior cicatrices distinct and well impressed; posterior cicatrices large and confluent; dorsal cicatrices placed under the plate posterior to the cardinal teeth; cavity of the shell rather shallow; cavity of the beaks very deep and angular; nacre white and iridescent.

*Remarks.*—A single specimen only of this species is before me, sent for my examination by Dr. Newcomb. It has an unusual golden tint in the epidermis, stronger on the posterior slope. On this specimen a few small rays may be seen. The beaks are too much eroded to decide as to undulations on the tips. It is closely allied to *rubiginosus*, (nobis,) but seems to be a smaller species and more rotund. It also resembles *Schoolcraftensis*, (nobis,) but it has no tubercles, is devoid of the broad green ray of that species and is not so high in the keel of the posterior slope. There is some resemblance to *petrinus*, Gould, but it is not so round, nor so ponderous, nor so much inflated, nor is the color of the epidermis of so light and bright a yellow.

UNIO CHUNII. Pl. 27, fig. 265.

Testâ lævi, triangulari, inflatâ, ad umbones subtumidâ, posticè obtusè angulatâ, anticè rotundâ, subæquilaterali; valvulis suberassis, anticè crassioribus; natibus subprominentibus, subincurvis, ad apices paulisper undulatis; epidermide rufo-fuscâ, obsoletè radiatâ; dentibus cardinalibus subgrandibus, subcompressis corrugatisque; lateralibus suberassis, corrugatis, subeurtis subrectisque; margaritâ vel albâ vel rosacèâ vel salmoniâ et valdè iridescente.

Shell smooth, triangular, inflated, somewhat swollen on the umbones, obtusely angular behind and round before, nearly equilateral; valves rather thick, thicker before; beaks somewhat prominent, slightly incurved and slightly undulate at the tips; epidermis reddish brown and obscurely radiate; cardinal teeth somewhat large,

slightly compressed and corrugate; lateral teeth rather thick, corrugate, rather short and nearly straight; nacre white, rose color or salmon and very iridescent.

Proc. Acad. Nat. Sci., 1861, p. 392.

*Hab.*—Dallas, Texas, Prof. C. G. Forshey.

My cabinet and cabinet of Prof. Forshey.

Diam. 1.1,

Length 1.6,

Breadth 2 inches.

Shell smooth, triangular, inflated, slightly swollen at the beaks, obtusely angular behind and rounded before, nearly equilateral; substance of the shell rather thick, thicker before; beaks somewhat prominent, somewhat incurved, with a few rather coarse undulations at the tips; ligament rather long and dark brown; epidermis reddish brown, obscurely radiate, with somewhat distant, broad marks of growth; umbonial slope somewhat raised and obtusely angular; posterior slope rather broad, elongately cordate, with two somewhat rugose lines on each valve from the beaks to margin; cardinal teeth rather large, somewhat compressed and corrugate; lateral teeth rather thick, corrugate, rather short and nearly straight; anterior cicatrices large, distinct and well impressed; posterior cicatrices rather large, distinct and moderately well impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell rather deep and rounded; cavity of the beaks deep and angular; nacre white, salmon or rose color and very iridescent.

*Remarks.*—Several specimens of different ages were received among the shells from Prof. Forshey. The species is closely allied to *trigonus*, (nobis,) and is near to *Riddelli*, herein described. It may be distinguished from *trigonus* by its being more lenticular in its form and not having so sharp an umbonial slope. From *Riddelli* it may be distinguished by the want of the high beaks, the color of the epidermis and the undulations of the beaks, which, in the above described species are few, as in *trigonus*, and follow down the angle of the umbonial slope. On all the specimens before me there are a few very indistinct rays over the disk.

#### UNIO ANTHONYI. Pl. 27, fig. 266.

Testâ lævi, ellipticâ, inflatâ, ad latere planiusculâ, posticè obtusè biangulatâ, anticè rotundatâ, inæquilaterali; valvulis subtenuibus, anticè paulisper crassioribus; natibus prominulis; epidermide luteo-olivâ, eradiatâ; dentibus cardinalibus parvis, obliquis, subcompressis crenulatisque; lateralibus longis, lamellatis subcurvisque; margaritâ cæruleo-albâ et iridescente.

Shell smooth, elliptical, inflated, slightly flattened at the sides, obtusely biangular behind and rounded before, inequilateral; valves rather thin, and slightly thicker before; beaks somewhat prominent; epidermis yellowish olive, without rays; cardinal teeth small, oblique, somewhat compressed and crenulate; lateral teeth long, lamellar and somewhat curved; nacre bluish white and iridescent.

Proc. Acad. Nat. Sci., 1861, p. 41

*Hab.*—Florida, J. G. Anthony.

My cabinet and cabinet of Mr. Anthony.

Diam. .9,

Length 1.4,

Breadth 2.3 inches.

Shell smooth, elliptical, inflated, slightly flattened at the sides, obtusely biangular behind, rounded before, inequilateral; substance of the shell rather thin, slightly thicker before; beaks somewhat prominent; ligament rather long, somewhat thick and brown; epidermis yellowish olive, without rays, shining, with rather distant marks of growth; umbonial slope raised into a somewhat acute angle; posterior slope wide, elliptical, subcarinate, darker than the side and furnished with corrugate folds; cardinal teeth small, oblique, slightly compressed, striate and crenulate; lateral teeth long, lamellar and somewhat curved; anterior cicatrices distinct, rather large and well impressed; posterior cicatrices confluent, large and slightly impressed; dorsal cicatrices placed under the plate over the cavity of the beaks; cavity of the shell rather deep and wide; cavity of the beaks somewhat deep and obtusely angular; nacre bluish white and iridescent.

*Remarks.*—A single specimen only is before me, and this is so imperfect at the beaks as to preclude a knowledge of the undulations of the tips. I know of no species which this closely resembles. At first view it reminds one of *Margaritina marginata* (*Alasmodonta marginata*, Say,) having a broad posterior slope with corrugate folds, but it has not the colored markings of the species on the sides. In the teeth of course they entirely differ, *Anthonyi* having regular, large, lamellar lateral teeth. With a single specimen it is very difficult to decide upon unusual characters. The specimen before me has irregular scattered corrugate folds on the whole of the posterior slope, which, if persistent and increased in size in most individuals, would properly place it in the *plicate* group. The epidermis of this specimen has been varnished, and some of its characters injured thereby, giving it a false polish and plastering down the striæ which usually exist along the basal margin. In this specimen the lines of growth are four. I name it after Mr. J. G. Anthony, to whom I am indebted for the specimen. He mentions having received five or six individuals from Florida.

UNIO RIDDELLII. Pl. 27, fig. 267.

Testâ lævi, subtriangulari, valdè inflatâ, ad umbones tumidâ, posticè obtusè angulatâ, anticè rotundâ, subæquilaterali; valvulis crassis, anticè paulisper crassioribus; natibus valdè prominentibus, incurvis, ad apices plieis parvis indutis; epidermide fusco-olivâ, obsoletè radiatâ; dentibus cardinalibus parviuseulis, subpyramidatis corrugatisque; lateralibus crassis, corrugatis, eurtis subeuvisque; margaritâ albâ et irideseente.

Shell smooth, subtriangular, very much inflated, swollen at the umbones, obtusely angular behind, round before and subequilateral; valves thick, slightly thicker before; beaks very prominent, incurved, covered at the tips with small folds; epidermis brownish olive, obscurely radiate; cardinal teeth somewhat small. subpyra-



*Hab.*—Stewart's Mill Dam. Union County, North Carolina, Dr. Genth.

My cabinet.

Diam. 1.1,

Length 1.5,

Breadth 3 inches.

Shell smooth, widely elliptical, inflated, inequilateral, obliquely angular behind, rounded before; substance of the shell rather thick, thicker before; beaks rather prominent; ligament rather large and dark brown; epidermis dark brown, lighter towards the margin, with many obscure rays, shining, with distant, well marked lines of growth; umbonial slope inflated and rounded; posterior slope flattish, with two obscure, impressed lines on each valve from the beaks to the margin on both valves; cardinal teeth rather large, compressed and crenulate; lateral teeth long, lamellar and nearly straight; anterior cicatrices distinct, large and well impressed; posterior cicatrices confluent, large and very slightly impressed; dorsal cicatrices placed across the centre of the cavity of the beaks; cavity of the shell deep and wide; cavity of the beaks rather deep and rounded; nacre salmon color and very iridescent.

*Remarks*—A single specimen only was obtained by Dr. Genth. It belongs to the group of which *Nashvillensis* (nobis) may be considered the type. This is probably a male, and it very closely resembles the male of *Nashvillensis*. It also reminds one of *concestator* and *Whiteianus*, (nobis,) as well also *Mississippiensis*, Con. It is wider than the two first, but not so wide as the last. The rays are numerous and close over the posterior half, but are dark and somewhat obscure in this specimen. In others they may be better developed, particularly in younger specimens. In older individuals they may be more obscure. The nacre of this specimen is of a fine rich salmon. In other individuals the nacre may be found to be purple and white. The beaks are too much eroded to make out the undulations of the tips. In this specimen there is a small thin division of the cardinal tooth in the left and a well defined double tooth in the right valve. Other specimens may not always present this triple cardinal tooth.

UNIO SQUAMEUS. Pl. 28, fig. 269.

Testâ lævi, suboblongâ, valdè compressâ, inæquilaterali, posticè obtusè biangulatâ, anticè rotundatâ; valvulis suberassis, anticè paulisper crassioribus; natibus prominulis; epidermide vel rufo-fuscâ vel tenebroso-fuscâ, striatâ, infernè squamosâ, obsoletè radiatâ; dentibus cardinalibus subgrandibus, compressis, striatis, in utroque valvulo subduplicibus; lateralibus prælongis, lamellatis, obliquis subrectisque; margaritâ albâ et valdè iridescente.

Shell smooth, suboblong, very much compressed, equilateral, obtusely biangular behind, rounded before; valves rather thick, slightly thicker before; beaks a little prominent; epidermis reddish brown or dark brown, striate, squamose below, obscurely radiate; cardinal teeth rather large, compressed, striate, somewhat double in

both valves; lateral teeth very long, lamellar, oblique and nearly straight; nacre white and very iridescent.

Proc. Acad. Nat. Sci., 1861, p. 391.

*Hab.*—North Carolina, J. G. Anthony.

My cabinet and cabinet of Mr. Anthony.

Diam. 1·1,

Length 1·9,

Breadth 3·8 inches.

Shell smooth, suboblong, very much compressed, flattened at the sides, inequilateral, obtusely biangular behind, rounded before; substance of the shell rather thick, slightly thicker before; beaks slightly prominent; ligament long, thick and brown; epidermis reddish brown or dark brown, transversely striate, with distant lines of growth, scaly below, obscurely rayed; umbonial slope slightly raised and rounded; posterior slope narrow, elliptical, carinate, with an impressed line; cardinal teeth rather large, compressed, striate, slightly double in the right as it is in the left valve; anterior cicatrices distinct, exceedingly large, rough and well impressed; posterior cicatrices confluent, large and moderately impressed; dorsal cicatrices placed immediately over the centre of the cavity of the beaks; cavity of the shell very shallow and very wide; cavity of the beaks very shallow and rounded; nacre white and very iridescent.

*Remarks.*—Two specimens were sent to me by Mr. Anthony. The beaks of both much eroded, and therefore the undulations cannot be noticed. The larger is a reddish brown, the other a dark brown. In outline this species is closely allied to *funatus*, (nobis,) but that is a smaller species, and has a smooth, close, nearly black epidermis, while *squamus* is roughly striate below and squamose, like *percoarctatus*, (nobis,) but not quite to such an extent, nor is it quite so much flattened at the sides as *percoarctatus*, while it is more inclined to be elliptical. It is also thicker in the substance of the valves and has larger teeth. Both the specimens have white nacre. The cardinal teeth have the cleft nearly perpendicular.

#### UNIO ROSTRUM. Pl. 29, fig. 270.

Testâ lævi, subtriangulari, ad latere planulatâ, valdè inæquilaterali, posticè subbiangulatâ, anticè rotundâ; valvulis crassiusculis, anticè paulisper crassioribus; natibus prominulis; epidermide tenebroso-fuscâ, nigricante, eradiatâ; dentibus cardinalibus parvis, sulcatis, crenulatis, in utroque valvulo duplicibus; lateralibus longis, lamellatis subcurvisque; margaritâ albidâ et iridescente.

Shell smooth, subtriangular, flattened at the side, very inequilateral, subbiangular behind, round before; valves somewhat thick, slightly thicker before; beaks slightly prominent; epidermis dark brown, nearly black, without rays; cardinal teeth small, sulcate, crenulate, double in both valves; lateral teeth long, lamellar and somewhat curved; nacre whitish and iridescent.

Proc. Acad. Nat. Sci. 1861. p. 391.

*Hab.*—Davidson County, North Carolina, Dr. Genth.

My cabinet.

Diam. .8,

Length 1.3,

Breadth 2.4 inches.

Shell smooth, subtriangular, flattened at the sides, very inequilateral, subbiangular behind, round before; substance of the shell somewhat thick, slightly thicker before; beaks slightly prominent; ligament rather short, thick and dark brown; epidermis dark brown, nearly black, without rays, with indistinct rather distant lines of growth, striate on the lower portion; umbonial slope raised and obtusely angular; posterior slope slightly flattened, with an obscure wide furrow from the beaks to the margin on each valve; cardinal teeth small, sulcate, crenulate, subconical and double in both valves; lateral teeth long, lamellar, corrugate and somewhat curved; anterior cicatrices distinct, rather large and well impressed; posterior cicatrices confluent, large and slightly impressed; dorsal cicatrices placed above the centre of the cavity of the shell; cavity of the shell rather deep and wide; cavity of the beaks shallow and rounded; nacre whitish and iridescent.

*Remarks.*—A single specimen only is before me. This species belongs to the *complanatus* group, and is, perhaps, nearest to *fumatus*, (nobis,) but is not so raised on the posterior slope. It reminds one of a young *crassidens*, Lam., but the teeth are by no means so large. The beaks being eroded, it could not be ascertained if the tips are undulate. The nacre of this specimen is whitish, with clouded epidermal matter. Other specimens may prove to be purple and salmon.

UNIO MACER. Pl. 29, fig. 271.

Testâ lævi, oblongâ, compressissimâ, valdè inæquilaterali, posticè subbiangulatâ; valvulis tenuibus; natibus parvis, acuminatis, ad apices undulatis; epidermide fuscâ, nitidâ, valdè radiatâ; dentibus cardinalibus parvis, tuberculatis; lateralibus prælongis, attenuatis, lamellatis subrectisque; margaritâ purpureâ et iridescente.

Shell smooth, oblong, very much compressed, very inequilateral, subbiangular behind; valves thin; beaks small, acuminate and undulate at the tips; epidermis brown, shining, very much rayed; cardinal teeth small, tuberculate; lateral teeth very long, attenuate, lamellar and nearly straight; nacre purple and iridescent.

Proc. Acad. Nat. Sci., 1857, p. 86.

*Hab.*—Roanoke River, Weldon North Carolina, Prof. Emmons.

My cabinet and cabinet of Prof. Emmons.

Diam. .6,

Length 1.4,

Breadth 2.8 inches.

Shell smooth, oblong, very much compressed, very inequilateral, subbiangular behind and obliquely rounded before; substance of the shell thin, somewhat thicker before; beaks small, acuminate and transversely undulate at the tips; ligament rather thin, long and dark brown; epidermis brown, shining, very much rayed,



with very distant marks of growth; umbonial slope very low and very obtusely angular; posterior slope very much compressed, very dark and raised into a high carina; cardinal teeth small, tuberculate and double in both valves; lateral teeth very long, attenuate, lamellar and nearly straight; anterior cicatrices distinct, large, well impressed; posterior cicatrices confluent, large and slightly impressed; dorsal cicatrices deeply impressed, in a row across the centre of the cavity of the beaks; cavity of the shell very shallow and very wide; cavity of the beaks very shallow and obtusely angular; nacre purple and iridescent.

*Remarks.*—Several imperfect specimens were among the shells from Weldon. It belongs to the great *complanatus* group, and closely resembles the compressed wide varieties. It is nearly allied to *Roanokensis*, (nobis.) When I published the description of the *macer* in the Proc. Acad. Nat. Sci. I had not seen the specimen of a single valve which Prof. Emmons since sent to me from the Neuse River near Raleigh. This valve seems to be of the same species, but it is very much larger and heavier, while the outline and general appearance is the same. This valve has a very strong resemblance to *Roanokensis*, and it may prove to be of that species. This species is so high on the posterior slope as to appear winged, and the young take an obovate form.

UNIO CONTRACTUS. Pl. 29, fig. 272.

Testâ lævi, ellipticâ, valdè compressâ, valdè inæquilaterali, posticè subrotundatâ; valvulis tenuibus; natibus depressis, ad apices undulatis; epidermide tenebroso-fuscâ, obsoletè radiatâ; dentibus cardinalibus parvis, tuberculatis; lateralibus longis, lamellatis rectisque; margaritâ vel albâ vel purpureâ et iridescente.

Shell smooth, elliptical, very much compressed, very inequilateral, subrotund behind; valves thin; beaks depressed, undulate at the tips; epidermis dark brown, obscurely radiate; cardinal teeth small, tuberculate; lateral teeth long, lamellar and straight; nacre white or purple and iridescent.

Proc. Acad. Nat. Sci., 1857, p. 86.

*Hab.*—Roanoke River, Weldon, North Carolina, Prof. E. Emmons.

My cabinet and cabinet of Prof. Emmons.

Diam. .3,                                      Length .8,                                      Breadth 1.7 inch.

Shell smooth, elliptical, very much compressed, very inequilateral, subrotund behind; substance of the shell thin; beaks depressed, undulate at the tips; ligament rather long, thin and light brown; epidermis dark brown, striate, obscurely rayed, with distant lines of growth; umbonial slope very slightly raised, obscurely angular; posterior slope very much compressed, elevated into a carina; cardinal teeth small, tuberculate, crenulate and disposed to be double in both valves; lateral teeth long, lamellar and straight; anterior cicatrices distinct, small and

slightly impressed; posterior cicatrices confluent, small and very slightly impressed; dorsal cicatrices placed above the centre of the cavity of the beaks; cavity of the shell very shallow; cavity of the beaks very shallow and obtusely angular; nacre white or purple and iridescent.

*Remarks.*—This is a small, very much compressed species, and is allied in outline to *subgibbosus*, (nobis,) but has not thick valves as that species has. It is also more rounded at the posterior margin. Among the numerous new species sent to me by Prof. Emmons were several smaller specimens of this species, which do not appear to me to be quite adult.

UNIO BEALEI. Pl. 30, fig. 273.

Testâ lævi, ellipticâ, subcompressâ, inæquilaterali, posticè obtusè angulatâ, anticè rotundatâ; valvulis crassiuseculis, anticè crassioribus; natibus promiunlis; epidermide vel tenebroso-fuscâ vel nigricente, obsoletè radiatâ; dentibus cardinalibus parvis, compressis, crenulatis, acuminatis, in utroque valvulo duplicibus; lateralibus prælongis, subcurvis, lamellatis; margaritâ vel albâ vel dilutè salmoniâ et valdè iridescente.

Shell smooth, elliptical, somewhat compressed, inequilateral, obtusely angular behind, rounded before; valves slightly thickened, thicker before; beaks a little prominent; epidermis dark brown or blackish, obscurely radiate; cardinal teeth small, compressed, crenulate, pointed and double in both valves; lateral teeth very long, slightly curved and lamellar; nacre white or pale salmon and very iridescent.

Proc. Acad. Nat. Sci., 1862, p. 169.

*Hab.*—Leon County, Texas, Lieut. E. F. Beale, U. S. Navy. Rutersville, Texas, Prof. Forshey.

My cabinet and cabinets of Smithsonian Institution and Prof. Forshey.

Diam. .6, Length 1, Breadth 1.7 inches.

Shell smooth, elliptical, somewhat compressed, inequilateral, obtusely angular behind, rounded before; substance of the shell slightly thickened, thicker before; beaks a little prominent; ligament rather short, thin and dark brown; epidermis dark brown or blackish, obscurely radiate and with distant marks of growth; umbonial slope slightly raised and rounded; posterior slope very narrow, slightly raised, with two lines on a lighter ground from the beaks to the margin; cardinal teeth small, compressed, crenulate, pointed and double in both valves; lateral teeth very long, slightly curved and lamellar; anterior cicatrices distinct, rather large and moderately impressed; posterior cicatrices confluent and very slightly impressed; dorsal cicatrices placed nearly across the centre of the cavity of the beaks; cavity of the shell shallow and wide; cavity of the beaks shallow and obtusely angular; nacre white or pale salmon and very iridescent.

*Remarks.*—Quite a number of this species was brought by Lieut. Beale. A

single one was sent to me, among other molluscs, by Prof. Forshey. This specimen is larger than any from Lieut. Beale, and is more inflated, but it is very imperfect. It is two inches and four-tenths wide, while the largest from Lieut. Beale is one inch and three-tenths. None of them had beaks perfect enough to observe the form of undulations of the tips, but they appear to be concentric, somewhat like the *parvus*, Barnes, to which group it seems to belong. It is allied to *Texasensis*, (nobis,) but of a darker color, more lenticular, not being so transverse. It also has affinities to *callosus*, (nobis.) The nacre is rich in all the specimens, and most of them are disposed to be slightly salmon-colored in the cavity of the beaks. In some cases the salmon tint pervades the whole area. I name this after Lieut. Beale, of the United States Navy, who obtained specimens while on his professional duty in the State of Texas.

UNIO GRANDIDENS. Pl. 30, fig. 274.

Testâ valdè tuberculatâ, obliquâ, ad umbones inflatâ; valvulis crassissimis, anticè crassioribus; uatibus valdè tumidis terminalibusque; epidermide fuscâ; dentibus cardinalibus pergrandis, percrassis corrugatisque; lateralibus crassis, sublongis, obliquis et valdè corrugatis; margaritâ albâ et iridescente.

Shell very much tuberculate, oblique, inflated at the umbones; valves very thick, thicker before; beaks very much swollen and terminal; epidermis brown; cardinal teeth very large, very thick and corrugate; lateral teeth thick, rather long, oblique and very rough; nacre white and iridescent.

Proc. Acad. Nat. Sci., 1862, p. 168.

*Hab.*—Near Hot Springs, Arkansas, Byrd Powell, M. D.

My cabinet and cabinet of Smithsonian Institution.

Diam. 1·7,

Length 2·6,

Breadth 3·6 inches.

Shell very much tuberculate over nearly the whole disk, oblique, inflated on the umbones; substance of the shell very thick, thicker before; beaks very much swollen, very much raised, incurved and terminal; ligament thick and long; epidermis brown and with distant marks of growth; umbonial slope raised and rough; posterior slope rather wide, corrugate, with oblique folds from the beaks to basal margin; cardinal teeth double in both valves, very large, very thick, corrugate and longitudinally and roughly striate; lateral teeth disposed to double in both valves, thick, rather long, oblique and very rough; anterior cicatrices distinct, large, very deeply impressed and corrugate; posterior cicatrices large, distinct and well impressed; dorsal cicatrices in a long row near the edge above the cavity of the beaks; cavity of the shell deep and rounded; cavity of the beaks very deep and angular; nacre white and iridescent.

*Remarks.*—Two opposed valves of different individuals of nearly the same size are before me. They were sent by Dr. Powell to the Smithsonian Institution

among other species from the vicinity of the Hot Springs of Arkansas. It is a very remarkable species, belonging that group of which *irroratus* (nobis) may be considered the type, judging from the general form and the outline. But, unfortunately, the epidermis on both valves is so much worn and deteriorated that the character of the markings cannot be observed. Perfect specimens may present minute greenish spots like *irroratus*, or the epidermis may be like *pustulosus*, (nobis.) More than one-half of the disk is covered with coarse tubercles, the remaining part, the umbonial and posterior slopes are covered with about ten rough, slightly curved folds. The beaks are very much raised and pointed, but they are so much eroded that the nature of the undulations cannot be observed. The most remarkable characteristics of this species is the enormous size and thickness of the cardinal teeth. From the point of the beaks perpendicularly to the end of this tooth in one specimen, the mass is one inch and four-tenths, and transversely it is one inch and five-tenths, while the valve itself is but three and seven-tenths by two and seven-tenths inches. Wood, in his "General Conchology," pl. 22, figs. 1—4, and in his "Index Testa." pl. 2, fig. 29, describes and figures a specimen, (*Mya nodulosa*,) in outline and tubercles very closely like this, but the lateral tooth has regular, equal, parallel striæ, which places it in *Prisodon*, Schum. = *Castalia*, Lam. The description is so short and imperfect as really to be useless, and the habitat is unknown.

In the Imperial Cabinet in Vienna, I saw, in 1853, opposed valves of two individuals of Wood's shell, the cardinal and lateral teeth of which were both regularly striate. It was there named *Chama plumbea*, Müllfeld. Prof. Fraunfeld, the able zoologist of the Museum, informed me that it had long been in the cabinet and its habitat was entirely unknown. (See my notice, Proc. Acad. Nat. Sci., vol. vi. p. 368.) In the MS. for my next edition of Synopsis, I have transferred Wood's *nodulosa* to the genus *Prisodon*. By the liberal permission of the Secretary of the Smithsonian Institution, one valve will remain in my collection.

UNIO ARKANSASENSIS. Pl. 30, fig. 275.

Testâ lævi, ovato-obliquâ, inæquilaterali, posticè compressâ et obtusè biangulatâ, anticè rotundâ; valvulis crassiusculis, anticè paulisper crassioribus; natibus subelevatis; epidermide flavescente, obsoletè radiatâ; dentibus cardinalibus parvis, striatis crenulatisque; lateralibus sublongis, subrectis subcrassisque; margaritâ albâ et valdè iridescente.

Shell smooth, ovately oblique, compressed behind, inequilateral, obtusely biangular behind and rounded before; valves somewhat thick, slightly thicker before; beaks somewhat raised; epidermis yellowish, obscurely radiated; cardinal teeth small, striate and crenulate; lateral teeth rather long, nearly straight and thick; nacre white and very iridescent.

*Hab.*—Near Hot Springs, Arkansas, Byrd Powell, M. D.

Cabinet of the Smithsonian Institution.

Diam. .7, Length 1.1, Breadth 1.5 inch.

Shell smooth, ovately oblique, compressed behind, inequilateral, obtusely biangular behind and round before; substance of the shell somewhat thick, thicker before; beaks somewhat raised and approaching to medial; ligament rather short; epidermis yellowish, inclining to greenish, with rather close marks of growth; umbonial slope slightly raised; posterior slope narrow elliptical, cardinal teeth small, striate, crenulate, double in the left and disposed to be treble in the right valve; lateral teeth rather long, nearly straight, and thickened towards the end; anterior cicatrices distinct and well impressed; posterior cicatrices distinct and moderately well impressed; dorsal cicatrices in a row on the upper side of the cavity of the beaks; cavity of the shell shallow and wide; cavity of the beaks shallow and obtusely angular; nacre pearly white and very iridescent.

*Remarks.*—A single specimen of this species was sent by Dr. Powell, and it is too imperfect to give the character of the undulations of the beaks. In outline it is nearest to *modicellus*, (nobis,) but it is a larger species and more compressed. It is nearly of the size of *Ravenellianus*, (nobis,) and is compressed like it, but it is not so oblique and the epidermis is more yellow.

UNIO SPECIOSUS. Pl. 31, fig. 276.

Testâ omninò tuberculatâ, ferè granulatâ, quadrangulari, valdè compressâ, ad laterè planulata, subæquilaterali, posticè subbiangulatâ et emarginatâ, auticè rotundatâ; valvulis suberassis, anticè paulisper crassioribus; natibus subelevatis, ad apices acuminatis et elegantissimè perundulatis; epidermide viridi-luteâ, substriatâ, vel obsoletè radiatâ vel eradiatâ, submicanti; dentibus cardinalibus subgrandibus, compressis, obliquis, erectis, striatis, in utroque valvulo duplicibus; lateraliibus rectis, sublongis obliquisque; margaritâ argenteâ et iridescente.

Shell covered with tubercles, almost granular, quadrangular, very much compressed, flattened at the sides, nearly equilateral, subbiangular and emarginate behind, rounded before; valves rather thick, slightly thicker before; beaks somewhat elevated, pointed and beautifully undulate at the tips; epidermis greenish yellow, substriate, obscurely radiate or without rays, somewhat shining; cardinal teeth rather large, compressed, oblique, erect, striate, double in both valves; lateral teeth straight, rather long and oblique; nacre silver white and iridescent.

Proc. Acad. Nat. Sci., 1862, p. 168.

*Hab.*—Colorado River, near Lagrange, Texas, Prof. Forshey; and Leon County, Texas, Lieut. E. F. Beale.

My cabinet and cabinet of Prof. Forshey and Smithsonian Institution.

Diam. .7, Length 1.5, Breadth 1.2 inch.

Shell covered over with small tubercles, almost granular, quadrangular, very much

compressed, flattened at the sides, nearly equilateral, subbiangular and emarginate behind, rounded before; substance of the shell rather thick, slightly thicker before; beaks somewhat elevated, pointed and beautifully undulate at the tips; ligament rather short and somewhat thick and light brown; epidermis greenish yellow, substriate, obscurely radiate or without rays, somewhat shining and with very distant marks of growth; umbonial slope slightly raised, obtusely angular and covered with nodes; posterior slope carinate, almost raised into a wing, covered with a series of nearly parallel, curved rows of elongated tubercles wider apart at the approach to the margin, depressed so as to cause a slight emargination; cardinal teeth rather large, compressed, oblique, erect, striate and double in both valves; lateral teeth straight, rather long, oblique and enlarged towards the end; anterior cicatrices distinct, rather large and well impressed; posterior cicatrices confluent, large and slightly impressed; dorsal cicatrices placed along the base of the cardinal tooth and above the cavity of the beaks; ventral cicatrices nearly in the centre of the disk and indistinctly marked; cavity of the disk very shallow and wide; cavity of the beak deep and angular; nacre silver white and iridescent.

*Remarks.*—Some time since I received two young specimens of this beautiful species from Prof. Forshey, and now have several adult and perfect specimens from the Smithsonian Institution. Hitherto I had doubts as to this being only a variety of *Forsheyi*, but these specimens from the Smithsonian Institution are conclusive as to their being specifically distinct. They are constant in the more quadrate form, in the smaller tubercles which might almost be considered granules, in the elevated carina and the more compressed form. I know of no species which is so much covered with small tubercles as this, except *apiculatus*, Say. Towards the tips these sometimes arrange themselves in rows, gracefully finishing off the points. In all the specimens before me the cicatrix of the ventral muscle is more or less obvious, while in a dozen of *Forsheyi* before me, there are none visible. There are many affinities in *speciosus* with Mr. Say's beautiful *apiculatus*, from Louisiana, which has, perhaps, the most highly ornamented exterior of any of our *Uniones*. It need not, however, be confounded with that shell, as it is more compressed, more transverse, and has smaller tubercles and a less elevated umbonial slope.

UNIO GERHARDTI. Pl. 31, fig. 277.

Testâ subsulcatâ, ellipticâ, subcompressâ, sublenticulari, inæquilaterali, posticè obtusè angulatâ, anticè rotundâ; valvulis crassiusculis, anticè paulisper crassioribus; natibus subelevatis; epidermide stramineâ, radiis capillaribus; dentibus cardinalibus parviusculis, compressis, in utroque valvulo duplicibus; lateralibus sublongis, lamellatis subcurvisque; margaritâ albâ et valdè iridescente.

Shell slightly sulcate, elliptical, rather compressed, sublenticular, obtusely angular behind, round before; valves somewhat thick, slightly thicker before; beaks somewhat raised; epidermis straw yellow, with capillary rays; cardinal teeth



My cabinet and cabinet of Smithsonian Institution.

Diam. .7,

Length 1.2,

Breadth 2.3 inches.

Shell smooth, broadly elliptical, compressed, biangular and compressed behind, rounded before, very inequilateral; beaks a little prominent; ligament rather long, thin and dark brown; epidermis dark brown, somewhat shining towards the beaks, without rays, with rather close lines of growth; umbonial slope very slightly raised and rounded; posterior slope very narrow-elliptical, compressed, carinate, with two slightly raised lines from the beaks to the margin; cardinal teeth very small, striate and crenulate, disposed to be double in both valves; lateral teeth very long and somewhat curved; anterior cicatrices distinct, rather small and moderately well impressed; posterior cicatrices confluent and but slightly impressed; dorsal cicatrices small, and placed nearly in the centre of the cavity of the beaks; cavity of the shell very shallow and wide; cavity of the beaks very shallow; nacre purple and very iridescent.

*Remarks.*—This species belongs to the group of which *complanatus* is the type. There are three specimens before me of different ages—the largest 2.7 inches wide. In outline it is very nearly the same as *viridiradiatus*, (nobis,) and like it the greater diameter is nearly in the middle of the disks, making it somewhat lenticular. It is, however, higher in the posterior slope and more carinate, and the color of the epidermis is totally different, and it is also destitute of rays. I name it after Dr. Mercer, who sent it, with many other species from Georgia, to the Smithsonian Institution.

MARGARITANA QUADRATA. Pl. 32, fig. 279.

Testâ lævi, oblongâ, subcompressâ, ad latere planulatâ, subæquilaterali, posticè obtusè angulatâ, anticè rotundâ; valvulis subtenuibus, anticè paulisper crassioribus; natibus prominulis, ad apices undulatis; epidermide luteolâ, viridi-radiatâ; dentibus cardinalibus subgrandibus, obliquis, compressis, triangularis, erectis subcurvisque; margaritâ albâ, supernè salmonis colore tinctâ, valdè iridescente.

Shell smooth, oblong, somewhat compressed, flattened at the side, nearly equilateral, obtusely angular behind, round before; valves rather thin, slightly thicker before; beaks slightly prominent, undulate at the tips; epidermis yellowish, with green rays; cardinal teeth rather large, oblique, compressed, triangular, erect and somewhat curved; nacre white, tinted with salmon color above and very iridescent.

Proc. Acad. Nat. Sci., 1861, p. 41.

*Hab.*—East Tennessee, President Estabrook.

My cabinet.

Diam. .5,

Length 1,

Breadth 1.5 inches.

Shell smooth, oblong, somewhat compressed, flattened at the side, nearly equilateral, obtusely angular behind, round before; substance of the shell rather thin,



slightly thicker before; beaks slightly prominent, rugosely undulate at the tips; ligament rather small and light brown; epidermis yellowish, shining, with green rays rather closely set on the posterior part, with distant marks of growth; umbonal slope raised, inflated and rounded; posterior slope raised into a keel, rather compressed, with two green rays on each valve passing from the beaks to the posterior margin along a wide furrow; cardinal teeth rather large, oblique, compressed, triangular, erect, lamellar and slightly curved upward; anterior cicatrices confluent, indistinct; posterior cicatrices confluent and very indistinct; dorsal cicatrices placed over the centre of the cavity of the beaks; cavity of the shell wide and shallow; cavity of the beaks rather shallow and subangular; nacre white, tinted with salmon color above and very iridescent.

*Remarks.*—The two specimens which are before me were received a long time since from the late President Estabrook. At first, as they came with specimens of *M. Holstonia*, (nobis,) I considered them as a quadrate variety; but I have never seen, among many of that species since received, any specimen which would connect the two; I am now satisfied they must be distinct. On comparison, it will be observed that this species is much more square than *Holstonia*, that it has larger and more lamellar teeth, which are large for the size of the valves; and are curved upwards towards the beak. Both lobes in the left valve are large, and are widely and deeply separated. In the older specimen the rays are distinct nearly over the whole disk, on the umbonal slope they are broader and run together. In smaller and younger specimens the rays are very indistinct.

MARGARITANA GESNERII. Pl. 32, fig. 280.

Testâ sulcatâ, quadratâ, inflatâ, posticè obtusè angulatâ, subequilaterali; valvulis subcrassis, anticè crassioribus; natibus subprominentibus; epidermide tenebroso-fuscâ, micante, obsolete radiatâ; dentibus cardinalibus parvis, lævibus, subcompressis, in utroque valvulo unicis; margaritâ albâ.

Shell sulcate, quadrate, inflated, obtusely angular behind, nearly equilateral; valves rather thick, thicker before; beaks somewhat prominent; epidermis dark brown, shining, obscurely radiate; cardinal teeth small, rather compressed and single in both valves; nacre white.

Proc. Acad. Nat. Sci., 1858, p. 138.

*Hab.*—Uphaupsee Creek, Alabama, below Columbia, Georgia, Wm. Gesner, M. D. and Mr. Hallenbeck.

My cabinet and cabinets of Drs. Gesner and Lewis, and Mr. Hallenbeck.

Diam. 1·5, Length 2·2, Breadth 3·7 inches.

Shell sulcate, quadrate, inflated, obtusely angular behind, nearly equilateral; substance of the shell rather thick, thicker before; beaks somewhat prominent; ligament large, rather short and dark brown; epidermis dark brown, shining, ob-



lations at the tips on each valve. It has not the acuminate recurved beaks of *Kennicottii*, herein described, nor is it so much inflated. It need not be confounded with that species. It is somewhat allied to *Oregonensis*, (nobis,) but is not so wide in proportion, nor so high in the carina, nor so much inflated below, and has much closer lines of growth. I dedicate this species to my friend, the late Sir George Simpson, Governor-in-Chief of the Hudson's Bay Company. I am personally indebted to him for specimens from Upper Canada and Columbia in former years, and he has at all times, with great liberality, promoted the objects of science, as well as those of geographical discovery in Arctic America in various ways.

ANODONTA VIRGULATA. Pl. 33, fig. 282.

Testâ lævi, ellipticâ, ventricosâ, inæquilaterali, posticè obtusè angulatâ; valvulis subtenuibus; natibus prominulis, ad apices undulatis; epidermide vittatâ, virido-radiatâ; margaritâ cæruleo-albâ et iridescente.

Shell smooth, elliptical, ventricose, inequilateral, obtusely angular behind; valves rather thin; beaks slightly prominent and undulate at the tips; epidermis banded, with green rays; nacre bluish white and iridescent.

Proc. Acad. Nat. Sci., 1857, p. 86.

*Hab.*—Roanoke River, Weldon, North Carolina, Prof. Emmons; and Washington County, Georgia, Rev. G. White.

My cabinet and cabinets of Prof. Emmons and Rev. G. White.

Diam. 1·3,

Length 1·7,

Breadth 3 inches.

Shell smooth, elliptical, ventricose, inequilateral, obtusely angular behind and rounded before; substance of the shell rather thin, slightly thickened before; beaks slightly prominent and undulate at the tips; ligament rather long, thick and dark brown; epidermis banded with green rays and very distant marks of growth; umbonial slope raised and rounded; posterior slope wide, dark, with three slightly raised lines on each valve; anterior cicatrices confluent, rather large and indistinctly impressed; posterior cicatrices confluent, large, scarcely perceptible; dorsal cicatrices very slightly impressed and placed nearly in the centre of the cavity of the beaks; cavity of the shell deep and broad; cavity of the beaks very shallow and very obtusely angular; nacre bluish white and iridescent.

*Remarks.*—I have several specimens before me from North Carolina and Georgia. That figured is from the Roanoke River, at Weldon, and is smaller than those from Georgia. It seems to be between *fluviatilis* and *decora*, and perhaps nearer to the latter, the plane of the valve forms a very regular ellipse. It is more inflated than *fluviatilis* usually is, and in the undulations of the beaks it differs, those of *virgulata* being more like *Ferussaciana*, (nobis.)

## ANODONTA KENNICOTTI. Pl. 33, fig. 283.

Testâ lævi, ellipticâ, subiufatâ, inæquilaterali, posticè obtusè biangulatâ, anticè rotundâ; valvulis subtenuibus; natibus prominentibus, acuminatis, ad apices granulatis; epidermide pallido-luteâ usque tenebroso-fuscâ, eradiatâ; margaritâ cæruleo-albâ et iridescente.

Shell smooth, elliptical, somewhat inflated, inequilateral, obtusely angular behind and round before; valves rather thin; beaks somewhat prominent, pointed, granulate at the tips; epidermis from pale yellow to dark brown, without rays; nacre bluish white and iridescent.

Proc. Acad. Nat. Sci., 1861, p. 56.

*Hab.*—Great Slave Lake, at Fort Rae, and North End of Lake Winnipeg, Arctic America, R. Kennicott.

My cabinet and cabinet of Smithsonian Institution.

Diam. .7,

Length 1.2,

Breadth 1.9 inches.

Shell smooth, elliptical, somewhat inflated, inequilateral, obtusely angular behind and round before; substance of the shell rather thin; beaks prominent, pointed and granular at the tips; ligament long, thin and dark brown; epidermis varying from pale yellow to dark brown, without rays, with eight or ten rather close lines of growth; umbonial slope raised and rounded; posterior slope rather narrow, elliptical, slightly carinate, with two indistinct lines in each valve from the tips to the margin; anterior cicatrices confluent and very slightly impressed; posterior cicatrices confluent, large and scarcely perceptible, dorsal cicatrices placed over the centre of the cavity of the beaks; cavity of the shell rather deep and wide; cavity of the beaks shallow and very obtusely angular, nacre bluish white and iridescent.

*Remarks.*—Seven specimens were sent recently by Mr. Kennicott, from his present quarters, in Arctic America, where he is liberally entertained by the Hudson Bay Company's officers, who promote the object of his explorations in Zoology by all the means in their power. All these specimens are more or less imperfect, and probably were all dead specimens when taken. The largest is 1.5 long by 2.2 inches wide. It is a well characterized species, nearly allied to *Pepiniana*, (nobis,) but is more elliptical and has the beaks rather higher and more recurved. The lines of growth are closer and the umbonial slope is not angular as it is in *Pepiniana*. It is to be regretted that none of the specimens were perfect in the beaks, but they were enough so to show that they had a double row of granules. The pointed beaks of this species is a remarkable character among the *Anodontæ*.

I have great pleasure in dedicating this species to my young friend Mr. Kennicott, who has displayed so much energy in his arduous expedition to the great waters leading to the Arctic seas.

Accompanying this new species were two well-known ones which inhabit over a vast expanse of territory,—viz.: *Unio luteolus*, Lam., in Great Slave Lake, and

*Margaritana complanata*, (nobis,) in Lake Winnipeg. The former being found, also in Athabasca Lake, near the mouth of Moose River, Hudson Bay, on the upper waters of the Missouri, in the St. Lawrence, Lake Champlain, in the Ohio River and the upper waters of the Missouri. The latter in upper Missouri and the Ohio. (See table of distribution of species, in Proc. Acad. Nat. Sciences, March, 1858.) Thus *luteolus* is found in a southeast line of 3000 miles from Great Slave Lake to Montreal, at four different points. And in a south direction about the same distance to the Platte River and the Ohio.

ANODONTA SHOWALTERII. Pl. 33, fig. 284.

Testâ lævi, ellipticâ, ventricosâ, posticè obtusè angulatâ, anticè rotundatâ, subequilaterali; valvulis crassiusculis, anticè paulisper crassioribus; natibus subprominentibus, ad apices minutè undulatis; epidermide teucbroso-fuscâ, obsoletè radiatâ; margaritâ vel albâ vel paulisper salmonis colore tinctâ et iridescente.

Shell smooth, elliptical, ventricose, obtusely angular behind, rounded before and nearly inequilateral; valves somewhat thick, a little thicker before; beaks somewhat prominent, minutely undulate at the tips; epidermis dark brown, obsoletely radiate; nacre white or slightly salmon color and iridescent.

Proc. Acad. Nat. Sci., 1860, p. 307.

*Hab.*—Coosa River, Wetumpka, Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter and Dr. Hartman.

Diam. 1·2

Length 1·6,

Breadth 2·8 inches.

Shell smooth, elliptical, ventricose, obtusely angular behind, rounded before and nearly equilateral, dorsal margin furnished with an imperfect tooth; substance of the shell somewhat thick, a little thicker before; beaks somewhat prominent, minutely undulate at the tips; ligament rather large and dark brown; epidermis dark brown, obscurely rayed, and with very distant marks of growth; umbonial slope inflated and rounded; posterior slope dark brown, very slightly raised, with two indistinct lines from the beaks to posterior margin; anterior cicatrices confluent and slightly impressed; posterior cicatrices large, confluent and very slightly impressed; dorsal cicatrices placed in a row anterior to the centre of the cavity of the beaks; cavity of the shell deep and wide; cavity of the beaks rather shallow and obtusely angular; nacre white, or slightly salmon color and iridescent.

*Soft parts.*—*Branchial uterus* filled with embryonic shells the whole length of the outer leaves. *Branchiæ* rather large, nearly semicircular, thin, free half the length of abdominal sack. *Pulpi* rather large, subtriangular, united a short distance on the posterior edges. *Mantle* very thin, slightly thickened on the edges. maculate on the outer posterior edges. *Branchial opening* rather small, with numerous pale papillæ. *Anal opening* very small, with very small, pale papillæ. *Super-anal opening* very small, maculate on the outside and united for some distance below. Color of the mass dirty white.

*Embryonic shell* triangular, large, of a brown color and altogether like that of *A. undulata*, Say.

*Remarks.*—I have two specimens from Dr. Showalter in alcohol, and Dr. Hartman has two larger specimens without the soft parts. The outline of this species is very close to some of the forms of *A. undulata*, Say, and it also has the aspect of *A. pavonia*, (nobis.) It has subconcentric folds on the tips of the beaks like *pavonia*, but they are smaller. Like *undulata* it has a callus on the dorsal margin on each valve under the beak, and in *Showalterii* this callus is quite erect and compressed, tooth-like, so that it seems to be the link between *Margaritana* and *Anodonta* proper. It is more inflated than *pavonia* or *undulata*. From its close alliance to the latter in the form of the shell, it would seem to be likely that the important organ of the *branchial uterus* would be somewhat alike. In their position in the branchiæ they are entirely different, the *undulata* having the branchial ovisacks transverse, while the *Showalterii* has them vertical as in *A. fluviatilis*. It gives me great pleasure to name this species after Dr. Showalter, who has done so much to develop the molluscs of that part of Alabama in which he lives.

ART. VI.—*New Melanidæ of the United States.*

By ISAAC LEA.

During the past and present years, I have read several papers describing new species of *Unionidæ* and *Melanidæ* kindly sent to me by E. R. Showalter, M. D., of Uniontown, Alabama, a correspondent of our Academy, who has been unremitting in his exertions to make known the natural history of that part of the State. In those papers there were but few species of *Melanidæ*. They were purposely delayed with a view to bring them as much together as possible, and the present paper will exhibit here the vast expansion of zoological life in this Family,—the Coosa River really appearing to be the zoological centre of this particular group. The great variety of form, color and size will at once strike the naturalist, and he will be surprised in the examination of those forms to observe how very few there are of tuberculate or folded species, which so well characterize the members of the same Family in streams which form the Tennessee and Cumberland Rivers at no great distance. It will also be observed that Dr. Spillman, another of our correspondents, has contributed much to these papers, from other sources, as have also many other friends.

Family *MELANIDÆ*.Genus *GONIOBASIS*.\*

Testa vel conica vel fusiformi. Apertura subrhomboidea, infernè subangulata. Columella supernè interdum incrassata. Opereulum corneum, ad spirans pertinens.†

In my paper on the genus *Trypanostoma*, proposed by me (Proc. Acad. Nat. Sci. 1862, p. 169), I mentioned the importance of eliminating as many species as possible from the genus *Melania*, which is so enormously extended as almost to prevent the possibility of finding suitable names for the species. In the Proceedings of the Academy, Dec., 1861, I stated that Prof. Haldeman's genus *Lithasia* formed a very excellent group. In working up a very large number of the family *Melanidæ*, obtained from the Southern and Western States, I have, notwithstanding the divisions which had been made, found myself embarrassed with that form of aperture which is quite

\* *Γωνία*, angle, and *βασίς*, base.

† This genus may be divided into two groups, one embracing the conical, the other the fusiform species, and these into smooth, plicate, carinate, &c.

different from the auger-mouthed (*Trypanostoma*) species and the *Lithasia*, to which latter they are most nearly allied. I mean those which usually, though not always, have a slight thickening of the upper part of the columella and no callus below, and which are also without the notch of *Lithasia*, although subangular at base. In this subangular character they differ from *Melania* proper, which are round or loop-like at the base. For this group I propose the name of *Goniobasis*,\* which will give us for our American *Melanidæ* the following genera, all of them having spiral opercula :

*Melania*,† Lam., *Anculosa*, Say, *Io*, Lea, *Lithasia*, Hald., *Schizostoma*, Lea, *Strephobasis*, Lea, *Trypanostoma*, Lea, *Goniobasis*, Lea, and *Amnicola*, Gould and Hald.

They may be known by,

*Melania* having a regular loop-form aperture.

*Anculosa* having a rounded aperture and a callous columella.

*Io* having a greater or lesser elongate channel or spout at the base.

*Lithasia* having a callus on the columella above and below, and a notch at the base.

*Schizostoma* having a cut in the upper part of the outer lip.

*Strephobasis* having a retrorse callus at base, and usually a squarish aperture.

*Trypanostoma* having an expanded outer lip and an auger-shaped aperture.

*Goniobasis* having usually a subrhomboidal aperture, subangular at base and without a channel.

*Amnicola*‡ having a round mouth and no callus.

#### GONIOBASIS HARTMANII. Pl. 34, fig. 1.

Testâ lævi, conicâ, magnâ, vel tenebroso-corneâ vel tenebroso-olivâ, valdè vittatâ, imperforatâ; spirâ obtusè conicâ; suturis valdè impressis; anfractibus subplanulatis, instar septenis, ultimo grandi; aperturâ grandi, ovato-rhomboideâ, intus brunneo-vittatâ, ad basim obtusè angulatâ; labro acuto; columellâ incurvatâ.

Shell smooth, conical, large, dark horn or olive color, much banded, imperforate; spire obtusely conical; sutures much impressed; whorls somewhat flattened, about seven, the last large; aperture large, ovately rhomboid, brown, banded within, obtusely angular at the base; outer lip sharp; columella incurved.

*Operculum* ovate, spiral, dark brown, rather rough, with the polar point on the edge, about  $\frac{1}{4}$  from the base.

*Melania Hartmaniana*, Proc. Acad. Nat. Sci., 1861, p. 117.

\* Adams' *Elimia* takes in part of this genus.

† Cuvier describes *Melania* as having long tentacula, the eyes being on the exterior side about the third of the length. The eyes of *Melania Virginica*, Say, are at the base of short tentacula. I very much doubt if we have a single species in the United States properly belonging to this genus, which Cuvier considered *amarula* as the type, and Lamarek, *asperata* as the type.

‡ *Amnicola*, although much like *Paludina*, is more nearly allied to the *Melanidæ*. The operculum is spiral and therefore very different in this character from *Paludina*.



*Hab.*—Coosa and Cahawba Rivers, Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter, Dr. Hartman and Dr. Lewis.

Diam. .68,

Length 1.65 inch.

*Remarks.*—This is a fine large species, and among the most robust yet found in the United States. It is much larger than *Melania robusta* (nobis) and cannot be confounded with that species, being entirely smooth and banded. The whorls are also more flattened. The general character of the species is to have four broad brown bands, very strongly marked on the inside. In some cases these bands are increased in width, and even so combined as to make the fauces nearly black within. These bands do not quite reach the margin. Where the bands are not strong, the exterior is light horn color. There is a disposition on the upper part of the whorls to geniculation, and this part is there yellowish. The aperture is nearly half the length of the shell. I have great pleasure in naming this fine species after my friend Wm. D. Hartman, M. D., of Westchester, Pa., who is always ready to promote the objects of Natural History and other branches of science.

GONIOBASIS VARIANS. Pl. 34, fig. 2.

Testâ lævi, vel plicatâ vel striatâ, elevato-conicâ, suberassâ, luteolâ vel dilutè fuscâ, vittatâ; spirâ elevatâ; suturis impressis; anfractibus septenis, supernè planiuseulis; aperturâ parviuseulâ, ellipticâ, intus albidâ et vittatâ; labro acuto; columellâ albidâ, incurvatâ, ad basim obtusè angulatâ.

Shell smooth, plicate or striate, raised conical, rather thick, yellowish or pale brown, banded; spire raised; sutures impressed; whorls seven, flattened above; aperture rather small, elliptical, whitish and banded within; outer lip acute; columella whitish, incurved, obtusely angular at the base.

*Melania varians*, Proc. Acad. Nat. Sci., 1861, p. 120.

*Hab.*—Coosa River, Alabama, Dr. Showalter and Dr. Budd.

My cabinet and cabinets of Dr. Showalter, Dr. Budd and Dr. Hartman.

Diam. .40,

Length 1.4 inch.

*Remarks.*—I have a number of specimens before me, some of which have been in my possession for several years. They are allied to *Melania Haysiana* (nobis), and I formerly thought they were a mere variety of that species; but the numerous and fine specimens sent to me, of various ages and forms, by Dr. Showalter, satisfy me that the species is quite distinct. It is very variable, some being smooth and beautiful, while others are plicate and others again roughly striate, with a shoulder below the sutures, giving it quite a different aspect. The aperture is more than one-third the length of the shell. It usually has four bands, but in some individuals there are none and others have one, two, three or four.

## GONIOBASIS RARA. Pl. 34, fig. 3.

Testâ lævi, elevato-conoideâ, scalariformi, subcrassâ, tenebroso-olivâ, nitidâ; spirâ elevatâ; suturis irregulariter impressis; anfractibus octonis, planulatis, supernè angulatis; aperturâ parviusculâ, ellipticâ, intus tenebroso-purpureâ; labro-acuto; columellâ incurvâ, purpureâ, ad basim obtusè angulatâ.

Shell smooth, high conical, scalariform, rather thick, dark olive, shining; spire raised; sutures irregularly impressed; whorls eight, flattened, angular above; aperture rather small, elliptical, dark purple within; outer lip sharp; columella incurved, purple, obtusely angular at the base.

*Melania rara*, Proc. Acad. Nat. Sci., 1861, p. 121.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .38,

Length .90 inch.

*Remarks.*—A single specimen only of this species was sent to me by Dr. Showalter. It is remarkable for its fine polish, its dark color and its square shoulder below the sutures. It has a few obscure striæ on the lower part of the whorl. The Babylonian form is unusual. It reminds one of *varians*, herein described, but that species is plicate and not scalariform. The length of the aperture is more than one-third the length of the shell.

## GONIOBASIS SHOWALTERII. Pl. 34, fig. 4.

Testâ lævi, elevato-conicâ, subcrassâ, luteo-fuscâ, quadrivittatâ; suturis impressis; spirâ obtusè elevatâ; anfractibus instar senis, supernè planulatis, infernè subinflatis, ultimo subgrandi; aperturâ subgrandi, ovato-rhomboidicâ, intus albidâ et vittatâ; labro acuto et paulisper sinuato; columellâ albâ, inflectâ, supernè paulisper incrassatâ, ad basim subrotundatâ.

Shell smooth, raised conical, rather thick, yellowish brown, four bands; spire obtusely elevated; sutures impressed; whorls about six, flattened above, somewhat inflated below, the last rather large; aperture rather large, ovately rhombic; whitish and banded within; outer lip sharp and slightly sinuate; columella white, inflected, slightly thickened above, rounded at the base.

*Operculum* elongate, tongue-shaped, narrower at the outer end, dark brown, without polar point, having parallel, transverse, slightly curved striæ.

*Melania Showalterii*, Proc. Acad. Nat. Sci., 1861, p. 120.

*Hab.*—Coosa and Cahawba Rivers, Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter and Dr. Lewis.

Diam. .42,

Length — inch.

*Remarks.*—This remarkable shell was sent to me by Dr. Showalter last summer, calling my attention to the very unusual form of its horny operculum, which in the old specimens is half an inch long, being a quarter of an inch wide at the inner end, gradually diminishing to an angular point at the outer end. It is usually curved,

the outer end forming a half circle from the base, the starting or inner end. Thus quite half the length extends outside of the outer lip, the inner half stretching across the aperture of the shell. Dr. Showalter did not observe whether there was any difference in the soft parts of this species from other *Goniobases*, but proposes to examine living specimens. He remarks in his letters that "the operculum is very striking and not observed in any other species, the mouth being remarkably uniform in its shape, as indeed it is in its general form and aspect." "Some of the Coosa *Anculosæ*," he says, "have this peculiar form of operculum," but I have never seen any operculum of the *Melanice* take this long tongue-shaped form but in this species.\* Having asked Dr. S. if he had observed whether the opercula of young individuals were spiral, he very kindly sent me one about one-third grown. This was in no way different from the adults except in size, being rather more than one-third of an inch long. He says that he "finds the young specimens of this species have the same peculiarity in the operculum." Should there be found to exist any difference in the anatomical structure of this mollusk, when the soft parts shall be examined, then it must be eliminated from the *Goniobases*. In which case I propose the name of *Macrolimen*† for it. Among nearly a dozen specimens which I have examined, none have a perfect apex. The length of the shell, therefore, cannot be stated, nor the exact number of whorls, or the character of the very young. The length of the aperture is probably nearly half the length of the shell. All the specimens I have examined are handsomely adorned with four bands, more or less distinct inside and out. It is nearly allied to *suavis* (nobis) and *bellula* (nobis), and reminds one of *Lewisii* (nobis.)

## GONIOBASIS BULLULA. Pl. 34, fig. 5.

Testâ lævi, subfusiformi, subinflata, subtenui, viridi-luteâ, quadrivittatâ; spirâ elevatâ; suturis impressis; anfractibus instar quinis, inflatis, ultimo subgrandi; aperturâ subgrandi, latè ovatâ, intus albidâ et vittatâ; labro acuto; columellâ albidâ, supernè incrassatâ, sinuatâ, infernè subangulatâ.

Shell smooth, conical, inflated, rather thin, greenish yellow, four-banded; spire raised; sutures impressed; whorls about five, inflated, the last rather large; aperture rather large, widely ovate, whitish and banded within; outer lip acute; columella whitish, thickened above, sinuous, subangular below.

*Operculum* elliptical, spiral, dark brown, with the polar point near the base.

*Melania bullula*, Proc. Acad. Nat. Sci., 1861, p. 121.

*Hab.*—Yellowleaf Creek, Shelby County, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .40,

Length .90 inch.

\* I have several specimens of *A. rubiginosa* (nobis) which have an elongated operculum, but I have never observed it in any other species of *Anculosa*.

† μακρος, longus; λιμην, portus.

*Remarks.*—This is a somewhat inflated species, with four regular brown bands and reminds one of *bellula* herein described. It is not so solid a species, is usually more inflated, higher in the spire and has not usually any striæ, although some specimens have a few. Neither of the specimens before me have a perfect apex, therefore the number of whorls is uncertain. The aperture is not quite half the length of the shell.

GONIOBASIS FUMEA. Pl. 34, fig. 6.

Testâ lævi, conicâ, subtenui, fumcâ, subnitidâ, aliquando obsolete vittatâ; spirâ subelevatâ; suturis irregulariter impressis; anfractibus supernè planulatis, infernè subinflatis; aperturâ ovato-rhombicâ, intus albidâ; labro acuto; collumellâ inflectâ, supernè paulisper incrassatâ, ad basim subrotundâ.

Shell smooth, conical, rather thin, sooty brown, sometimes obscurely banded; spire somewhat raised; sutures irregularly impressed; whorls flattened above, somewhat inflated below; aperture ovately rhombic, whitish within; outer lip acute; columella inflected, slightly thickened above, rounded at the base.

*Melania fumca*, Proc. Acad. Nat. Sci., 1861, p. 123.

*Hab.*—Yellowleaf Creek, Shelby County, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .36,

Length .80 inch.

*Remarks.*—This is an obscure species and is near to *crepera* herein described, but it is more inflated, and reminds one of *bullula* also herein described. But it has not the well marked bands of that species, some individuals being without any bands, while others have a few very obscure ones. In some there are very obscure striæ towards the base of the lower whorl. All the specimens before me being worn at the tips, I cannot make out the character of the apical whorls. The aperture is about one-third the length of the shell.

GONIOBASIS PUDICA. Pl. 34, fig. 7.

Testâ lævi, conoideâ, crassiusculâ, olivaceâ vel rufusculâ; spirâ conicâ; suturis irregulariter impressis; anfractibus senis, convexiusculis; aperturâ parviusculâ, ovatâ, intus cæruleo-albâ; labro acuto; columellâ inflectâ, supernè incrassatâ, ad basim rotundatâ.

Shell smooth, conical, somewhat thick, olive or reddish; spire conical; sutures irregularly impressed; whorls six, slightly convex; aperture rather small, ovate, bluish white within; outer lip acute; columella inflected, thickened above, rounded at the base.

*Melania pudica*, Proc. Acad. Nat. Sci., 1861, p. 120.

*Hab.*—Yellowleaf Creek, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .34.

Length .80 inch.

*Remarks.*—This is a modest little species, with regular, even whorls. One of the specimens has obscure bands, the other has none. It is allied to *aqua*, herein described. The aperture is not quite half the length of the shell.

GONIOBASIS CAHAWBENSIS. Pl. 34, fig. 8.

Testâ lævi, subfusiformi, elevato-conicâ, mucronatâ, subtenui, tenebroso-corneâ, obsolete vittatâ; spirâ subelevatâ; suturis linearibus; anfractibus octonis, supernè planulatis, ultimo subgrandi; aperturâ parviuseulâ, ovatâ, intus albidâ vel luteolâ; labro acuto; columellâ arcuatâ, ad basim subrotundâ.

Shell smooth, somewhat fusiform, raised conical, pointed, rather thin, dark horn color, obtusely banded; spire somewhat raised; sutures line-like; whorls eight, flattened above, the last rather large; aperture rather small, ovate, whitish or yellowish within; outer lip acute; columella arcuate, somewhat rounded at the base.

*Melania Cahawbensis*, Proc. Acad. Nat. Sci., 1861, p. 121.

*Hab.*—Cahawba River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Dian. .42,

Length .84 inch.

*Remarks.*—This is a regularly formed, graceful species, with very obscure bands. In three of the specimens these bands are scarcely noticeable, but the fourth, which is the youngest has three bands well defined within the aperture. It is nearly allied to *Melania germana*, Anth., but it is more elongate and has not the carination of the middle of the whorl, nor the rhomboidal aperture. The aperture is more than one-third the length of the shell. The apical whorls are carinate.

GONIOBASIS VIRGULATA. Pl. 34, fig. 9.

Testâ lævi, fusiformi, conicâ crassiusculâ, nitidâ, luteolâ, quadrivittatâ; spirâ conicâ, mucronatâ; suturis subimpressis; anfractibus septenis, supernè constrictâ, ultimo bulboso; aperturâ subgrandi, subellipticâ, intus luteo-albâ et valdè vittatâ; labro acuto; columellâ inflectâ ad basim angulatâ et canaliculatâ.

Shell smooth, fusiform, conical, somewhat thick, shining, yellowish, four-banded; spire conical, sharp-pointed; sutures impressed; whorls seven, constricted above, the last bulbous; aperture rather large, somewhat elliptical, yellowish white and very much banded within; outer lip sharp; columella inflected, angular at the base and canaliculate.

*Operculum* ovate, spiral, dark brown, with the polar point on the inner side near the base.

*Melania virgulata*, Proc. Acad. Nat. Sci., 1861, p. 119.

*Hab.*—Coosa and Tallapoosa Rivers, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .36,

Length .76 inch.

*Remarks.*—This is a beautiful banded species, having the two middle bands more approximate. The four bands are broad and of an intense brown; on the upper whorls a single band only is exhibited. On one specimen this band reaches nearly to the apical whorl, in the other only to the second. Its mucronate spire and inflated body whorl reminds one of *Melania conica*, Say, but it may be distinguished by its having a larger body whorl and a shorter spire. The aperture is nearly half the length of the shell.

GONIOBASIS MELLEA. Pl. 34, fig. 10.

Testâ lævi, subfusiformi, conicâ, crassiusculâ, melleâ, aliquandò vittatâ; spirâ valdè obtusâ; suturis regulariter impressis; anfractibus septenis, supernè planulatis, ultimo grandi et inflato; aperturâ grandi, rhomboido-ellipticâ, intus luteolâ; labro acuto; columellâ incrassatâ, inflectâ, infernè obtusè angulatâ.

Shell smooth, subfusiform, conical, rather thick, honey yellow, sometimes banded; spire very obtuse; sutures regularly impressed; whorls seven, flattened above, the last large and inflated; aperture large, rhomboido-elliptical, yellowish within; outer lip acute; columella thickened, inflected, obtusely angular below.

*Operculum* ovate, spiral, light brown, with polar point near the edge and base.

*Melania mellea*, Proc. Acad. Nat. Sci., 1861, p. 120.

*Hab.*—Coosa River, at Wetumpka, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .52,

Length .98 inch.

*Remarks.*—This is a well marked species with an unusual yellow, smooth epidermis. There are four specimens before me, one being quite young, the others mature or nearly so. One has four somewhat obscure, broad, purplish bands, better defined within. The aperture is about half the length of the shell. In outline it approaches *Lithasia Florentiana* and *L. fuliginosa*, both which were described by me as *Melanice*, but it is larger, more yellow, has a higher spire and is not so thickened on the columella as either of those species.

GONIOBASIS VARIATA. Pl. 34, fig. 11.

Testâ lævi, subfusiformi, crassiusculâ, vel luteolâ vel purpuresecente; spirâ valdè obtusâ; suturis irregulariter impressis; anfractibus senis, supernè planiuseculis, ultimo inflato; aperturâ grandi, intus vel luteolâ vel purpuresecente; labro acuto; columellâ arcuatâ, incrassatâ, ad basim obtusè angulatâ.

Shell smooth, subfusiform, somewhat thick, yellowish or purplish; spire very obtuse; sutures irregularly impressed; whorls six, flattened above, the last inflated; aperture large, yellowish or purplish within; outer lip sharp; columella arcuate, thickened, obtusely angular at base.

*Melania variata*, Proc. Acad. Nat. Sci., 1861, p. 119.

*Hab.*—Coosa River, at Wetumpka and Montevallo, Bibb County, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .40,

Length .76 inch.

*Remarks.*—Six specimens are before me. Two of them are mature, are yellowish and are somewhat thick. Four are thinner and are purplish inside and out, not disposed to be banded, but are obscurely maculate. The apical whorls have obscure folds. One of the old ones has obscure bands on the inside. The other has none. The aperture is more than half the length of the shell. It is somewhat like *Melania fuliginosa* (nobis) in outline, but it is not so much inflated as that species.

GONIOBASIS PURPUREA. Pl. 34, fig. 12.

Testâ lævi, subfusiformi, obtuso-conicâ, subtenui, tenebroso-rufâ; suturis paulisper impressis; spirâ valdè obtusâ; anfractibus quinis, ultimo grandi; aperturâ subgrandi, ellipticâ, intus tenebrosâ; labro acuto; columellâ tenebrosâ, inflectâ.

Shell smooth, subfusiform, obtusely conical, rather thin, dark brown; spire very obtuse; sutures slightly impressed; whorls five, the last large; aperture rather large, elliptical, dark within; outer lip acute; columella dark and bent inward.

*Operculum* ovate, spiral, dark brown, with polar point near the inner edge, and one-fourth distance from the base.

*Melania purpurea*, Proc. Acad. Nat. Sci., 1861, p. 120.

*Hab.*—Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Spillman and Dr. Hartman.

Diam. .35,

Length .81 inch.

*Remarks.*—There are two specimens before me of this very dark brown shell. The larger one has three bands faintly visible on the inside. It is very possible that it may be found much less intense in color. It is a graceful well proportioned species. On the upper portion of the whorls, immediately under the suture, there is a disposition to take on a light color, like a thread. The aperture is about one half the length of the shell. The nearest allied species is *ebenum* (nobis) = *Melania iostoma*, Anth., but it may at once be distinguished by the line of the outer lip, which in *ebenum* is remarkably indented, while in *purpurea* that line is nearly straight. *Ebenum* is also smaller and thicker.

GONIOBASIS ELLIPTICA. Pl. 34, fig. 13.

Testâ lævi, ellipticâ, luteolâ, quadrivittatâ; spirâ brevi, obtusâ, ad apicem plicatâ; suturis impressis; anfractibus senis, subconvexis; aperturâ subgrandi, elongato-ellipticâ, intus quadrivittatâ. ad basim obtusè angulatâ; labro acuto; columellâ albidâ et incurvatâ.

Shell smooth, elliptical, yellowish, four-banded; spire short, obtuse, folded at the tip; sutures impressed; whorls six, subconvex; aperture rather large, elongate

elliptical, four-banded within; obtusely angular at the base; outer lip acute; columella whitish and incurved.

*Operculum* narrow elliptical, spiral, light brown, with the polar point near the inner margin above the base.

*Melania elliptica*, Proc. Acad. Nat. Sci., 1861, p. 118.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D., and E. Foreman, M. D.

My cabinet and cabinets of Dr. Showalter and Dr. Foreman.

Diam. .41,

Length .78 inch.

*Remarks.*—This is a remarkably regular elliptical species, pointed at the base and apex. There are five specimens before me. One is an old worn one, which I long since received among other species from Dr. Foreman. It looks much like the young or immature of *Melania ovalis* (nobis), but is not so thick, nor has it striæ. It has somewhat the aspect of *Lithasia Showalterii* (nobis), but it has not the callus of that genus, and it is not compressed at the sides, but is regularly convex. All the specimens under examination, have four regular bands, and one of them is disposed to be striate. The folds on the upper whorls are represented below by irregularities on the whorls which interrupt the upper band and give it a maculate appearance.

#### GONIOBASIS GLANDARIA. Pl. 34, fig. 14.

Testâ lævi, fusiformi, crassâ, viridi-luteâ, quadrivittatâ; spirâ obtusâ; suturis valdè et irregulariter impressis; anfractibus septenis, convexiuseulis, ultimo gaudi; aperturâ elongato-ellipticâ, subconstrictâ; intus albidâ et valdè vittatâ; labro acuto, subsinuoso; columellâ arcuatâ, supernè et infernè incrassatâ, paulisper canaliculatâ et contortâ.

Shell smooth, fusiform, thick, greenish yellow, four-banded; suture irregularly and much impressed; whorls seven, slightly convex, the last large; aperture long elliptical, subconstricted, whitish within and much banded; outer lip acute, subsinuous; columella arcuate, thickened above and below, slightly canaliculate and twisted.

*Melania glandaria*, Proc. Acad. Nat. Sci., 1861, p. 120.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .42,

Length .86 inch.

*Remarks.*—This is a solid species nearly an inch long, and reminds one of the form of an acorn. It is near to some of the forms of *nebula*, herein described, but has not the dark maculations of that shell, the four dark brown bands being distinct on the inside. The aperture is half the length of the shell. The upper band is well defined on the upper whorls.

#### GONIOBASIS QUADRIVITTATA. Pl. 34, fig. 15.

Testâ lævi, subellipticâ, crassiusculâ, viridi-luteâ, nitidâ; spirâ obtusè conoideâ; suturis valdè impressis; anfractibus octonis, convexiuseulis; aperturâ subconstrictâ, rhombo-ovatâ, intus albidâ, quadrivittatâ; labro acuto; columellâ incurvâ, ad basim angulatâ.



Shell smooth, subelliptical, a little thick, greenish yellow, shining; spire obtusely conical; sutures very much impressed; whorls eight, somewhat convex; aperture somewhat constricted, ovately rhombic, whitish and four-banded within; outer lip acute, columella incurved, angular at base.

*Melania quadrivittata*, Proc. Acad. Nat. Sci., 1861, p. 119.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .38,

Length .84 inch.

*Remarks.*—This brilliant species, with its four well-defined, dark brown bands on a dark yellow, is allied to *fascinans*, herein described, and to *Melania pupoidea*, Anth., but it is shorter and more robust than either. The five specimens before me are very nearly of the same size, and all have four beautiful bands which are somewhat close, and give a darkish color to the whole. The aperture is more than one-third the length of the shell.

GONIOBASIS STRAMINEA. Pl. 34, fig. 16.

Testâ lævi, subfusiformi, obtusè conoideâ, crassiusculâ, stramineâ; spirâ valdè obtusâ; suturis impressis; anfractibus quinis, ultimo pergrandi et subinflato; aperturâ grandî, elongato-ellipticâ, intus luteo-albidâ; labro acuto; columellâ arcuatâ, supernè paulisper callosâ, ad basim obtusè angulatâ.

Shell smooth, subfusiform, obtusely conoidal, somewhat thick, straw color; spire raised; sutures impressed; whorls five, the last large and somewhat inflated; aperture large, elongate elliptical, yellowish white within, outer lip acute; columella arcuate, slightly callous above, obtusely angular at the base.

*Operculum* ovate, spiral, light brown, with the polar point near the edge towards the base.

*Melania straminea*, Proc. Acad. Nat. Sci., 1861, p. 121.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .40,

Length .80 inch.

*Remarks.*—The regularly elliptical outline of this species is remarkable among the *Goniobases*. There is no appearance of bands in either of the three specimens sent by Dr. Showalter. One of them has a slight line of brown in the callus of the interior above. The largest specimen has some indistinct striæ towards the base of the whorl. It is nearly allied to *Melania olivula*, Conrad, but it is more inflated and has a shorter spire. The aperture is more than half the length of the shell.

GONIOBASIS LEPIDA. Pl. 34, fig. 17.

Testâ lævi, subfusiformi, subtenui, luteo-orneâ, obsoletè vittatâ, nitidâ; spirâ elevatâ; suturis valdè impressis; anfractibus instar senis, supernè convexiusculis, infernè inflatis; aperturâ subgrandi, ovatâ, intus luteo-albâ; labro acuto; columellâ inflectâ, supernè incrassatâ, ad basim rotundatâ.

Shell smooth, subfusiform, rather thin, yellowish horn-color, obscurely banded, shining; spire raised; sutures very much impressed; whorls about six, slightly convex above, inflated below; aperture rather large, ovate, yellowish white within; outer lip acute; columella inflected, thickened above and rounded at the base.

Proc. Acad. Nat. Sci. 1861, p. 123, as *Melania propria*, which was repeated in this paper in error.

*Hab.*—Yellowleaf Creek, Shelby County, Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter and Dr. Lewis.

Diam. .42,

Length .98 inch.

*Remarks.*—A single specimen was sent to me by Dr. Lewis, Mohawk, N. Y., who received it from Dr. Showalter. It is allied to *straminea* herein described, and to *Melania proteus* (nobis). It was more elongate than the former, and larger and darker horn-color. It differs from the latter in not being so solid and in being more oval. The specimen before me is eroded at the apex, and therefore the apical whorls cannot be described, nor the number correctly ascertained. There is a slight swelling below the suture, and irregular flattenings on the bulge of the whorls. A single obscure band is visible on the upper part of the whorls, and some obscure striæ on the lower part.

GONIOBASIS SHELBYENSIS. Pl. 34, fig. 18.

Testâ lævi, fusiformi, subcrassâ, olivaceâ, vittatâ vel evittatâ; spirâ obtusè conicâ; suturis impressis; anfractibus supernè plauulatis; aperturâ parviuseulâ, subovatâ, intus albâ; labro acuto; columellâ inflectâ, ad basim obtusè angulatâ.

Shell smooth, fusiform somewhat thick, banded or without bands; spire obtusely conical; sutures impressed; whorls flattened above; aperture rather small, subovate, white within; outer lip acute; columella inflected, obtusely angular at base.

*Melania Shelbyensis*, Proc. Acad. Nat. Sci., 1861, p. 121.

*Hab.*—Yellowleaf Creek, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .38,

Length .86 inch.

*Remarks.*—This species is allied to *clausa* and to *bellula* herein described. It is more elliptical than either, and smaller than the former. One of the specimens before me has four well-defined, though not strong bands, while another is entirely without any. The aperture is nearly half the length of the shell. Neither of the two specimens before me have a perfect spire, and thence the number of whorls cannot be ascertained.

GONIOBASIS SUAVIS. Pl. 34, fig. 19.

Testâ lævi, subfusiformi, subcrassâ, luteo-viridi, politâ, quadrivittatâ; spirâ obtuso-conicâ; suturis regulariter impressis; anfractibus senis, supernè planiusculis; aperturâ subgrandi, ellipticâ, intus albidâ et vittatâ; labro acuto; columellâ incurvâ, ad basim rotundatâ.

Shell smooth, subfusiform, rather thick, yellowish green, polished, four-banded; spire obtusely conical; sutures regularly impressed; whorls six, slightly flattened above; aperture rather large, elliptical, whitish and banded within; outer lip acute; columella incurved and rounded at the base.

*Melania suavis*, Proc. Acad. Nat. Sci., 1861, p. 169.

*Hab.*—Coosa River, Alabama. E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .33,

Length .68 inch.

*Remarks.*—There are two specimens before me of this pretty little species, both of the same size and appearance in every way. The bands are remarkably perfect and well defined, and the two middle ones, in these specimens, are approximate, while they are equidistant from that above and below. It reminds one of *Melania ovalis* (nobis), but it has a higher spire and is more disposed to be fusiform. The greenish yellow tint, its well marked bands and shining surface, give it a very agreeable aspect.

GONIOBASIS FASCINANS. Pl. 34, fig. 20.

Testâ lævi, subfusiformi, crassiusculâ, luteo-corneâ, nitidâ; spirâ elevato-conicâ; suturis impressis; anfractibus convexiusculis; aperturâ subgrandi, intus albâ, trivittatâ; labro acuto; columellâ albâ, ad basim retusâ.

Shell smooth, subfusiform, somewhat thick, yellowish horn-color, shining; spire high conical; sutures impressed; whorls slightly convex; aperture rather large, white and three-banded within; outer lip acute; columella white and retuse at base.

*Melania fascinans*, Proc. Acad. Nat. Sci. 1861, p. 119.

*Hab.*—Yellowleaf Creek, Shelby County, Alabama. E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .38,

Length .92 inch.

*Remarks.*—This graceful and beautifully banded species, is allied to *Melania pupoides*, Anth. It is more elongate and has only three bands usually, which are deep brown, well defined and nearly equidistant; but sometimes has a thin additional one below the middle one. Neither of the two specimens before me have a perfect apex, so that the number of whorls might be determined, but a perfect mature specimen would probably exhibit seven. In the penultimate whorl are two bands, on those above only one can be observed. The aperture is more than one-third the length of the shell.

GONIOBASIS PROPRIA. Pl. 34, fig. 21.

Testâ lævi, fusiformi, luteo-olivâ, quadrivittatâ, subcrassâ; spirâ obtuso-conoideâ; suturis impressis; anfractibus senis, convexiusculis; aperturâ subgrandi, elongato-ellipticâ, intus albidâ et vittatâ; labro acuto; columellâ inflectâ, albâ, ad basim subangulatâ.

Shell smooth, fusiform, yellowish olive, four-banded, rather thick; spire obtusely conical; sutures impressed; whorls six, slightly convex; aperture somewhat large, elongately elliptical, whitish within and banded; outer lip acute; columella inflected, white and subangular at base.

*Melania propria*, Proc. Acad. Nat. Sci., 1861, p. 118.

*Hab.*—Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .34,

Length .80 inch.

*Remarks.*—This is a regular fusiform species, with an agreeable outline near to that of *gracilior*, herein described. It is not so stout a shell and is rather smaller, and having bands cannot be easily confounded with that species. The aperture is more than half the length of the shell, and the apex is quite pointed.

GONIOBASIS LUTEOLA. Pl. 34, fig. 22.

Testâ lævi, subellipticâ, subtenni, pallido-luteâ; spirâ subelevatâ, conoideâ; suturis paulisper impressis; anfractibus planiusculis; aperturâ subgrandi, intus albidâ; labro acuto; columellâ albidâ, incurvâ, ad basim obtuso-angulatâ.

Shell smooth, elliptical, rather thin, pale yellow; spire rather raised, conical; sutures slightly impressed; whorls a little flattened aperture rather large, whitish within; outer lip acute; columella whitish, incurved, obtusely angular at the base.

*Melania luteola*, Proc. Acad. Nat. Sci., 1861, p. 119.

*Hab.*—Alabama River, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .28,

Length .62 inch.

*Remarks.*—Two specimens of this pale little species are before me. They are nearly allied to *punicea*, herein described, but it is a shorter and thinner species and of quite different color in the epidermis. The aperture is more elongate and larger in proportion. Both specimens are decollate, but in one there are four whorls apparent, and I presume the normal number would be six. The larger specimen has an obscure band on the upper part of the whorl, which is well defined inside. The smaller one has none whatever. There is a slight disposition to take on folds on the upper whorls. The aperture is about one-half the length of the shell.

GONIOBASIS SOLIDULA. Pl. 34, fig. 23.

Testâ lævi, subfusiformi, obtusè conicâ, crassiusculâ, luteo-viridi vel luteo-fuscâ, vittatâ; spirâ obtusâ; suturis impressis; anfractibus quinis, supernè planulatis, infernè rotundatis, ultimo grandî; aperturâ subgrandi, ovatâ, intus albidâ; labro acuto; columellâ arcuatâ, supernè paulisper callosâ, ad basim obtusè angulatâ.

Shell smooth, subfusiform, obtusely conical, somewhat thick, yellowish green or yellowish brown, banded; spire raised; sutures impressed; whorls five, above

flattened, rounded below, the last large; aperture rather large, ovate, whitish within; outer lip acute; columella arcuate, slightly thickened above, obtusely angular at the base.

*Melania solidula*, Proc. Acad. Nat. Sci., 1861, p. 121.

*Hab.*—Yellowleaf Creek, near its junction with Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .33,

Length .68 inch.

*Remarks.*—Two specimens of this solid little species are before me. The larger has five well-defined bands, which are visible in the interior as well as the exterior. The smaller one has obsolete bands on the outside, but none within. In outline it is very near to *Melania abrupta*, (nobis,) but it differs in being more solid and less expanded in the aperture. The aperture is nearly one-half the length of the shell.

#### GONIOBASIS FALLAX. Pl. 34, fig. 24.

Testâ lævi, pupæformi, subcylindraceâ, subcrassâ, vel tenebroso-fuscâ vel tenebroso-corneâ, obsolete vittatâ vel evittatâ; spirâ valdè elevatâ; suturis impressis; anfractibus septenis, convexiusculis, ultimo parvo; aperturâ parvâ, valdè constrictâ, elongato-ellipticâ; labro acuto; columellâ paulisper inflectâ, ad basim obtusè angulatâ.

Shell smooth, pupæform, somewhat cylindrical, rather thick, either dark brown or dark horn-color, obscurely banded or without bands; sutures impressed; whorls seven, slightly convex, the last small; aperture small, very much constricted, elongate elliptical; outer lip sharp; columella a little inflected, obtusely angular at the base.

*Melania fallax*, Proc. Acad. Nat. Sci., 1861, p. 120.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .34,

Length .96 inch.

*Remarks.*—This species is nearly allied to *clausa*, herein described, but it is a smaller species, rather more cylindrical and with a smaller aperture. The dark specimens are four-banded, the bands being well defined inside, but obscure exteriorly. These dark ones have a light line below the suture. The aperture is not quite one-third the length of the shell.

#### GONIOBASIS CLAUSA. Pl. 34, fig. 25.

Testâ lævi, subfusiformi, crassâ, olivâ, vittatâ vel evittatâ; suturis valdè impressis; spirâ obtusâ; anfractibus septenis, convexiusculis; aperturâ parvâ, constrictâ, ellipticâ, intus albidâ; labro acuto; columellâ paulisper inflectâ, ad basim obtusè angulatâ.

Shell smooth, subfusiform, thick, olive, banded, or without bands; sutures very much impressed; whorls seven, somewhat convex; aperture small, constricted,

elliptical, whitish within; outer lip acute; columella slightly inflected, obtusely angular at base.

*Melania clausa*, Proc. Acad. Nat. Sci., 1861, p. 120.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of E. R. Showalter, M. D.

Diam. .42,

Length 1.2 inch.

*Remarks.*—This species reminds one at once of *Pupa caryalis*, Fer., but the outline is more fusiform than it. It is nearly allied to *Melania pupæformis*, Anth., but it is a larger and stouter shell and is not so much banded. The aperture is narrow and unusually closed. Some specimens are feebly banded, while others have the usual four bands very broad, which make the interior dark, and give the exterior a dark brownish or submaculate appearance. Two of the specimens are entirely without bands. The aperture is about one-third the length of the shell.

GONIOBASIS ALABAMENSIS. Pl. 34, fig. 26.

Testâ lævi, pupæformi, subelevatâ, suberassâ, luteolâ, quadrivittatâ; spirâ elevatâ; suturis valdè impressis; anfractibus instar septenis, convexis; aperturâ parvâ, subconstrictâ, subellipticâ, intus albidâ et vittatâ; labro acuto; columellâ inflectâ, albidâ, ad basim obtusè angulatâ.

Shell smooth, pupæform, subelevated, rather thick, yellowish, four-banded; spire raised; sutures very much impressed; whorls about seven, convex; aperture small, rather constricted, subelliptical, whitish and banded within; outer lip sharp; columella inflected; whitish, obtusely angular at base.

*Melania Alabamensis*, Proc. Acad. Nat. Sci., 1861, p. 121.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .38,

Length .92 inch.

*Remarks.*—This species is allied to *clausa*, herein described, but it is more conical and less cylindrical. One of the two specimens is obscurely banded, while the other has well-defined bands, the broadest one being above. The aperture is about one-third the length of the shell.

GONIOBASIS PUNICEA. Pl. 34, fig. 27.

Testâ lævi, subcylindraceâ, crassâ, puniceâ; spirâ elevatâ, conicâ; suturis impressis; anfractibus convexiusculis; aperturâ parvâ, rotundo-ovatâ, intus albâ; labro acuto; columellâ incrassatâ, albâ, ad basim rotundatâ.

Shell smooth, somewhat cylindrical, thick, reddish brown; spire elevated, conical; sutures impressed; whorls slightly convex; aperture small, ovately rounded, white within; outer lip acute; columella thickened, white, rounded at the base.

*Melania punicea*, Proc. Acad. Nat. Sci., 1861, p. 119.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .38,

Length .94 inch.

*Remarks.*—All the five specimens before me are decollate, and have nearly the general outline of *Bulimus decollatus*, Lam. Some have but two complete whorls, while one has four; probably when complete the number would be seven. Two of the specimens have slight striæ below, and one has a few obscure capillary bands. The reddish brown shining epidermis well characterizes the species. The aperture is small, and is probably a little more than the third of the length of the shell.

GONIOBASIS MIDAS. Pl. 34, fig. 28.

Testâ lævi, cylindræo-ellipticâ, crassiusculâ, virente, obsolete vittatâ; spirâ valdè obtusâ; suturis irregulariter impressis; anfractibus compressiusculis, ultimo pergrandi, infernè obsolete striatâ; aperturâ grandi, auriculæformi, intus cæruleo-albâ; labro acuto, columellâ cæruleo-albâ, incrassatâ, inflectâ, ad basim obtusè-angulatâ.

Shell smooth, cylindræo-elliptical, somewhat thick, greenish, obscurely banded; spire very obtuse; sutures irregularly impressed; whorls somewhat compressed, the last very large, obscurely striate below; aperture large, ear-shaped, bluish white within; outer lip acute; columella bluish white, thickened and inflected, obtusely angular at the base.

*Operculum* subelliptical, spiral, dark brown, with polar point near the inner edge and one-fifth from the base.

*Melania Midas*, Proc. Acad. Nat. Sci. 1861, p. 119.

*Hab.*—Coosa and Alabama Rivers, near Wetumpka, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .48,

Length .98 inch.

*Remarks.*—This is a well marked species. There are several specimens before me, differing but little. Two of them have a brown band in the interior of the upper part of the aperture, another has none, but exhibits an obscure row of spots on the upper whorls, which others have also. Two of the specimens have irregular, tuberculous swellings on the upper part of the whorls, which obscure the bands, and thus cause them to take on a maculate character. The increment of growth usually commences below the previous termination, leaving angles on the sutures. In this character one is reminded of *Melania* (*Goniobasis*) *oppugnata* (nobis). In these specimens there is a difference in the form of the base of the aperture, one of them being more rounded; but this may arise from difference of age. In outline this species is allied to *Hartmanii* (nobis), but it cannot be confounded with that shell, which is much larger, more robust, more elevated in the apex, and has more and better developed bands. It is on the other side near to *Melania* (*Goniobasis*) *basalis* (nobis). The aperture is about two-thirds the length of the shell.

## GONIOBASIS PROPINQUA. Pl. 34, fig. 29.

Testâ lævi, subcylindraccâ, suberassâ, luteolâ, quadrivittatâ; spirâ subelevatâ, conoideâ; suturis valdè impressis; anfractibus senis, supernè planiusculis; aperturâ ellipticâ, parviusculâ, intus albidâ, et vittatâ; labro acuto; columellâ paulisper inerassatâ, infernè rotundatâ.

Shell smooth, subcylindrical, somewhat thick, yellowish, four-banded; spire somewhat raised, conical; sutures very much impressed; whorls six, flattened above; aperture elliptical and rather small, whitish and banded within; outer lip acute; columella slightly thickened and rounded below.

*Melania propinqua*, Proc. Acad. Nat. Sci., 1861, p. 119.

*Hab.*—Coosa and Cahawba Rivers, Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter and Dr. Lewis.

Diam. .33,

Length .90 inch.

*Remarks.*—This species is very closely allied to *Melania (Goniobasis) pupoidea*, Anth., but it differs in being more cylindrical, in being smaller, and in having the base of the aperture more rounded. Most of the specimens are decollate. One has a few raised striæ. In some there is a disposition to have a shoulder under the sutures.

## GONIOBASIS COOSAENSIS. Pl. 34, fig. 30.

Testâ striatâ, fusiformi, corneâ, quadrivittatâ, suberassâ; spirâ subelevatâ, conicâ; suturis valdè impressis; anfractibus septenis, convexiuseulis, sulcatis; aperturâ constrictâ, elongato-ellipticâ, intus albidâ et quadrivittatâ; labro acuto, subcrenolato; columellâ paulisper incrassatâ, incurvatâ, ad basim obtusè angulatâ.

Shell striate, fusiform, horn-color, four-banded, rather thick; spire rather raised, conical; sutures very much impressed; whorls seven, slightly convex, sulcate; aperture constricted, elongate elliptical, whitish and four-banded within; outer lip acute, subcrenulate; columella slightly thickened, incurved and obtusely angular at the base.

*Melania Coosaensis*, Proc. Acad. Nat. Sci., 1861, p. 118.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .42,

Length 1.2 inch.

*Remarks.*—About a dozen specimens of various ages are before me. They all bear the four well-marked bands, more distinct from the inside. The transverse striae are coarse and rounded, cord-like, making well impressed sulcations. This species reminds one of *Melania (Goniobasis) Vanuxemiana* and *ovalis* (nobis), but it is a more fusiform shell, and has a longer aperture. Some of the young are almost free from striae, and are disposed to be plicate at the apex.

## GONIOBASIS ELLIPSOIDES. Pl. 34, fig. 31.

Testâ striatâ, fusiformi, viridi-lutescente, suberassâ; spirâ subelevatâ, conicâ; suturis irregulariter impressis; anfractibus septenis, vix convexis; aperturâ subconstrictâ, elongato-ellipticâ, intus albidâ; labro acuto; columellâ albidâ, infernè paulisper recurvâ, ad basim subrotundatâ.



Shell striate, fusiform, greenish yellow, rather thick; spire rather elevated, conical; sutures irregularly impressed; whorls seven, scarcely convex; aperture somewhat constricted, elongately elliptical, whitish within; outer lip acute; columella whitish, a little recurved below, rounded at the base.

*Melania gracilior*,\* Proc. Acad. Nat. Sci., 1861, p. 118.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .43,

Length .86 inch.

*Remarks.*—This species is very near in outline and size to *Coosaensis*, herein described. It differs in being without bands, except obscure ones on the upper whorls, and in having but few raised striae. The channel at the base also differs in *ellipsoides* being slightly retuse. The color and whole aspect of the two specimens before me are exactly alike, having a peculiar greenish yellow epidermis. In both these specimens there are two raised cord-like striae above and a few impressed striae at the base.

#### GONIOBASIS RUBICUNDA. Pl. 34, fig. 32.

Testâ valdè striatâ, rubidâ, subfusiformi; spirâ subelevatâ, conoideâ; suturis impressis; anfractibus instar senis, convexiuseulis; aperturâ subconstrictâ, elongato-ellipticâ, intus rubidâ, ad basim obtuso-angulatâ; labro acuto; columellâ incrassatâ, rubidâ, incurvatâ.

Shell much striate, reddish, subfusiform; spire subelevated, conical; sutures impressed; whorls about six, slightly convex; aperture rather constricted, elongate elliptical, reddish within, obtusely angular at the base; outer lip acute; columella thickened, reddish, incurved.

*Melania rubicunda*, Proc. Acad. Nat. Sci., 1861, p. 118.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .43,

Length .96 inch.

*Remarks.*—There are five specimens before me, two of them being old and so much eroded as to leave little more than the body whorl. The other specimens are more perfect, but the apices are worn and their character unascertained. The species is allied to *Melania* (*Goniobasis*) *Haysiana* (nobis), but may be distinguished by its not being cylindrical and by the aperture being longer. Like *Haysiana*, the striae are coarse and rounded, somewhat cord-like. These striae number eight to ten. As *Haysiana* is sometimes found without striae, this species may also be found without them. The aperture is more than one-third the length of the shell.

#### GONIOBASIS NUBILA. Pl. 34, fig. 33.

Testâ striatâ, subellipticâ, subfusiformi, tenebroso-virente, obscure maculatâ vel latè vittatâ, subcrassâ; spirâ obtusè elevatâ; suturis irregulariter impressis; anfractibus senis, subinflatis, ultimo grandi;

\* Changed to *ellipsoides*, the name of *gracilior* being preoccupied.

aperturâ subgrandi, rhomboido-ellipticâ, intus quadrivittatâ; labro acuto; columellâ arcuatâ, ad basim obtusè angulatâ.

Shell striate, somewhat elliptical, subfusiform, dark green, obscurely spotted, rather thick; spire obtusely elevated; sutures irregularly impressed; whorls six, rather inflated, the last large; aperture rather large, rhomboido-elliptical, four-banded within; outer lip acute; columella arcuate, obtusely angular at the base.

*Melania nubila*, Proc. Acad. Nat. Sci., 1861, p. 118.

*Hab.*—Coosa River, Wetumpka, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .45,

Length 1.1 inch.

*Remarks.*—Several specimens of different ages are before me. The oldest one is about an inch long, the youngest about half an inch. They all bear the same dark nebulous character, but the largest only has the four bands so wide as to combine and give the fauces a dark purple hue, which extends to the callus of the columella. The other have the columella whitish and the bands are distinct within. The oldest has a few coarse striæ on the upper and lower parts of the whorls, but the younger ones in my possession have not these striæ. There is a disposition in all these specimens to have obscure coarse folds, which are yellowish, leaving between them darkish spots. The aperture is nearly one-half the length of the shell.

#### GONIOBASIS CAPILLARIS. Pl. 34, fig. 34.

Testâ crebrè striatâ, subfusiformi, crassiusculâ, luteo-fuscâ, striis transversis capillaris crebressimè indutis; spirâ valdè obtusâ; suturis irregulariter impressis; anfractibus subcompressis, ultimo grandi; aperturâ grandi, elongato-ellipticâ, intus striis capillaris; labro crenulato; columellâ albidâ, incrassatâ, incurvâ, ad basim obtusè angulatâ.

Shell thickly striate, subfusiform, somewhat thick, yellowish brown, covered with close transverse striæ; spire very obtuse; sutures irregularly impressed; whorls somewhat compressed, the last large; aperture large, widely elliptical, capillary striæ within; outer lip crenulate; columella whitish, thickened, incurved, obtusely angular at the base.

*Operculum* ovate, spiral, dark brown, with the polar point near the inner side and near to the base.

*Melania capillaris*, Proc. Acad. Nat. Sci., 1861, p. 122.

*Hab.*—Coosa Rivers, Alabama, E. R. Showalter, M. D. and Wm. Spillman, M. D.

My cabinet and cabinets of Dr. Showalter, Dr. Spillman, Dr. Lewis and Dr. Hartman.

Diam. .38,

Length .88 inch.

*Remarks.*—This species belongs to the group of which *Melania (Goniobasis) impressa* (nobis) may be considered the type. It is covered with hair-like raised lines, like *impressa* and *Melania (Goniobasis) crebristriata* from the same river. It may be

distinguished from the former by being more cylindrical, being of a slightly lighter brown, and in having more striæ. From the latter by having a less exerted spire, by having finer striæ and being of a darker brown. All three of these species have usually more or less finer brown bands in the interior, but occasionally a specimen may be seen without bands. Among the specimens before me, the *crebristriata* has about 15 striæ, the *capillaris* about 26, and the *impressa* about 28. These raised rounded striæ cause, in all the three species, a beautiful crenated outer lip. The aperture is about half the length of the shell, and the apex is usually decollate. The brown lines of the interior do not reach the edge of the outer lip. In some specimens the columella is so much thickened that it reminds one of the genus *Lithasia*.

GONIOBASIS BELLULA. Pl. 34, fig. 35.

Testâ striatâ, subfusiformi, crassiusculâ, luteo-corneâ, quadrivittatâ; spirâ obtusâ; suturis valdè impressis; anfractibus instar quinis, convexiuseulis, ultimo grandi; aperturâ subgrandi, ellipticâ, intus albidâ et vittatâ; labro acuto; columellâ albâ, inflectâ, ad basiu obtusè angulatâ.

Shell striate, subfusiform, somewhat thick, pale horn-color, four-banded; spire obtuse; sutures much impressed; whorls about five, somewhat convex, the last large; aperture rather large, elliptical, whitish within and spotted; outer lip sharp; columella white, inflected, obtusely angular at the base.

*Operculum* elliptical, spiral, dark brown, with the polar point near the inner edge about one-fourth from the base.

*Melania bellula*, Proc. Acad. Nat. Sci., 1861, p. 122.

*Hab.*—Yellowleaf Creek, Shelby County, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .43,

Length .78 inch.

*Remarks.*—The four bands which are well marked on the three specimens before, seem to be regular and prominent in character. The two middle ones are slightly nearer together than they are to the outside ones. These bands are strongly marked inside and out. The transverse striæ are few, coarse and cord-like. Neither of the specimens are perfect in the apex, and therefore the number of whorls cannot be correctly ascertained. The bands are exhibited on all the whorls. The aperture is nearly the length of the shell. This is a remarkably beautiful species, the deep brown bands forming a contrast to the bright yellowish horn-color of the ground. In outline and general appearance it is closely allied to *Showalterii*, herein described, but it is more inflated and has a regularly formed spiral *operculum*, while the *Showalterii* is long tongue-shaped.

GONIOBASIS CULTA. Pl. 34, fig. 36.

Testâ rugoso-striatâ, subfusiformi, inflatâ, suberassâ, viridi-luteâ, nitidâ, trivittatâ; spirâ valdè obtusâ; suturis valdè et irregulariter impressis; anfractibus septenis, supernè carinatis; aperturâ amplâ, subrhomboidèâ, intus albidâ et vittatâ; labro acuto; columellâ incurvâ, dilutè roseâ, infernè angulatâ.

Shell rugosely striate, subfusiform, inflated, rather thick, greenish yellow, shining, three-banded; spire very obtuse; sutures irregularly and very much impressed; whorls seven, carinate above; aperture wide, subrhomboidal, whitish within and banded; outer lip acute; columella incurved, pale rose-color, angular below.

*Melania culta*, Proc. Acad. Nat. Sci., 1861, p. 121.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .42,

Length .79 inch.

*Remarks.*—A single specimen only was received from Dr. Showalter, and this may not be entirely mature. It has six coarse transverse striæ, which are rather sharp; the two upper ones, being rather distant, cause quite a large furrow between them. Other specimens may not present these characters, as striæ, whether fine or coarse, vary very much on the *Melanidæ*. The color on the callus of the columella may also vary in other individuals. The aperture is nearly half the length of the shell. This species is allied to *Vanuxemiana* (nobis), but it has not so high a spire, and it is wider in proportion.

GONIOBASIS ORBICULA. Pl. 34, fig. 37.

Testâ striatâ, globosâ, subcrassâ, lnteo-virente, quadrivittatâ; spirâ brevi, obtusâ; suturis valdè impressis; anfractibus quinis, valdè inflatis, ultimo grandi; aperturâ grandi, ellipticâ, intus quadrivittatâ; labro acuto; columellâ albâ, incurvatâ, ad basim obtusè angulatâ.

Shell striate, globose, somewhat thick, yellowish green, four-banded; spire short, obtuse; sutures very much impressed; whorls five, very much inflated, the last large; aperture large, elliptical, four-banded within; outer lip acute; columella white, incurved, obtusely angular at the base.

*Operculum* ovate, dark brown, with the polar point near the inner border, one-quarter above the base.

*Melania orbicula*, Proc. Acad. Nat. Sci., 1861, p. 118.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .31,

Length .54 inch.

*Remarks.*—This is a remarkably globose, small species, of which only a single specimen was received. The striæ are coarse and cord-like, and cover the whole of the body whorl. It is so nearly like, in form and color, to *Schizostoma globula* (nobis) that it might easily be taken for that shell, if it were not that there is no appearance of a fissure. The length of the aperture is two-thirds the length of the shell.

GONIOBASIS CALCULOIDES. Pl. 34, fig. 38.

Testâ striatâ, subglobosâ, crassâ, corneâ, robustâ; spirâ obtuso-conicâ; suturis impressis; anfractibus senis, valdè inflatis, ultimo grandi; aperturâ subgrandi, elongato-ellipticâ, intus albidâ; labro acuto; columellâ albidâ, incrassatâ, arcuatâ, ad basim retusâ.

Shell striate, subglobose, thick, horn-color, robust; spire obtusely conical; sutures impressed; whorls six, very much inflated, the last large; aperture rather large, elongately elliptical, whitish within; columella whitish, thickened, arcuate, retuse at the base.

*Melania calculoides*, Proc. Acad. Nat. Sci., 1861, p. 118.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .50,

Length .93 inch.

*Remarks.*—Four specimens of different ages were received; two are without bands and two have four bands each. It is not so globose as *orbicula*, herein described, and is much larger. It is also higher in the spire. It is nearest to *Melania* (*Goniobasis*) *robusta* (nobis), but is not so high in the spire. The two differ in the channel at base of the columella. The aperture is a little more than half the length of the shell. All these specimens are more or less striate, the upper ones being more conspicuous.

GONIOBASIS COPIOSA. Pl. 34, fig. 39.

Testâ striatâ, latè fusiformi, ventricosâ, obtuso-conicâ, crassiusculâ, luteo-corneâ, obsoletè vittatâ; spirâ valdè obtusâ; suturis irregulariter impressis; anfractibus quinis, convexiuseulis, ultimo pergrandi; aperturâ copiosâ, latè ellipticâ, iutus albidâ; labro acuto, sinuoso; columellâ arcuatâ, superuè paulisper iucrassatâ, ad basim subrotundâ.

Shell smooth, broadly fusiform, ventricose, obtusely conical, somewhat thick, yellowish horn-color, obscurely banded; spire very obtuse; sutures irregularly impressed; whorls five, somewhat convex, the last very large; aperture very large, widely elliptical, whitish within; outer lip acute, sinuous; columella arcuate, slightly thickened above, rounded at the base.

*Melania copiosa*, Proc. Acad. Nat. Sci., 1861, p. 122.

*Hab.*—Coosa River, Alabama. E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .42,

Length .69 inch.

*Remarks.*—The single specimen before me seems to be mature. It is allied to *Melania* (*Goniobasis*) *ovalis* (nobis) and to *culta*, herein described. It is more inflated than either, and has a more expanded outer lip. In this specimen the upper whorls have a single well-defined band, which is obsolete on the lowest whorl. It has ten rather coarse rounded striæ, which are slightly interrupted by the lines of growth, giving the surface a rugose appearance. These striæ being thickened, cause in the interior whitish lines. The aperture is more than one-half the length of the shell. The apical whorls are plicate.

GONIOBASIS LITA. Pl. 34, fig. 40.

Testâ rugoso-striatâ, subfusiformi, conoideâ, subcrassâ, quadrivittatâ, variegatâ, nitidâ; spirâ obtusè

elevatâ; suturis irregulariter impressis; anfractibus senis, supernè convexis, ultimo elongato; aperturâ subconstrictâ, elongato-ovatâ, intus purpurecente et vittatâ; labro acuto, spissato; columellâ infernè incurvatâ, purpureâ, ad basim rotundatâ.

Shell rugosely striate, subfusiform, rather large, four-banded, variegated, shining; spire obtusely elevated; sutures irregularly impressed; whorls six, convex above, the last elongate; aperture somewhat constricted, elongately ovate, purplish and banded within; outer lip acute, thickened; columella incurved and purple below, rounded at the base.

*Melania lita*, Proc. Acad. Nat. Sci., 1861, p. 121.

*Hab.*—Cahawba River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .31,

Length .78 inch.

*Remarks.*—I have seen but a single specimen of this species. It is remarkable for the several greenish and brownish tints of the exterior and its purple aperture. The apical whorls are plicate. The two lower whorls have rather rugose striæ. Other individuals may differ from the characters given above. The aperture is about two-fifths the length of the shell. It is one of the pupoid group and is nearly allied to *fallax*, herein described, but it is not so cylindrical and the aperture is longer. It differs also in color.

GONIOBASIS ÆQUA. Pl. 34 fig. 41.

Testâ substriatâ, conicâ, subcrassâ, tenebroso-fuscâ; spirâ subelevatâ; suturis impressis; anfractibus instar senis, supernè planulatis; aperturâ parvâ, rhomboideâ, intus albidâ; labro acuto; columellâ inflectâ, paulisper incrassatâ, ad basim obtusè angulatâ.

Shell substriate, conical, somewhat thick, dark brown; spire somewhat elevated; sutures impressed; whorls about six, flattened above; aperture small, rhomboidal, whitish within; outer lip acute; columella inflected, slightly thickened, obtusely angular at the base.

*Melania æqua*, Proc. Acad. Nat. Sci., 1861, p. 122.

*Hab.*—Yellowleaf Creek, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .37,

Length .34 inch.

*Remarks.*—This is a modest looking species near to *pubica*, herein described. One of the specimens has a few obscure transverse striæ on the lower part of the whorls, the other has them nearly over the whole surface. Both specimens are imperfect at the spire. The aperture is about one-third the length of the shell.

GONIOBASIS CREPERA. Pl. 34, fig. 42.

Testâ substriatâ, conicâ, subcrassâ, fuligiosâ; spirâ subelevatâ; suturis irregulariter impressis; anfractibus senis, convexiusculis; aperturâ ovato-rhombicâ, intus albidâ; labro acuto; columellâ inflectâ, supernè paulisper incrassatâ, ad basim obtusè angulatâ.

Shell substriate, conical, somewhat thick, sooty brown; spire somewhat raised; sutures irregularly impressed; whorls six, somewhat convex; aperture ovately rhombic, whitish within; outer lip acute; columella inflected, slightly thickened above, obtusely angular at the base.

*Melania crepera*, Proc. Acad. Nat. Sci. 1861, p. 123.

*Hab.*—Yellowleaf Creek, Shelby County, Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter and Dr. Lewis.

Diam. .41,

Length .83 inch.

*Remarks.*—This species is closely allied to *Haysiana* (nobis), but is less striate, has a darker epidermis, is rather smaller and not so solid. Some of the specimens have but few and obscure striæ on the lower part of the whorls, while others have them over the whole whorl. None were perfect enough to show the character of the apical whorls. The length of the aperture is more than one-third the length of the shell.

GONIOBASIS GRATIOSA. Pl. 35, fig. 43.

Testâ tuberculatâ, aliquando striatâ, obtuso-fusiformi, crassiusculâ, luteo-viridi, vel vittatâ vel evittatâ; spirâ valdè obtusâ; suturis impressis; anfractibus senis, supernè planulatis, ultimo grandi; aperturâ subgrandi, subrhomboideâ, intus albidâ; labro acuto, subsinuoso; columellâ inflectâ, incrassatâ, ad basim subangulatâ.

Shell tuberculate, sometimes striate, obtusely fusiform, somewhat thick, yellowish green, banded or without bands; spire very obtuse; sutures impressed; whorls six, flattened above, the last large; aperture rather large, subrhomboidal, whitish within; outer lip acute, slightly sinuous; columella inflected, thickened, subangular at the base.

*Operculum* ovate, spiral, dark brown, with the polar point near to the base.

*Melania gratiosa*, Proc. Acad. Nat. Sci., 1861, p. 122.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .39,

Length .78 inch.

*Remarks.*—This is a very remarkable and beautiful little species. There are three specimens before me, all of them having four somewhat distant, low, obtuse, rather large nodes. I have never seen any other species with this kind of nodes. The texture of the shell is delicate, the epidermis smooth and shining. Two of the specimens have four well-defined, brown bands, which are strongly marked inside and out. The third specimen is without bands, but it is covered with very remarkable transverse striæ, which traverse the nodes as well as the other parts of the surface. The aperture is more than half the length of the shell.

## GONIOBASIS BLANDA. Pl. 35, fig. 44.

Testâ plicatâ, obtusè fusiformi, supernè obtusè conicâ, subtenui, tenebroso-corneâ; spirâ valdè obtusâ; suturis impressis; anfractibus quinis, supernè planulatis, ultimo grandi et subangulato; aperturâ subgrandi, ellipticâ, intus luteo-albâ; labro acuto; columellâ incrassatâ, inflectâ, infernè subangulatâ.

Shell plicate, obtusely fusiform, obtusely conical above, rather thin, dark horn-color; spire very obtuse; sutures impressed; whorls five, flattened above, the last large and subangular; aperture rather large, elliptical, yellowish white within; outer lip acute; columella thickened, inflected, subangular below.

*Melania blanda*, Proc. Acad. Nat. Sci., 1861, p. 122.

*Hab.*—Yellowleaf Creek, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .37,

Length .73 inch.

*Remarks.*—A single specimen only was received from Dr. Showalter. I think it is not entirely mature. The folds are low, somewhat distant and vertical. The aperture is about half the length of the shell. In outline it is near to *Lithasia Duttoniana*, which I described as a *Melania*, but it has not the callus above and below on the columella, which constitute that genus, nor has it any tubercles, being covered above by folds.

## GONIOBASIS VESICULA. Pl. 35, fig. 45.

Testâ obsoletè plicatâ, ellipticâ, luteâ, immaculatâ, subtenui; spirâ brevissimâ, obtusâ; suturis subimpressis; anfractibus ternis, subconvexis; aperturâ grandi, regulariter ovatâ, intus dilute-salmoniâ; labro acuto; columellâ incrassatâ, incurvatâ, ad basim rotundatâ.

Shell obscurely folded, elliptical, yellow, without spots, rather thin; spire very short and obtuse; sutures rather impressed; whorls three, somewhat convex; aperture large, regularly ovate, pale salmon within; outer lip sharp; columella thickened, incurved, rounded at the base.

*Melania vesicula*, Proc. Acad. Nat. Sci., 1861, p. 118.

*Hab.*—Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .18,

Length .37 inch.

*Remarks.*—A single specimen of this very small species was found among others of a different species from Dr. Showalter. It is a small, regularly oval, inflated species. In this specimen there is a disposition on the upper part of the whorls to plication, and this produces obscure spots round this part of the whorls. Other specimens may not have this character. The aperture is very large, being two-thirds the length of the shell. It is nearly allied to *Melania (Goniobasis) auriculæformis* (nobis), but is not so large and has a wider aperture, which is not so elongate. The color is nearly the same, but the tint is rather brighter. It cannot be confounded



with *Melania (Goniobasis) corneola*, Anth., although of the same size and color, that shell being fusiform, with a conical spire and an aperture only half the length of the shell.

GONIOBASIS LEWISII. Pl. 35, fig. 46.

Testâ striatâ, subcylindraceâ, tenebroso-virente, valdè vittatâ; spirâ subelevatâ, conoideâ; suturis valdè impressis; anfractibus planulatis, sulcatis, iustar senis; aperturâ parviusculâ, ovatâ-rhomboidêâ, intus valdè vittatâ, ad basim obtusè angulatâ; labro acuto; columellâ albâ et incurvatâ.

Shell striate, somewhat cylindrical, dark green, much banded; spire somewhat raised, conical; sutures much impressed; whorls flattened, sulcate, about six; aperture rather small, ovately rhomboidal, much banded within, obtusely angular at the base; outer lip acute; columella white and incurved.

*Operculum* ovate, spiral, nearly black, with the polar point near the inner edge and close to the base.

*Melania Lewisii*, Proc. Acad. Nat. Sci., 1861, p. 118.

*Hab.*—Coosa and Talapoosa Rivers, Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter and Dr. Lewis.

Diam. .44,

Length .94 inch.

*Remarks.*—Several specimens were sent to me by Dr. Lewis and by Dr. Showalter. It is a well marked species, and has somewhat the appearance of a *Schizostoma*, but there is no fissure. The shoulder below the suture is well marked and like *Schizostoma*, and the suture so wide and deep as to make quite a furrow. There is a disposition to have five to eight coarse rounded striæ, with sulcations between, but some specimens are nearly smooth. These coarse striæ are cord-like and usually dark colored. The dark brown bands are well defined within, and in each of the eight specimens before me, there are four. On the upper part of the whorls the bands are interrupted with yellowish spots. The aperture is more than one-third the length of the shell. I have great pleasure in dedicating this interesting species to my friend James Lewis, M. D., of Mohawk, N. Y., who has done so much to develop the history of our fresh-water *Molluscs*.

GONIOBASIS PERGRATA. Pl. 35, fig. 47.

Testâ striatâ, subfusiformi, obtusè conicâ, crassiusculâ, viridi-eorneâ; spirâ valdè obtusâ; suturis valdè impressis; anfractibus senis, supernè humerosi, striis transversis crebrè indutis, ultimo pergrandi et cylindraceo; aperturâ grandi, elongato-ovatâ, intus-albidâ; labro acuto; columellâ arcuatâ, supernè paulisper callosâ, ad basim subrotundatâ.

Shell striate, subcylindrical, obtusely conical, somewhat thick, greenish horn-color; spire very obtuse; sutures very much impressed; whorls six, shouldered above, covered with transverse striæ, the last very large and cylindrical; aperture large, elongately ovate, whitish within; outer lip acute; columella arcuate, slightly callous above, somewhat rounded at the base.

*Operculum* ovate, spiral, dark brown, with the polar point on the edge near to the base.

*Melania pergrata*, Proc. Acad. Nat. Sci., 1861, p. 122.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .44,

Length .90 inch.

*Remarks.*—This species reminds one of *M. crebristriata*, *M. capillaris* and *M. impressa* (nobis), (all *Goniobases*) by its numerous transverse striae; but these striae are neither so numerous, so regular, or the intervals so deeply impressed, nor do these striae exist on the upper whorls, as in those species. The color of the epidermis is also much lighter and brighter. In outline it is near to *impressa*, but the spire is not so elevated, nor has it the bands which are visible on that species. It is to be regretted that a single specimen only was received, as others may be found with different character. This one has an obscure band on the upper whorls, but none whatever on the lower one. The striae on the outside are represented inside by whitish lines. The aperture is fully half the length of the shell.

GONIOBASIS PAULA. Pl. 35, fig. 48.

Testâ carinatâ, conicâ, tenui, diaphanâ, rufo-corneâ; spirâ subelevatâ; suturis paulisper impressis; anfractibus senis, supernè acuto-carinatis, ultimo subbicarinato; aperturâ parviusculâ, lato-ellipticâ, intus albidâ; labro acuto; columellâ vel albidâ vel rufescente, inflectâ, ad basim obtuso-angulatâ.

Shell carinate, conical, thin, diaphanous, reddish horn-color; spire subelevated; sutures slightly impressed; whorls six, acutely carinate above, the last subbicarinate; whorls rather small, widely elliptical, whitish within; outer lip acute; columella either whitish or reddish, obtusely angular at the base.

*Melania paula*, Proc. Acad. Nat. Sci., 1861, p. 122.

*Hab.*—Cahawba River, Alabama, E. R. Showalter, M. D.

My Cabinet and cabinet of Dr. Showalter.

Diam. .27,

Length .66 inch.

*Remarks.*—A very small species, about one-third of an inch long. Four specimens are before me all nearly of the same size and color. This species is very closely allied to *Melania* (*Goniobasis*) *bicineta*, Anth., but it is not much more than half the size, and the carina below that on the middle of the whorl is more indistinct. In the aperture they also differ, the *bicineta* having it larger and more disposed to be rhombic, and having indistinct bands within, which this has not. In all the specimens the carina is sharp. The aperture is about two-fifths the length of the shell. It reminds one also of *Melania* (*Goniobasis*) *rhombica*, Anth., being about the same length, but that species has a single sharp carina, with a less exerted spire and a larger mouth.

## Genus SCHIZOSTOMA.

It will be observed that I have here adopted my first name (*Schizostoma*) for the division of those *Melanidæ* which have a cut or fissure in the upper portion of the last whorl. This name I proposed in December, 1842. Subsequently finding that it was used by Bronn in 1835, I abandoned it, and proposed the name of *Schizochilus* as a substitute, (Obs. on the Genus Unio, v. 5, p. 51, 1852, and Trans. Am. Phil. Soc. 1852). I am now satisfied that Bronn's name was applied to the same genus—*Euomphalus*—which Sowerby established in 1814, (Min. Conch. tab. 45). This evidently liberates my original name, and Herrmannsen, in the appendix to his "Generum Malacozorum," very properly restores it. It was supposed that this was the *Melatoma* of Swainson, and Mr. Anthony adopted this name. But it is evident that Mr. Swainson's *Melatoma* is not my *Schizostoma*. By reference to his figure (Malacology, p. 342, f. 104) it will be observed at once that there has never been observed in the United States any of the group of which that figure is the type, while it is known that they exist in the islands of the Indian Ocean. Mr. Swainson says (p. 202) that his *Melatoma* was "founded upon a remarkable Ohio shell" sent by Rafinesque. Now, as no member of the family *Melanidæ* with a cut in the lip has ever been found in the Ohio, where such hosts of active collectors have since pursued their investigations, it is perhaps beyond the bounds of possibility that the specimen sent by Rafinesque, so eminently careless and reckless as he always was, should ever have been found there. Indeed, if the specimen figured was sent by Mr. Rafinesque to Mr. Swainson, then the question would arise whether it had not been obtained by Mr. R. from some dealer or collector, who may have obtained it from Asia. I have no doubt of the *Melatoma costata*, which Mr. Swainson has figured, being exotic, and belonging to a group probably from the Philippine Islands. Mr. Anthony says, page 64, Proc. A. N. S. 1860, that "it may be doubted whether Mr. Lea's first name will not eventually prevail, since, before he published *Schizostoma*, Bronn's genus of the same name had been called a synonym of *Bifrontia*, Desh." And that "H. and A. Adams (Gen. Rec. Moll. 1, 105) do not appear correct in giving preference to *Gyrotoma* over *Schizostoma*, Lea," &c. Notwithstanding this, Mr. Anthony in this paper, where he describes nine supposed new species of this genus, adopts the generic name of *Gyrotoma*. It may be added here that Dr. Gray, in his *Genera of Recent Mollusca*, gives *Melatoma* to Mr. Anthony, not to Swainson, while he does not notice the name of *Schizostoma*. Mr. A. does not pretend to claim it, of course, but adopts *Gyrotoma*, Mr. Shuttleworth's name, proposed in 1845, which being three years later cannot have precedence.

The genus *Schizostoma* seems to be capable of being divided into two natural

groups in the form of the *fissura*, the cut in the lip. In one group this fissura is deep and direct, that is parallel with the suture or upper edge of the whorl; in the other it is not deep and is oblique to the suture.

The observations of Dr. Showalter, in his letter accompanying the specimens, as to the habits of the *Schizostoma* are well worth recording. He says, "this genus seems only to flourish among the rocks, in waters flowing through the Carboniferous and Primary Formations. It does not exist in the Black Warrior River at Tuscaloosa, among the Carboniferous rocks, nor at Centreville in the Cahawba River, of the same geological period. From the species described by you in the Transactions of the Am. Phil. Soc., which you kindly sent to me, and whose habitat is given at Tuscaloosa, I was led to examine that locality for them, but found none." It is important to correct the errors of habitat of these (some four or five) species, which I described about sixteen years since. When the exact habitat of a species can be given it ought always to be carefully put down. All the species referred to as existing at Tuscaloosa came to me with that habitat, and now we learn that the genus does not inhabit that part of Alabama. They were probably sent to my friend Dr. Budd, who kindly sent them to me for description if new, from Tuscaloosa, without reference of their being from another district.

In Mr. Anthony's paper (Proc. Acad. Nat. Sci. Feb., 1860), I recognize several of my old species. His *Gyrotoma demissa* I believe to be my *Schizostoma constricta*. His *G. quadrata* to be my *S. incisa*.

SCHIZOSTOMA SHOWALTERII. Pl. 35, fig. 49.

Testâ transversê costatâ, subcylindraceâ, crassâ, castaneâ, minutè striatâ; spirâ elevatâ; suturis impressis; anfractibus subplanulatis; fissurâ submagnâ, profundâ; aperturâ subparvâ, ellipticâ, intus vitatâ; columellâ subcrassâ; labro paulisper crenulato.

Shell transversely ribbed, subcylindrical, thick, chestnut color, minutely striate; spire elevated; sutures impressed; whorls flattened; fissure rather large and deep; aperture rather small, elliptical, banded within; columella thick; outer lip slightly crenulate.

*Operculum* ovate, with the polar point near the inner lower edge.

*Schizostoma Showalterii*, Proc. Acad. Nat. Sci., 1860, p. 93.

*Hab.*—Coosa River, at Uniontown, Alabama. E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .46,

Length .98 inch.

*Remarks.*—Two specimens of this fine species of *Schizostoma* were sent to me last year by Dr. Showalter, after whom I have great pleasure in naming it. His zeal and industry has done much to discover very many new species of *molluscs* which inhabit that part of Alabama in which he resides. This species differs much from any I have

seen. It is somewhat like *pagoda* (nobis), but is much larger, more robust and sub-cylindrical. It also has more and larger ribs, which are very prominent. The specimens before me have on the last whorl seven ribs, the three lower ones being small, the three middle ones large, looking like cords wrapped round the shell. These are of a lighter brown. Two ribs only are visible on the upper whorls. The fissure in the lip is three-tenths of an inch long. The apex being eroded, I am unable to describe that part, nor can I give, consequently, the number of whorls, but they are likely to be seven or eight.

SCHIZOSTOMA CASTANEUM. Pl. 35, fig. 50.

Testâ carinatâ, conicâ, suberassâ, tenebroso-fuscâ, imperforatâ; spirâ elevatâ; suturis valdè impressis; anfractibus senis, planulatis, carinatis, quadrivittatis; fissurâ rectâ, angustâ profundâque; aperturâ parviuseulâ, ellipticâ, intus vittatâ, ad basim subrotundatâ; columellâ albâ, incrassatâ; labro acuto, vix sinuato.

Shell carinate, conical, rather thick, dark brown, imperforate; spire exerted; sutures very much impressed; whorls six, flattened, with a single carina and four bands; lip-cut straight, narrow and deep; aperture rather small, elliptical, banded within, rounded at the base; columella white and thickened; outer lip acute, slightly sinuous.

*Operculum* nearly round, light brown, with the polar point below the middle on the inner side.

*Schizostoma castaneum*, Proc. Acad. Nat. Sci., 1860, p. 186.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of E. R. Showalter, M. D.

Diam. .32,

Length .64 inch.

*Remarks.*—Several specimens are before me of nearly the same size. A single rather obscure carina follows round the middle of the lower whorls, and is exhibited on the upper whorls just above the suture with more force. The four bands are obscure on the outside, but well defined on the inside. One specimen has but three bands, and another has very pale bands. The impression made by the lip-cut is well defined and forms a narrow hem-like line below the suture. The aperture is rather small, not being quite half the length of the shell, and is rounded at the base. It is nearest in outline to *pagoda* (nobis), but may at once be distinguished by the color being usually darker, by being less carinate, in having a deeper lip-cut, and in being rounded at the base, instead of being angular there, as that species is. The aperture is rather more than one-third the length of the shell.

SCHIZOSTOMA HARTMANI. Pl. 35, fig. 51.

Testâ lævi subcylindraceâ, crassâ, luteo-corneâ, imperforatâ; spirâ elevatâ; suturis valdè impressis; anfractibus planulatis. ultimo subgrandi; fissurâ rectâ subbrevisque; aperturâ parviuseulâ, ovatâ. intus

albâ, ad basim obtusè angulatâ; columellâ albâ, incurvâ, infernè paulisper incrassatâ; labro acuto, sinuato.

Shell smooth, subcylindrical, thick, yellowish horn-color, imperforate; spire raised; sutures very much impressed; whorls flattened, the last rather large; fissure straight and rather short; aperture rather small, ovate, white within, obtusely angular at the base; columella white, incurved, somewhat thickened below; outer lip sharp and sinuous.

*Schizostoma Hartmanii*, Proc. Acad. Nat. Sci., 1860, p. 187.

*Hab.*—Coosa River, Alabama, W. D. Hartman, M. D.

My cabinet and cabinet of Dr. Hartman.

Diam. .46,

Length .96 inch.

*Remarks.*—This specimen, which I owe to the kindness of Dr. Hartman, of Westchester, Penna., was no doubt sent to him by Dr. Showalter. It is distinct from any species I have before seen, and is more nearly allied in outline to *Babylonicum* (nobis) than any other species I know. It differs in not being umbilicate, in not having a square shoulder, and in being yellowish horn-color. It is impressed below the hem-like margin of the suture, which the other is not. It is also near to *recta*, Anth., but is stouter, is of a light color, and has a more twisted columella. The specimen in my possession is nearly an inch in length. With a perfect spire it would exceed an inch. All is imperfect about the second whorl, but there are indications of there being at least six. One specimen has no bands, the other has three obscure ones. The aperture is about half the length of the shell. The hem is rather narrow and is well defined. I have great pleasure in naming this species after my friend Dr. Hartman, who has done so much to promote natural science.

#### SCHIZOSTOMA GLANS. Pl. 35, fig. 52.

Testâ lævi, ovato-conicâ, inflatâ, suberassâ, luteo-corneâ vel castaneâ, striatâ, imperforatâ; spirâ obtusè elevatâ; suturis regulariter impressis; anfractibus senis, obsoletè vittatis, ultimo subgraudi; fissurâ rectâ, angustâ profundâque; aperturâ parviusculâ, ellipticâ, intus albidâ, ad basim obtusè angulatâ; columellâ albidâ, supernè incrassatâ; labro acuto, subsinuato.

Shell smooth, ovately conical, inflated, rather thick, yellowish horn-color or chestnut brown, striate, imperforate; spire obtusely elevated; sutures regularly impressed; whorls six, obsoletely banded, the last rather large; lip-cut straight, narrow and deep; aperture rather small, elliptical, white within, obtusely angular at the base; columella white, thickened above; outer lip sharp and somewhat sinuous.

*Operculum* ovate, dark brown, with the polar point near to the inner lower edge.

*Schizostoma glans*, Proc. Acad. Nat. Sci., 1860, p. 186.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .44.

Length .78 inch.

*Remarks.*—This is rather a robust species, and judging from the specimens before me, I should presume that there would be much regularity in the species. On one of the specimens there are two obscure hair-like bands, one on the middle of the body whorl and another near the base. Other specimens have only a very obscure thin band near the base. Very probably specimens may be found with a third band near to the suture, and others with better defined bands. Some were chestnut brown. The upper whorls were rather flattened, and the lines of growth few and obscure. The impression made by the lip-cut is well defined, and forms a strong, narrow, hem-like line below the suture. The outer lip stands close to the body whorl. The aperture is one half the length of the shell, and the base is obtusely angular. This species, in general facies, is near to *glandula*, herein described, but differs in the form of the lip-cut, which is narrow, deep and straight. It is also a much larger species, and is without the well-marked shoulder of *glandula*.

SCHIZOSTOMA GLANDULA. Pl. 35, fig. 53.

Testâ lævi, curtâ, valdè inflatâ, suberassâ, luteo-corneâ, exilissimè striatâ, imperforatâ; spirâ obtusâ; suturis valdè impressis; aufractibus senis, vittatis, ultimo magno et tumido; fissurâ obliquâ brevique; aperturâ subgrandi, ellipticâ, intus albidâ; columellâ albidâ, supernè inerassatâ; labro acuto, subsinuato.

Shell smooth, short, much inflated, rather thick, yellowish horn-color, minutely striate, imperforate; spire short; sutures much impressed; whorls six, banded, the last large and swollen; lip-cut oblique and short; aperture rather large, elliptical, white within; columella whitish and thickened above; outer lip sharp and somewhat sinuous.

*Operculum* ovate, brown, with the polar point very close to the inner lower edge.

*Schizostoma glandula*, Proc. Acad. Nat. Sci., 1860, p. 187.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .36,

Length .57 inch.

*Remarks.*—A single specimen only was received from Dr. Showalter. The lip-cut in this species is not deep, but it is wider than usual, and being oblique, presents more of the whorl within than usual. In the specimen before me there are two small hair-like bands, one immediately under the shoulder and the other very near to the base, and in the middle there is a slight indication of a band, but these indistinct bands do not become visible in the interior except in a very small degree. The shoulder is slightly impressed, giving the suture a hem. In color it is nearly the same with *glans*, herein described, but it differs entirely in the lip-cut, and is a much smaller species with a much lower spire. It is very likely that in other specimens the color may be found to vary. The outer lip stands well off from the body whorl,

and the base is subangular. The aperture is more than one half the length of the shell. The hem is large and well defined. It is near to *virens* (nobis) in outline and size, but differs entirely in the color, bands and shoulder.

SCHIZOSTOMA ALABAMENSE. Pl. 35, fig. 54.

Testâ striatâ, ellipticâ, robustâ, luteo-olivaceâ, imperforatâ; spirâ obtuso-conoideâ; suturis valdè impressis; anfractibus senis, vittatis, subinflatis, ultimo pergrandi; fissurâ obliquâ subbrevisque; aperturâ subgrandi, ovatâ, intus vittatâ, ad basim obtusè angulatâ; columellâ albâ, infernè et supernè parum incrassatâ; labro acuto, sinuato.

Shell striate, elliptical, stout, yellowish-olive, imperforate; spire obtusely conical; sutures very much impressed; whorls six, banded, rather inflated, the last very large, fissure oblique and rather short; aperture rather large, ovate, banded within and obtusely angular at the base; columella white, somewhat thickened above and below; outer lip sharp and sinuate.

*Schizostoma Alabamense*, Proc. Acad. Nat. Sci., 1860, p. 187.

*Hab.*—Alabama, B. W. Budd, M. D, and E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Budd and Dr. Showalter.

Diam. .50,

Length .90 inch.

*Remarks.*—The specimen from Dr. Budd has been a long time in my possession, and was considered to be an inflated variety of *excisa*, but specimens recently received from Dr. Showalter satisfy me that it is distinct. It is among the largest of the genus, being nearly an inch long, and may be distinguished by its robust form and its regular elliptical outline. The specimens before me have three broad, dark purple bands within, which give an indistinct dark green hue to the outside, and stop short of the edge. The lip-cut stands well out, and the hem-like margin is distinct and yellowish. The base of the columella is yellowish. The aperture is half the length of the shell. The hem is yellow, broad and well marked.

SCHIZOSTOMA SPILLMANII. Pl. 35, fig. 55.

Testâ striatâ, subcylindraceâ, subcrassâ, luteo-fuscâ, imperforatâ; spirâ obtusè, conoideâ; suturis impressis; anfractibus senis, valdè vittatis, planulatis, ultimo grandi; fissurâ obliquâ subbrevisque; aperturâ grandi, ovatâ, intus vittatâ, ad basim obtusè angulatâ; columellâ albâ, supernè incrassatâ; labro acuto sinuatoque.

Shell striate, subcylindrical, rather thick, yellowish brown, imperforate; spire obtuse, conoidal; sutures impressed; whorls six, very much banded, flattened, the last large; fissure oblique and rather short; aperture large, ovate and banded within, obtusely angular at the base; columella white, thickened above; outer lip sharp and sinuous.

*Operculum* ovate, spiral, rather large, dark-brown, with the polar points near to the left edge, about 1-5th above the basal margin.

*Schizostoma Spillmanii*, Proc. Acad. Nat. Sci., 1861, p. 54.



*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Spillman and Dr. Showalter.

Diam. .48,

Length .92 inch.

*Remarks.*—I have a number of specimens chiefly young, from Dr. Spillman, and a fine suite of different ages from Dr. Showalter. There is much difference among them, some being subcylindrical, while others are disposed to be oval. This species is nearly allied to *Wetumpkaensis* (nobis) and closely resembles it in the adult state, but in the young state the two species differ very much. The young of *Wetumpkaensis* is remarkably carinate on the middle of the whorl, and this is more marked on the superior whorls, the epidermis being of a light yellowish horn-color, with a distinct brown band on the upper portion of the whorl, and generally two below, sometimes three. The *Spillmani* has a very obtuse angle along the middle of the whorl, which does not show in the upper whorls, which are dark brown, and the band is interrupted, making the spire somewhat maculate. The aperture is not quite half of the length of the shell. The hem is not well defined. I name this after my friend Dr. Spillman, who sent me a number of fine specimens, old and young.

SCHIZOSTOMA WETUMPKAENSE. Pl. 35, fig. 56.

Testâ striatâ, ovato-cylindraceâ, crassâ, pallido-fuscâ, perforatâ; spirâ obtusâ, conoideâ; suturis valdè impressis; anfractibus senis, vittatis, planulatis, ultimo grandi; fissurâ obliquâ brevique; aperturâ grandi, ovatâ, intus vittatâ, ad basim obtusè angulatâ; columellâ albâ, supernè incrassatâ; labro acuto, sinuato.

Shell striate, ovately cylindrical, thick, light brown, umbilicate; spire obtuse, conoidal; sutures very much impressed; whorls six, banded, flattened, the last large; fissure oblique and short; aperture large, ovate, banded within, at the base obtusely angular; columella white, thickened above; outer lip sharp and sinuous.

*Operculum* spiral, large and long, the polar point being near to the lower left edge.

*Schizostoma Wetumpkaense*, Proc. Acad. Nat. Sci., 1860, p. 187.

*Hab.*—Coosa River, at Wetumpka, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .44,

Length .70 inch.

*Remarks.*—Among the specimens from Dr. Showalter were a number of adults and young of this species. Some were eroded so much as to exhibit little more than the body whorl. The more perfect ones still slightly eroded at the apex exhibited six whorls. The half-grown have five whorls, with a cord-like carina on the middle of each, and this carina is raised much above the surface. The quite young have a sharp apex, and carry the carina to near the apex. The suite, which I owe to the kindness of Dr. S., consists of some eighteen specimens, varying from one-fourth to

nearly a whole inch in size. In general outline this species approaches *S. Buddii* (nobis), but it is more cylindrical when full grown, and generally has bands. Besides it is umbilicate, while *Buddii* is not. Usually *Wetumpkaense* is striate and banded, but it is not universally the case. The aperture is less than half the length of the shell. The hem is yellowish and not well marked.

SCHIZOSTOMA PUMILUM. Pl. 35, fig. 57.

Testâ striatâ, turbonatâ, subtenui, pallido-corneâ, imperforatâ; spirâ valdè obtusâ; suturis valdè impressis; anfractibus seuis, ventricosi, ultimo pergrandi; fissurâ reetâ, subbrevique; aperturâ parviusculâ, ovatâ, intus albâ, ad basim angulatâ et subcanaliculatâ; columellâ albâ, contortâ, infernè inerassatâ; labro acuto, sinuato.

Shell striate, top-shaped; rather thin, pale horn-color, imperforate; spire very obtuse; sutures much impressed; whorls six, ventricose, the last very large; fissure straight and rather short; aperture rather small, ovate, white within, angular at the base and somewhat canaliculate; columella white, twisted and thickened below; outer lip acute and sinuous.

*Schizostoma pumilum*, Proc. Acad. Nat. Sci., 1860, p. 187.

*Hab.*—Alabama, B. W. Budd, M. D.

My cabinet and cabinet of Dr. Budd, New York.

Diam. .40,

Length .63 inch.

*Remarks.*—This is a rather small dwarfish looking species, nearly as wide as it is long, which I have had for a long time from Dr. Budd. One of the specimens has a few obscure bands. It is nearly allied to *glandula* (nobis), but the spire is higher, and it is striate, while the other is not. It is not likely to be confounded with *glans* (nobis,) as that is a large species with a higher spire. The hem-like line left by the lip-cut is large and well-defined round the whorls. The aperture is about half the length of the shell. One of the specimens before me has three indistinct bands. The other two have none.

SCHIZOSTOMA GLOBOSUM. Pl. 35, fig. 58.

Testâ transversè striatâ, globosâ, subtenui, luteolâ, imperforatâ; spirâ curtâ, obtusè conoideâ; suturis impressis; anfractibus quaternis, triyittatis, ultimo grandi; fissurâ reetâ, angustâ brevique; aperturâ subgrandi, ellipticâ, intus vittatâ, ad basim angulatâ; columellâ albâ, incurvatâ; labro acuto, expanso.

Shell transversely striate, globose, rather thin, yellowish, imperforate; spire short, obtusely conical; sutures impressed; whorls four, three-banded, the last large; lip-cut straight, narrow and short; aperture rather large, elliptical, banded within and angular at the base; columella white, incurved; outer lip sharp and expanded.

*Operculum* ovate, rather light brown, with the polar point near the inner lower edge.

*Schizostoma globosum*, Proc. Acad. Nat. Sci., 1860, p. 187.

*Hab.*—Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .32,

Length .48 inch.

*Remarks.*—This is a very small globose species, more rounded and inflated than any other which has come under my notice, and it is the smallest which I have seen. The description being made from two specimens only, it may be found to vary when others are observed. In this specimen the three bands are broad and of a dark brown, the two upper ones having on the outside raised striæ running parallel to the edges. The aperture is large, and is rather more than half the length of the shell. The impression made by the lip-cut is well defined and forms a narrow helm-like line below the suture. This species is not likely to be confounded with any of the species known, being smaller than all but *laciniatum* (nobis), which is more conical. The aperture is nearly two-thirds the length of the shell.

SCHIZOSTOMA VIRENS. Pl. 35, fig. 59.

Testâ subnodulosâ, valdè inflatâ, suberassâ, tenebroso-viridî, exilissimè striatâ, imperforatâ; spirâ obtusâ; suturis impressis; anfractibus subplanulatis et trivittatis; fissurâ obliquâ brevique; aperturâ elongatâ, subpyriformi, intus tenebroso-vittatâ; columellâ supernè albidâ et incrassatâ; labro acuto, sinuato.

Shell very slightly nodulous, very much inflated, rather thick, dark green, very minutely striate, imperforate; spire short; sutures impressed; whorls rather flattened and with three bands; lip-cut oblique, short; aperture elongate, nearly pear-shaped, within darkly banded; columella whitish and thickened above; outer lip sharp and sinuous.

*Operculum* ovate, dark brown, with the polar point near to the inner lower edge.

*Schizostoma virens*, Proc. Acad. Nat. Sci., 1860, p. 187.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .32,

Length .50 inch.

*Remarks.*—This is rather a small species, at least the specimens before me indicate this. There appear to be about six whorls, the upper ones being disposed to put on indistinct folds. The lower whorl is flattened on the middle, has a distinct shoulder above, the top of which is yellowish. It is furnished with three dark broad bands. There is no appearance of a hem below the suture. The upper whorls are slightly inflated. The lines of growth are distinctly marked. The aperture is nearly two-thirds the length of the shell, and the base is subangular, and disposed to form a channel like *Lithasia*. The three dark broad bands are well marked within the aperture. This species is nearer in general outline and color to *bulbosa*, Anth., than any which have come under my notice, but it does not belong to the deep fissured group and the spire is by no means so high. The aperture is more than half the length of the shell.

## Genus ANCULOSA.

## ANCULOSA TURBINATA. Pl. 35, fig. 60.

Testâ lævi, subrotundâ, crassâ, ponderosâ, tenebroso-corneâ, trivittatâ; spirâ obtusâ, vix exsertâ; suturis valdè impressis; anfractibus quaternis, ultimo pergrandi; aperturâ magnâ, ovatâ, intus albidâ, trivittatâ, ad basim recurvatâ; columellâ incurvâ, impressâ; labro acuto, expanso, siuato.

Shell smooth, subrotund, thick, heavy, dark-horn color, three-banded; spire obtuse, scarcely exerted; sutures very much impressed; whorls four, the last very large; aperture large, ovate, within white and three-banded, recurved at the base; columella incurved, impressed; outer lip acute, expanded and sinuous.

*Anculosa turbinata*, Proc. Acad. Nat. Sci., 1861, p. 54.

*Hab.*—North Alabama, Prof. M. Tuomey and Dr. Lewis. Tuscaloosa, Dr. Budd.

My cabinet and cabinets of Dr. Lewis and Dr. Budd.

Diam. .56,

Length .70 inch.

*Remarks.*—I have seen only three specimens of this species. One, that which is figured, I have had for some years. It is not easily confounded with any species I know, being more turbinate than any which has come under my notice. It is broad above and pointed below, and has an abrupt curvature near the base of the columella made by the impressed callus over the umbilical region. The best specimen has three well-defined brown bands, more distinct within, the other two have them indistinct. These bands do not reach the edge, and the upper one is much the larger. There is a disposition on the callus above and below to be tinted with brown.

## ANCULOSA FORMOSA. Pl. 35, fig. 61.

Testâ lævi, globosâ, subtenui, diaphanâ, vel luteolâ vel crocatâ, valdè vittatâ et maculatâ; spirâ depressâ, vix conspicuâ; suturis impressis; anfractibus ternis, ultimo grandi et valdè ventricoso; aperturâ grandi, subrotundâ, intus pallido-erocatâ et tenebroso vittatâ; columellâ infernè et supernè incrassatâ et pallido-purpuratâ; labro acuto et valdè expanso.

Shell smooth, globose, rather thin, semi-transparent, yellowish or saffron color, very much banded and maculate; spire depressed, scarcely conspicuous; sutures depressed; whorls three, the last large and very ventricose; aperture large, rounded; within pale saffron, with dark bands; columella thickened below and above and pale purple; outer lip sharp and very much expanded.

*Operculum* small, thin, with the polar point below the centre towards the inner edge.

*Anculosa formosa*, Proc. Acad. Nat. Sci., 1860, p. 187.

*Hab.*—Coosa River, Shelby County, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .38,

Length .44 inch.

*Remarks.*—I have three specimens before me of this very beautiful species. While

it has much resemblance to the rounded varieties of that protean species, *prærosa*, Say, it may be distinguished by its being still more globose than its most globose varieties, by its delicacy, smoothness and brilliancy. Dr. S. says in his letter that he thinks it decidedly distinct from all others he has out of many thousands, and that "it is more rotund than any other." The largest specimen is four fifths of an inch long, has four well-marked continuous bands, with rows of maculation between them. The middle-aged specimen is quite saffron, has the same number of bands with the rows of maculation, but these bands are somewhat broken up, and the maculations are not so regular. In the third, the youngest one, the maculations are almost entirely absent. The largest specimen has a number of impressed revolving lines, stronger towards the base. The description of the operculum is made from the middle-aged, the only one which accompanied the three, and in the older ones this may differ much. In all the specimens before me, the upper whorls are almost entirely covered by the last one. In the full grown one, the deep color of the upper band on the inside continues over on to the callus of the columella. Two other specimens accompanying these are considered by Dr. S. to be the same. They are apparently about half-grown. They differ slightly in form, and totally in the colored bands, which in these specimens are replaced over the whole surface with oblong maculations, which, at the upper portion of the whorl run together, and form an irregular longitudinal band between low plications. I have been disposed to think that these two specimens may prove to be varieties of *picta*, Con., which puts on so many various kinds of bands, but the form is more globose than any *picta* I have seen. The aperture is nearly the whole length of the shell. Two adult specimens received since the above was written, have coarse transverse striæ and one is without any colored bands. The whole surface being a yellowish horn-color. The aperture is about 5-6ths the length of the shell.

ANCULOSA SHOWALTERII. Pl. 35, fig. 62.

Testâ valdè costatâ, suborbiculari, crassâ, tenebroso-fuscâ, nigricante, exilissimè striatâ; spirâ brevissimâ; suturis valdè impressis; anfractibus inflatis, septenis transversis costis indutis; aperturâ magnâ, subrotundâ, supernè subangulatâ, internè tenebroso-vittatâ; columellâ crassâ, planulatâ, tenebroso-fuscâ; labro valdè extenso et valdè crenulato.

Shell much ribbed, suborbicular, thick, very dark brown, almost black, very finely striate; spire very short; sutures much impressed; whorls inflated, covered with seven transverse ribs; aperture large, nearly round, subangular above, with dark bands inside; columella thick, flattened, dark brown; outer lip very much expanded and very much crenulate.

*Operculum* ovate, thin, with the polar point on the inner inferior edge.

*Anculosa Showalterii*, Proc Acad. Nat. Sci., 1860, p. 93.

*Hab.*—Coosa River, Uniontown, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .37,

Length .40 inch.

*Remarks.*—Several specimens of this very remarkable *Anculosa* were sent to me by Dr. Showalter. It differs from all the species I have seen in its peculiar large ribs which girt it with great strength. The apices being eroded, the number of whorls cannot be ascertained, but there are probably only three. On the second whorl only three ribs appear above the suture. It reminds us at once of *Paludomus loricata*, Reeve, but the transverse ribs are not beaded like that shell. It is also a diminutive shell compared with that, and has a more depressed spire. The ribs are very large, and sometimes obscurely maculate. They are accompanied on the inside with dark brown bands which terminate at the edge of the lip, each in a small furrow, which produces the crenulations of the lip.

ANCULOSA VITTATA. Pl. 35, fig. 63.

Testâ lævi, subglobosâ, crassâ, luteolâ, valdè vittatâ; spirâ obtusâ; suturis impressis; anfractibus quaternis, inflatis, ultimo grandi et ventricoso; aperturâ rotundâ, in faucibus valdè constrictâ, intus vittatâ; columellâ valdè incrassatâ, planulatâ, purpuratâ; labro acuto, expanso.

Shell smooth, subglobose, thick, yellowish, very much banded; spire obtuse; sutures impressed; whorls four, inflated, the last large and very much inflated; aperture round, very much contracted in the throat, banded within; columella very much thickened, flattened and purplish; outer lip sharp and expanded.

*Anculosa vittata*, Proc. Acad. Nat. Sci., 1860, p. 188.

*Hab.*—Coosa River, at Wetumpka, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .30,

Length .33 inch.

*Remarks.*—This is a very remarkable species, perhaps more like a much-banded *prærosa*, Say, than any other. It entirely differs from that species in the columella being very thick and flattened, and which nearly fills up half the aperture. The banded varieties of *prærosa* differ very much from each other, while this seems to be exceedingly regular. The five specimens before me have each four dark brown bands nearly covering up the yellow ground. The upper one is placed immediately under the suture, and is broader than the two next, which are approximate, revolving on the middle of the whorl. The fourth is larger again and revolves near to the base. I have no doubt, judging from the five individuals before me, that the characters of this little species will not be changeable, for they present no difference in phase whatever, although they are of several ages. The aperture is about two-thirds the length of the shell.

## ANCULOSA LEWISII. Pl. 35, fig. 64.

Testâ lævi, ellipticâ, subcrassâ, subinflatâ, luteo-corneâ; spirâ obtusâ, vix exsertâ, acuminatâ; suturis vix impressis; aufractibus quinis, ultimo pergrandi; aperturâ magnâ, regulariter ovatâ, intus albidâ; columellâ incurvâ, supernè et infernè parum incrassatâ; labro acuto, subexpanso, parum sinuato.

Shell smooth, elliptical, rather thick, somewhat inflated, yellowish horn-color; spire obtuse, scarcely exerted, acuminate; sutures scarcely impressed; whorls five, the last very large; aperture large, regularly ovate, whitish within; columella incurved, a little thickened above and below; outer lip acute, somewhat expanded and slightly sinuous.

*Operculum* rather large, very dark brown, ovate, with the polar point very near the base on the left.

*Anculosa Lewisii*, Proc. Acad. Nat. Sci. 1861, p. 54.

*Hab.*—Tennessee, James Lewis, M. D.

My cabinet and cabinet of Dr. Lewis.

Diam. .30,

Length .58 inch.

*Remarks.*—Dr. Lewis sent me three specimens for examination. I presume all he had received from Tennessee. It is quite distinct from any *Anculosa* I have seen. It verges toward the genus *Lithasia* in some of its characters. It reminds one of *Melania obovata*, Say, which probably should be removed from that genus to this. The aperture is more rounded at the base than in that shell, and the spire is much more obtuse, giving the outline of the two shells a very different appearance. It reminds one of the genus *Chilina*, Gray, but cannot be mistaken for that genus. The last whorl is so large that it nearly covers up the spire and leaves only a small portion extruded. Two of the specimens exhibit near the apex quite a disposition in the young to be earinate. In an immature state, therefore, they would present quite a different appearance, as the shoulder would be quite square.

## ANCULOSA COOSAENSIS. Pl. 35, fig. 65.

Testâ lævi, obtuso-conicâ, crassâ, tenebroso-corneâ, valdè vittatâ; spirâ exsertâ, ad apicem obtusâ; suturis valdè impressis; aufractibus quaternis, infernè suturis valdè constrictis, ultimo magno; aperturâ rotundatâ, albidâ, intus valdè vittatâ; columellâ incrassatâ, incurvâ, tenebroso-purpureâ; labro acuto, expanso.

Shell smooth, obtusely conical, thick, dark horn-color, very much banded; spire elevated, obtuse at the apex; sutures very much impressed; whorls four, very much constricted below the sutures, the last large; aperture rounded, white, much banded within; columella thickened, incurved, dark purple; outer lip acute and expanded.

*Operculum* rather large, elliptical, dark brown, with the polar point close to the left edge towards the base.

*Anculosa Coosaensis*, Proc. Acad. Nat. Sci., 1861, p. 54.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .34,

Length .55 inch.

*Remarks.*—This species is more nearly allied to *tintinnabulum* (nobis) than any other. It differs in being more elongate, having a higher spire, having a less dilate aperture, and in usually having four bands, the *tintinnabulum* usually having two bands, or being without any. In two of the *Coosaensis*, out of six specimens before me, the bands are interrupted, changing them to rows of square maculations. Some of the specimens are slightly umbilicate. The aperture is rather more than half the length of the shell.

ANCULOSA CONTORTA. Pl. 35, fig. 66.

Testâ lævi, globoso-ovoideâ, crassâ, luteo-corneâ; spirâ elevatâ; suturis valdè impressis; anfractibus inflatis, obsolete transversè striatis; aperturâ parvâ, subrotundâ, contractâ, intus luteo-albâ; columellâ incrassatâ; labro acuto, expanso.

Shell smooth, ovately rounded, thick, yellowish horn-color; spire raised; sutures deeply impressed; whorls inflated, obscurely and transversely striate; aperture small, nearly round, constricted, yellowish white within; columella thickened; outer lip acute and expanded.

*Anculosa contorta*, Proc. Acad. Nat. Sci. 1860, p. 187.

*Hab.*—Coosa River, at Wetumpka, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .36,

Length .50 inch.

*Remarks.*—A single specimen only was received from Dr. Showalter, which, being much eroded at the apex, prevents a perfect description being made. But the number of whorls appear to be about four. The form is remarkable for an *Anculosa*, the outline presenting the appearance of a *Paludina*; but the callus on the columella and its whole massiveness, forbid its being placed in that genus, while the regular rotundity of the whorls are similar in some measure to it. The aperture is about half the length of the shell.

Genus LITHASIA.

LITHASIA IMPERIALIS. Pl. 35, fig. 67.

Testâ tuberculatâ, fusiformi, subcrassâ, tenebroso-corneâ; spirâ elevatâ, conoideâ; suturis irregulariter et valdè impressis; anfractibus senis, ultimo subgrandi, supernè irregulariter tuberculatis, subinflatis; aperturâ parviusculâ, elongato-rhomboidèâ, intus albidâ, fuscis capillaribus instructis, ad basim caudiculatâ et recurvatâ; columellâ sigmoideâ, supernè paulisper incrassatâ; labro subexpanso, margine acuto.

Shell tuberculate, fusiform, rather thick, dark horn-color; spire raised, conoidal; sutures irregularly and much impressed; whorls six, the last rather large, irregularly



tuberculate above, rather inflated; aperture rather small, elongately rhomboidal, whitish within, furnished with brown hair-like lines, channelled at the base and re-curved; columella sigmoid, slightly thickened above; outer lip somewhat expanded, acute at the margin.

*Operculum* rather small, very dark brown, rhomboidal, with the polar point on the left edge near the base.

*Lithasia imperialis*, Proc. Acad. Nat. Sci., 1861, p. 55.

*Hab.*—North Alabama, Prof. Tuomey.

My cabinet.

Diam. .70,

Length 1.55 inch.

*Remarks.*—This is much the largest *Lithasia* I have seen. Although several of the whorls of the vertex are eroded off, still it measures one and a half inches in length. A single specimen only was received, and this without the operculum. The tubercles are large and irregular, and not much raised. The capillary brown lines in the interior are numerous and rather obscure, but this may not be the case with more perfect specimens. They seem to replace the usual bands. They do not reach the edge, which is bordered with white. Below the sutures there is a stricture which nearly amounts to a furrow. It more nearly resembles *Melania*\* (*Lithasia*) *Duttoniana*, (nobis), than any other known species, but it is a larger, more ponderous species, and has not the numerous small tubercles, nor the bands of that species.

LITHASIA TUOMEYI. Pl. 35, fig. 68.

Testâ tuberculatâ, valdè inflatâ, suberassâ, tenebroso-corneâ; spirâ obtuso-conoideâ; suturis impressis; anfractibus quinis, ultimo grandî, infrâ suturis obliquè tuberculatis; aperturâ magnâ, rhomboideâ, intus albidâ, obsoletè vittatâ, ad basim canaliculatâ; columellâ valdè incurvatâ, supernè et infernè incrassatâ; labro expanso, margine acuto.

Shell tuberculate, much inflated, rather thick, dark horn-color; spire obtusely conoidal; sutures impressed; whorls five, the last large, below the sutures obliquely tuberculate; aperture large, rhomboidal, whitish within, obscurely banded, channelled at the base; columella very much incurved, thickened above and below; outer lip expanded, acute at the margin.

*Lithasia Tuomeyi*, Proc. Acad. Nat. Sci., 1861, p. 55.

*Hab.*—North Alabama, Prof. Tuomey.

My cabinet.

Diam. .64,

Length 1.04 inch.

*Remarks.*—A single specimen only was sent to me by Prof. Tuomey. It was with *L. imperialis*, herein described. Being 1.04 of an inch in length and .64 in

\* This species was described before Mr. Haldeman established his genus *Lithasia*, to which this division belongs and with which I have placed it.

diameter, it will be seen that the proportions differ very much from that species. It cannot be confounded with *Lithasia semigranulata* (*Melania*, Desh.), for that species is always more raised in the spire and studded with numerous rather small tubercles. It is more closely allied to *Melania* (*Lithasia*) *salebrosa*, Con., but that species has a lower spire, has larger and usually more tubercles, and these, if not vertical, incline to the left, while those on *Tuomeyi* are irregular and incline very much to the right, the number on the specimen before me being five on half of the last whorl. It is closely allied to *Melania* (*Lithasia*) *Florentiana*, (nobis,) but differs much in the tubercles, in being a heavier shell, less acuminate, in being thicker on the columella and less open in the channel. The *Tuomeyi* is much thicker above and below on the columella, has three obscure bands within, and the outer lip is thickened and white inside the edge.

This species and *imperialis* were accompanied by many specimens of *semigranata* and *Florentiana*. The exact habitat was not mentioned. I have peculiar pleasure in dedicating this species to my friend, the late Professor Tuomey, whose able report on the geology of S. Carolina and Alabama have justly gained him so much reputation.

LITHASIA DILATATA. Pl. 35, fig. 69.

Testâ lævi, subglobosâ, suberassâ, glauco-virente, infrâ suturis luteolâ, obsoletè vittatâ; spirâ obtusè conoideâ; suturis irregulariter impressis; anfractibus quinis, ultimo grandi et ventricoso; aperturâ grandi, subrhomboideâ, intus fusceseente, ad basim angulatâ; columellâ infernè et supernè inerassatâ, incurvâ; labro aucto et valdè dilatato.

Shell smooth, subglobose, rather thick, greyish green, yellowish below the sutures, obscurely banded; spire obtusely conical; sutures irregularly impressed; whorls five, the last one large and ventricose; aperture large, subrhomboidal, brownish within and angular at the base; columella thickened above and below, incurved; outer lip sharp and much dilated.

*Lithasia dilatata*, Proc. Acad. Nat. Sci., 1861, p. 55.

*Hab.*—Tennessee, Dr. Troost.

My cabinet and cabinet of the Smithsonian Institution.

Diam. .45,

Length .73 inch.

*Remarks.*—This is a well-characterized species, nearly allied to two species which I described some years since before *Lithasia* was established, under the names of *Melania Florentiana* and *M. venusta*, both of which must be removed to the well recognized genus *Lithasia*. It is nearest to the former, but is more globose, more glaucous and darker inside, and has a larger callus above. The bands on this species are very obscure and are, indeed, simply the general color interrupted by light, transverse, fine lines. On the upper part of body whorl there are several low tubercles, which may not be found in all the individuals of this species. The callus above is

tinted with brown. The outer lip is bordered with white. The length of the best specimen is nearly three-quarters of an inch, and the aperture is more than half the length of the shell.

LITHASIA SUBGLOBOSA. Pl. 35, fig. 70.

Testâ tuberculatâ, subglobosâ, crassâ, luteo-corneâ, bivittatâ; spirâ vix exsertâ; suturis impressis; anfractibus quinis, ultimo grandissimo, apud humeris tuberculatis; aperturâ magnâ, rhomboideâ, intus albâ, bivittatâ, ad basin canaliculatâ; columellâ valdè incurvatâ, supernè et infernè valdè incrassatâ; labro expanso, margine acuto.

Shell tuberculate, subglobose, thick, yellowish horn-color, double-banded; spire scarcely exerted; sutures impressed; whorls five, the last very large, towards the shoulder tuberculate; aperture large, rhomboidal, within white and double-banded, channelled at the base; columella very much incurved, very much thickened above and below; outer lip expanded, acute at the margin.

*Operculum* rather small, very dark brown, subovate, with the polar point within the lower left edge.

*Lithasia subglobosa*, Proc. Acad. Nat. Sci., 1861, p. 55.

*Hab.*—Tennessee, Prof. G. Troost.

My cabinet.

Diam. .48,

Length .60 inch.

*Remarks.*—Two specimens of this remarkably globose species have been in my possession for a long time. I had doubts of their being only the young of *Melania* (*Lithasia*) *salebrosa* Con., but they are so different from any young of that species which I have seen that I cannot now doubt of their being entirely distinct. I know of no species which has so obtuse a spire. In this it resembles *Anculosa*, but the well characterized columella forbids its being at all confounded with any species of that genus. The callus above and below is unusually strong, below it almost amounts to a fold. One of the specimens is full grown, and has five tubercles on the shoulder of the outer half of the last whorl, and near the edge there are three above these five. The smaller one is little more than half grown, and has not as yet formed any tubercles. The two broad bands are below the row of tubercles. The last whorl is so large that it nearly covers all the others, leaving merely a point to mark the vertex. The two bands are well pronounced interiorly as well as exteriorly.

LITHASIA FUSIFORMIS. Pl. 35, fig. 71.

Testâ sulcatâ, fusiformi, subtenui, rufo-fuscâ, quadro-vittatâ; spirâ conoideâ; suturis irregulariter impressis; anfractibus senis, ultimo magno et parum inflato; aperturâ elongato-rhomboideâ, intus albidâ, quadro-vittatâ, ad basin canaliculatâ et recurvatâ; columellâ sigmoideâ, supernè incrassatâ; labro subconstricto, margine acuto.

Shell sulcate, fusiform, rather thin, obscurely furrowed, reddish brown, four-banded,

conical, sutures irregularly impressed; whorls six, the last large and somewhat inflated; aperture elongately rhomboidal; whitish within and four-banded, channelled and recurved at the base; columella with double curve, thickened above; outer lip somewhat constricted, with an acute margin.

*Operculum* small, ovate, dark brown, serrate around the base and outer margin, with the polar point inside the left edge about one-third above the basal margin.

*Lithasia fusiformis*, Proc. Acad. Nat. Sci., 1861, p. 54.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter and Dr. Lewis.

Diam. .30,

Length .52 inch.

*Remarks.*—Six specimens are before me. Neither, I think, quite full grown. This species differs materially from *Showalterii* (nobis) from the same river. It is not quite so large, is not inflated, but more constricted on the body whorl, and has rather distant, low, longitudinal folds, which in some specimens are scarcely observable. It differs in having four brown bands, the *Showalterii* having but three. The most remarkable character of *fusiformis* is the long recurved channel which brings it close to the genus *Io*. All the specimens have transverse furrows, which are more strongly developed in some of them than in others. The *operculum* is very remarkable, having the margin from near to the polar point round to the upper part of the outer margin completely *serrate*. Fortunately two of the specimens were found to have the operculum adhering to the desiccated parts within, and both were found to possess this peculiar character, which I have never observed in any other species of the *Melanidæ*. The aperture is nearly two-thirds the length of the shell.

LITHASIA SHOWALTERII. Pl. 35, fig. 72.

Coacta lævi, ovato-cylindraceâ, suberassâ, luteo-corneâ, vittatâ; spirâ obtusè conoideâ; suturis valdè impressis; anfractibus senis, ultimo grandi et planulato; aperturâ grandî, subovatâ, elongatâ, intus albidâ, tenebroso-vittatâ, ad basim obtusè angulatâ; columellâ infernè et supernè incrassatâ, incurvâ; labro acuto et subconstricto.

Shell smooth, ovately cylindrical, rather thick, yellowish horn-color, banded; spire obtusely conical; sutures very much impressed; whorls six, the last large and flattened; aperture large, subovate, elongate, whitish within, dark-banded, obtusely angular at the base, columella thickened above and below, incurved; outer lip acute and somewhat constricted.

*Lithasia Showalterii*, Proc. Acad. Nat. Sci., 1860, p. 188.

*Hab.*—Cahawba River, at Centreville, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .38,

Length .70 inch.

*Remarks.*—This species presents a number of varieties, but the character of the flattened enlarged side, frequently producing quite a large shoulder, is generally preserved.

Sixteen, out of nineteen specimens before me, have very much the same character of bands, viz: three broad, nearly equal distant revolving ones. The other three lose all the yellowness of the epidermis, and present an intensely deep purplish brown hue inside and out. The largest of these three has a more constricted aperture than any of the others, and it has revolving striæ more distinct towards the base, which I have not observed in the others. The aperture is also quite channelled below, which is indistinct in the others. Another of these three dark specimens has a higher spire and a shorter aperture, leaning towards the form of a *Melania*. The shoulder in many of the specimens is large and well pronounced, while in others it is small. The aperture is about two-thirds the length of the shell. This species reminds one as to its outline of *Melania undosa*, Anth., from Kentucky. It is, however, larger, more cylindrical and has the callus on the columella, which *undosa*, of course, has not. *Undosa* is also much paler and has a higher spire. I have great pleasure in dedicating this species to Dr. Showalter, who is doing so much for the Natural History of his adopted State.

## LITHASIA NUCLEA. Pl. 35, fig. 73.

Testâ levî, ellipticâ, luteo-olivâ, crassâ, solidâ, trivittatâ; spirâ obtusè conoideâ; suturis impressis; anfractibus quinîs, ultimo grandi et parum inflato; aperturâ parviuseulâ, ovato-rotundâ, intus albidâ, trivittatâ, ad basim recurvatâ; columellâ infernè et supernè incrassatâ, incurvâ; labro acuto.

Shell smooth, elliptical, yellowish olive, thick, solid, three-banded; spire obtuse-conical; sutures impressed; whorls five, the last large and slightly inflated; aperture rather small, ovately rounded, white and three-banded within, recurved at the base; columella thickened above and below, incurved; outer lip sharp.

*Lithasia nuclea*, Proc. Acad. Nat. Sci., 1860, p. 188.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .34,

Length .60 inch.

*Remarks.*—I have nine specimens before me of this little species, which has much the aspect of an *Anculosa*, as well also of some *Melania*. But the callus on the lower and upper parts of the columella naturally place it in *Lithasia*. The longest of these specimens is not more than half an inch, and all are banded precisely alike, the three bands being nearly of equal size and equidistant. It would appear then that these bands are more constant than usual in the *Melanidæ*. Four out of the nine have a light purple spot on the middle of the columella, the others are entirely white. Without being at all like *Melania obovata*, Say, (*consanguinea*, Anth.), in outline or general appearance, the columella is very much the same, both being thick with an incipient channel at base. Indeed, *M. obovata* properly belongs to the genus *Lithasia*. In form, color and bands, *nuclea* reminds one of *M. basalis* (nobis), but it is more rotund, has a thicker columella, has a less brilliant epidermis, and is a

more solid shell. The aperture is about one-half the length of the shell. Dr. Showalter says in his letter that "this is the most uniform species in his collection."

### Genus STREPHOBASIS.\*

Testa cylindracea. Apertura subquadrata. Columella internè incrassata et retro-canaliculata. Operculum corneum, ad spiram pertinens.

The mollusk, for which I propose this genus, was sent to me by Wm. Spillman, M. D., of Columbus, Mississippi, and I have before me over a dozen specimens from a third to nearly an inch in length. The very great number of species of the genus *Melania* makes it desirable to eliminate any group, with characters sufficiently distinct to permanently recognize it. The very remarkable retrorse callus at the base of the column, causing a lateral sinus, is characteristic of this genus.

#### STREPHOBASIS SPILLMANII. Pl. 35, fig. 74.

Testâ lævi, cylindraceâ, crassiusculâ, vel tenebroso-fuscâ vel virente, valdè vittatâ, nitidâ; spirâ obtusâ, curtâ, ad apicem carinatâ; suturis irregulariter impressis; anfractibus supernè convexiusculis, ultimo constricto; aperturâ subgrandi, subquadratâ, intus cæruleseenti et valdè vittatâ; labro acuto, sinuoso; columellâ sinuosâ, ad basim incrassatâ et retrò canaliculatâ.

Shell smooth, cylindrical, somewhat thick, dark brown or greenish, shining, very much banded; spire obtuse, short, carinate at the apex; sutures irregularly impressed; whorls slightly convex above, the last one constricted; aperture rather large, somewhat square, bluish and much banded within; outer lip acute, sinuous; columella sinuous, thickened at the base and channelled backward.

*Strophobasis Spillmanii*, Proc. Acad. Nat. Sci., 1861, p. 96.

*Hab.*—Tennessee River, 4 miles above Chattanooga. Wm. Spillman, M. D.

My cabinet and cabinets of Dr. Spillman, Dr. Showalter and Dr. Lewis.

Diam. .41,

Length .95 inch.

*Remarks.*—I owe to the kindness of Dr. Spillman a number of this remarkable shell, to which he gave the habitat of Tennessee River, but did not designate from what part. Fortunately, there were some young specimens which with those approaching maturity gives us the advantage of tracing the great difference between the old and young. The old are decollate, and present, by the body whorl being flattened, an almost perfect cylindrical form, while the young, which have the spire entire or nearly so, are almost perfectly oval and do not present a quadrate aperture, but an ovato-rhombic one. The callus at the base of the columella is strong, and amounts nearly to a fold, below which the channel suddenly turns backwards. The upper portion of the whorl, immediately below the suture, is tumid, and hence it has a bulbous appearance. This portion is usually lighter colored than the other parts of the whorl. The color differs in some of the specimens, some being more disposed to

\* στρέφω, I turn, and βάση, base.

being dark brown, while others again are greenish. All which I have seen are more or less banded, some of them so thickly so as to make the specimen almost black. These bands are all apparent on the inside. The length of the aperture is naturally, I presume, about half the length of the shell, but none of the mature specimens before me have perfect spires, and therefore the proportion cannot be correctly ascertained. There are 6 or 7 whorls.

I have great pleasure in dedicating this interesting species to Dr. Spillman, to whom I am not only indebted for this, but for very many of the mollusks which he has so successfully discovered in the streams which flow through other districts as well as his own.

STREPHOBASIS CORNEA. Pl. 35, fig. 75.

Testâ lævi, cylindraceâ, crassâ, corneâ; spirâ obtusâ; suturis irregulariter impressis; anfractibus supernè convexiuseulis, ultimo constricto; aperturâ rhombo-quadratâ, intus luteo-albâ; labro acuto, sinuoso; columellâ sinuosâ, ad basim incrassatâ et retro-canaliculatâ.

Shell smooth, cylindrical, thick, horn-color; spire obtuse; sutures irregularly impressed; whorls slightly convex above, the last one constricted; aperture rhombo-quadrant, yellowish white within; outer lip acute, sinuous; columella sinuous, thickened and channelled backward at its base.

*Operculum* small, ovate, spiral, dark brown, with the polar point near the base.

*Strephobasis cornea*, Proc. Acad. Nat. Sci., 1861, p. 96.

*Hab.*—Tennessee River, four miles above Chattanooga, Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .41,

Length .88 inch

*Remarks.*—Among the previously described species from Dr. Spillman, were two of this, which, while it has a close resemblance, still may easily be distinguished from it. They totally differ in the color of the epidermis and the *cornea* is without any bands. The substance of the shell is stouter and the channel below not quite so well pronounced. There is also a disposition to thickening on the upper part of the columella which the other has not. In both of the specimens before me there is a thickening following the inner edge of the outer lip. The lines of growth in both are well marked, and in all cases they begin below the antecedent one. The length of the aperture would, I presume, be rather less than half the length of the shell, but both specimens being decollate, the true length of the shell cannot be ascertained, nor can the character of the apical whorls be observed.

STREPHOBASIS CLARKII. Pl. 35, fig. 76.

Testâ lævi, cylindraceâ, subtenui, luteo-corneâ, trivittatâ; spirâ valdè obtusâ, curtâ; suturis irregulariter impressis; anfractibus quinis, supernè convexiuseulis, ultimo constricto; aperturâ subgrandi, quadratâ, intus albidâ, valdè vittatâ; labro acuto; columellâ sinuosâ, ad basim albâ, incrassatâ et retro-canaliculatâ.

Shell smooth, cylindrical, rather thin, yellowish horn-color, trebly banded; spire very obtuse, short; sutures irregularly impressed; whorls five, slightly convex above, the last one constricted; aperture rather large, squarish, whitish and much banded within; outer lip acute; columella sinuous, white at the base, thickened and channelled backward.

*Strophobasis Clarkii*, Proc. Acad. Nat. Sci., 1861, p. 96.

*Hab.*—Tennessee River, at Chattanooga, Tennessee, Joseph Clark.

My cabinet.

Diam. .38,

Length .72 inch.

*Remarks.*—Several specimens of this shell were long since sent to me by my deceased friend, Mr. Clark, and it is with peculiar pleasure that I dedicate it to him, who, during a long life, devoted his best energies to the investigation of the fauna and flora of Ohio, and other western States. This species differs from the two others herein described, in being more regularly cylindrical; in being shorter and in having three regularly revolving brown bands, one of which only is observable on the upper whorls. The aperture is more than one half the length of the shell. There is a thickening in the interior of the upper part of the whorls, which in some specimens is irregular and oblique, and is observable from the outside. It gives a yellowish appearance to this part of the whorl under the suture.

A small shell which I described in the Trans. Am. Phil. Soc., New Series, v. 10, p. 86, under the name of *Melania pumila*, from Tuscaloosa, I think will be found to belong to this genus. I have never seen but the one specimen, and it does not seem to me to be entirely mature.

STREPHOBASIS SOLIDA. Pl. 35, fig. 77.

Testâ lævi, subcylindraceâ, crassâ, solidâ, tenebroso-corneâ vel olivâ; spirâ obtuso-conicâ; suturis impressis; anfractibus convexiusculis, ultimo subconstricto; aperturâ subgrandi, subquadratâ, intus albidâ; labro acuto, valdè sinuoso; columellâ sinuosâ, infernè incrassatâ et retro-canaliculatâ.

Shell smooth, subcylindrical, thick, solid, dark horn-color or olive; spire obtusely conical; sutures impressed; whorls slightly convex, the last slightly constricted; aperture rather large, nearly quadrate, whitish within; outer lip acute, very sinuous columella sinuous, thickened below and channelled backwards.

*Operculum* subovate, very dark brown, with the polar point near the middle of the base.

*Melania solida* (nobis), Trans. Am. Phil. Soc., v. 10, pl. 9, fig. 27.

*Hab.*—Tennessee, E. Foreman, M. D.; East Tennessee, President Estabrook; Pulaskey Creek, Kentucky, Joseph Lesley.

My cabinet and cabinets of Dr. Foreman and President Estabrook.

Diam. .50,

Length 1 inch.

*Remarks.*—I described and figured an imperfect specimen of this species in the Trans. Am. Phil. Soc., May 2d, 1845, under the name of *Melania solida*. The figure



shows the specimen to have been very imperfect in the aperture. Having subsequently received a number of perfect specimens (except in the apex), and finding its proper place to be in the genus *Strophobasis*, I have made a new description, and propose to give a more perfect figure. The specimens before me, more than a dozen, vary much in outline, some being more cylindrical than others. One of them has two obscure bands, visible inside and out. Another has an indistinct band inside at the base of the columella; others are white. Two from Kentucky have two broad dark bands, and two are of an olive color, with a purple spot at the base of the columella. In mature specimens the inner edge of the outer lip is thickened. Some of the mature specimens have a broad furrow round the body whorl. The length of the aperture is usually about the third of the length of the shell.

### Genus NERITINA.

#### NERITINA SHOWALTERII. Pl. 35, fig. 78, 78a.

Testâ lævi, rotundatâ, diaphanâ, luteo-corneâ; spirâ valdè depressâ; suturis leviter impressis; anfractibus trinis, inflatis; aperturâ semirotundâ; labio dilatato, albo, incrassato, edentulo et incurvato; labro dilatato, tenui, margine acuto.

Shell smooth, rounded, semi-transparent, yellowish horn-color; spire very much depressed; sutures slightly impressed; whorls three, inflated; aperture semi-rotund; inner lip dilated, white, thickened, without teeth and incurved; outer lip acute, dilate and thin.

*Operculum* ——— ?

*Neritina Showalterii*, Proc. Acad. Nat. Sci., 1861, p. 55.

*Hab.*—Coosa River, ten miles above Fort William, Shelby County, Alabama.  
E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter and Dr. Lewis, and Academy of Natural Sciences.

Diam. .22,

Length .18 inch.

*Remarks.*—The discovery of this shell by Dr. Showalter marks the first notice, I believe, of the genus *Neritina* being observed in our fresh waters. His very close observation and active investigations of the waters of central and northern Alabama, have enabled him to lay the naturalists of this country under many obligations by new discoveries, and this is certainly one of much importance. We now see for the first time that this genus, which is common in Europe, Africa, Asia, South America and the West Indies, also inhabits our southern rivers. I have great pleasure in naming the species after the discoverer. This species is not closely allied to any which has come under my notice. It is more rotund than usual, has a clear horn-colored epidermis, smooth and shining. The substance of the shell is so thin as to permit the column to be visible through it. The inner lip is broad and slightly notched where it is in contact with the body whorl. It is to be regretted that among the four specimens

sent to me by Dr. Showalter, neither had an operculum. The soft parts of the animal have not yet been observed.

### Genus GONIOBASIS.

#### GONIOBASIS CRENATELLA. Pl. 35, fig. 79.

Testâ transversè striatâ, turrito-subulatâ, subcostatâ, parum plicatâ, subtenui, tenebroso-fuscâ, nigricante; spirâ elevatâ, ad apicem crebrè plicatâ; suturis valdè impressis; anfractibus septenis, planulatis, transversis costis indutis; aperturâ parvâ, ellipticâ, intus vittatâ; columellâ albidâ, incurvatâ; labro subcontracto et valdè crenulato.

Shell transversely striate, high turritid, subcostate, somewhat folded, rather thin, dark brown, almost black; spire elevated, closely folded at the apex; sutures very much impressed; whorls seven, flattened, covered with transverse ribs; aperture small, oval, banded within; columella whitish, incurved; outer lip somewhat contracted and very crenulate.

*Melania crenatella*, Proc. Acad. Nat. Sci., 1860, p. 93.

*Hab.*—Coosa River, Uniontown, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .16,

Length .50 inch.

*Remarks.*—Five specimens of this very beautiful little species are before me, all of which I owe to the kindness of Dr. Showalter. Most of these have eleven closely set, thread-like, transverse ribs on the last whorl, which are very dark brown, while the interspace is yellowish. On the next whorl above there are usually six, and above these the number diminishes to three. There appear to be about seven whorls. Within the aperture of four out of the five specimens there are brown bands accompanying the lines of the outer ribs, and these terminate in little furrows at the edge, which cause the outer lip to be beautifully and regularly crenulate. One of the specimens has the ribs without color, and therefore it is without bands inside. It is allied to *Melania* (*Goniobasis*) *striatula*, (nobis), but is a much smaller species, more cylindrical, of a darker color, and has stronger rib-like striæ.

### Genus TRYPANOSTOMA.\*

Testa conica. Apertura rhomboidea, infernè subcanaliculata. Labrum expansum. Columella levis, infernè contorta. Operculum corneum, ad spiram pertinens.

The enormous number of species in the genus *Melania* has made it very desirable to eliminate as many as possible, by founding new genera, where well characterized groups can be established. With this view I proposed in the Proceedings of the Academy, in April last, the genus *Strephobasis*. The genus now proposed under the name of *Trypanostoma* will include all the well known *Melania* with an *auger-shaped*

\* Τρυπανον, auger, and στόμα, mouth.

*aperture*, the type of which may be considered to be Mr. Say's *Melania canaliculata*, a very common and well known species from the basin of the Ohio River. It will include a number of large species; indeed, nearly all of the large and ponderous species of the United States. Many new ones will be found in this paper. Objections may be raised against now increasing the number of genera without the aid of the examination of the soft parts. But there is no validity in this objection, from the fact that, in the present condition of the science of Malacology, we are becoming acquainted with a vast number of new and interesting forms, without the hope at present of seeing the organic portion of the animals. These may at some future time, and no doubt will, be examined and carefully described by zoologists who may dwell near the waters where these numerous and highly developed species reside. Until this takes place we can only group them upon the characters which are presented by their outward hard portions, which are accessible to us now.

In proposing this new genus I am aware that European Zoologists have made many genera and subgenera in this Family, but none have made groups of our numerous species by which they can be properly divided. They have mixed them up, with all the time and care they have bestowed upon them, in a manner so as to make great confusion.

Mr. Swainson, in his "Treatise on Malacology," proposed a subgenus of *Melania* under the name of *Ceriphasia*, and gives a figure, page 204, (*C. sulcata*), stating it came from Ohio. It is evident on looking at this figure that it does not represent any Ohio species, neither in the aperture nor in the revolving ribs. Dr. Gray and Messrs. Adams adopt the genus, and the latter give a figure (pl. 31, fig. 6,) of *canaliculata*, Say, as the type, which I do not think answers to the description or figure of Mr. Swainson. Dr. Gray in his excellent "List of the Genera of Recent Mollusca," in the Proc. Zool. Soc., expresses a doubt whether his *Telescopella* may not be the same with *Ceriphasia*. Mr. Reeve, in his beautiful work, "Conchologia Iconica," mixes up many of our species in a manner that does not admit of their being separated into groups, and Dr. Chenu ("Manuel de Conchyliologie") groups many incongruously. Many of our groups are emphatically American, and the divisions made by our Zoologists have not had the attention they deserve from European writers. Thus, neither Dr. Gray, Mr. Reeve, nor the Messrs. Adams adopt Prof. Haldeman's genus *Lithasia*, established so long since, and which is an easily recognised group. Mr. Reeve puts them into my genus *Io*, to which they certainly do not belong, and Dr. Chenu puts part of them there. The genus *Amnicola*, long since proposed by Gould and Haldeman for a very natural group of small shells divided from *Paludina*, is not recognised by Chenu or Reeve.

I have elsewhere proposed to define the groups into which our *Melanidæ* seem

naturally to divide themselves, adopting the well recognized genera which have been established.

TRYPANOSTOMA HARTMANII. Pl. 36, fig. 80.

Testâ lævi, interdum obsoletè canaliculatâ, solidâ, virente vel rufo-fuscescente, regulariter conicâ, vittatâ vel evittatâ; spirâ pyramidatâ; suturis regulariter impressis; anfractibus instar novenis, convexiusculis; aperturâ parvâ, rhomboideâ, intûs vel albâ vel salmoneâ; labro acuto, sinuoso; columellâ infernè incrassatâ et valdè contortâ.

Shell smooth, sometimes obscurely channelled, solid, greenish or reddish brown, regularly conical, banded or without bands; spire pyramidal; sutures regularly impressed; whorls about nine, slightly convex; aperture small, rhombic, white or salmon color within; outer lip acute, sinuous; columella thickened below and very much twisted.

Proc. Acad. Nat. Sci. 1862, p. 173.

*Hab.*—Cahawba and Coosa Rivers, Dr. Showalter; Warrior River, Alabama, Dr. Budd; Knoxville, J. Clark; Tennessee River, Alabama, Dr. Spillman.

My cabinet and cabinets of Dr. Showalter, Dr. Hartman, Mr. Anthony and Dr. Budd.

Diam. .50,

Length 1.25 inch.

*Remarks.*—Two or three specimens of this fine species have been in my collection for a long time, and were given to me under the name of *Melania pyrenella*, Con., but Mr. Conrad's shell is not so solid, has flatter whorls and is carinate. Some of the specimens of *Hartmanii* are furnished with two broad bands, which are usually well marked inside, others are without bands, and these are usually salmon-colored within. Three of the specimens out of some thirty before me, are of a rich dark brown, which arises from the interior nacre being purplish. The aperture is more than one-third the length of the shell.

I have great pleasure in naming this after my friend W. D. Hartman, M. D., who has furnished me with a number of fine specimens.\*

TRYPANOSTOMA JAYI. Pl. 36, fig. 81.

Testâ lævi, subpupoideâ, crassâ, nitidâ, rufo-fuscâ; spirâ obtuso-conicâ; suturis valdè impressis; anfractibus octonis, subtumidis, ultimo subgrandi; aperturâ parvâ, rhomboideâ, subangustâ, intûs pallidofuscâ; labro acuto, sinuoso; columellâ infernè incrassatâ et contortâ.

Shell smooth, pupæform, thick, shining, reddish brown; spire obtusely conical; sutures very much impressed; whorls eight, rather swollen, the last rather large;

\* Since the above was written, a letter received from Dr. Hartman, says, that Dr. Showalter informed him that "the orange color of the animal is remarkable." Dr. Hartman also mentions that he and Dr. Showalter had distributed this shell under the name of *Melania pyrenella*, Con., which mistake Dr. Hartman corrected by reference to the type specimen, which is in the collection of the Academy of Natural Sciences.

aperture small, rhomboidal, rather narrow, pale brown within; outer lip acute, sinuous; columella thickened below and twisted.

Proc. Acad. Nat. Sci., 1862, p. 173.

*Hab.*—Alabama? J. C. Jay, M. D.

My cabinet and cabinet of Dr. Jay.

Diam. .46,

Length 1.16 inch.

*Remarks.*—A single specimen was given to me many years since by Dr. Jay under the name of *Melania prassinata*, Con., but it is a very different shell from the type of that species in the collection of the Academy of Natural Sciences, that being of a greenish color, having a few nodes round the periphery, which is angulated, neither of which characters belong to *Jayi*. Indeed, our shell is much nearer to *clausa* (nobis) in outline, but it is not so pupæform, and it has a more twisted columella, the spire being more conical.

It is to be regretted that a single specimen only should be under observation, as others may be different in color. The interior as well as the columella are of a dull salmon, and the darkness is occasioned by obscure bands which do not extend quite to the edge, which is slightly thickened. The aperture is not quite one-third the length of the shell. I name this species after Dr. Jay, to whom I owe the possession of it, and who has done so much to advance a knowledge of our conchology.

TRYPANOSTOMA SPILLMANII. Pl. 36, fig. 82.

Testâ, lævi regulariter conicâ, tenebroso-olivâ; spirâ elevatâ; suturis regulariter impressis; anfractibus instar novenis, planulatis; aperturâ parviusculâ, rhomboideâ, intus albidâ, interdum vittatâ; labro acuto, sinuoso; columellâ albâ et valdè contortâ.

Shell smooth, regularly conical, dark olive; spire much raised; sutures regularly impressed; whorls about nine, flattened; aperture rather small, rhomboidal, white within, sometimes banded; outer lip acute, sinuous; columella white and very much twisted.

*Operculum* ovate, reddish brown, rather thin, with the polar point near the base.

Proc. Acad. Nat. Sci., 1862, p. 173.

*Hab.*—Noxubee River, Mississippi, Wm. Spillman, M. D., and Tennessee, J. Clark.

My cabinet and cabinet of Dr. Spillman.

Diam. .46,

Length 1.20 inch.

*Remarks.*—Six specimens are before me, one of them is slightly carinate. In some there is a disposition to put on a whitish line below the suture. The aperture is about one-third the length of the shell.

I have great pleasure in naming this species after my friend Dr. Spillman.

## TRYPANOSTOMA CHRISTYI. Pl. 36, fig. 83.

Testâ lævi, elevato-conicâ, crassiusculâ, corneâ, raro-vittatâ; spirâ valdè elevatâ; suturis regulariter impressis; anfractibus instar denis, parum convexis; aperturâ parvâ, subrhomboideâ, intus albidâ; labro acuto, sinuoso; columellâ albâ et contortâ.

Shell smooth, elongately conical, somewhat thick, horn-color, rarely banded; spire very much elevated; sutures regularly impressed; whorls about ten, slightly convex; aperture small, subrhomboidal, whitish within; outer lip acute, sinuous; columella white and twisted.

*Operculum* subovate, dark-brown, with polar point near to the basal margin.

Proc. Acad. Nat. Sci., 1862, p. 173.

*Hab.*—Cane Creek, Tennessee, Prof. D. Christy.

My cabinet and cabinet of Dr. Hartman.

Diam. .48,

Length 1.12 inch.

*Remarks.*—I am indebted to the late Joseph Clark for many specimens from the above habitat, brought by Prof. Christy. It is allied to *Estabrooki*, herein described, but it is a larger and heavier shell, has a larger aperture, a much more twisted columella, and is of a darker horn-color. One of the specimens is somewhat carinate on the body whorl, and has a more developed channel. The form of the channel is very like to *Melania (Trypanostoma) regularis* (nobis), but it is not so cylindrical nor so green. The aperture is about the third of the length of the shell. I name this after Prof. David Christy, Hamilton, Butler Co., Ohio, who collected many fine shells in East Tennessee and North Carolina, which he kindly gave to Mr. Clark.

## TRYPANOSTOMA LABIATUM. Pl. 36, fig. 84.

Testâ lævi, acuto-conicâ, suberassâ, nuditâ, virido-corneâ; spirâ attenuatâ, mucronatâ; suturis regulariter impressis; anfractibus instar denis, convexiusculis, ad apicem carinatis, ultimo subgrandi; aperturâ parviusculâ, rhomboideâ, intus albidâ; labro acuto, juxtâ marginem incrassato, valdè dilatato, valdè sinuoso; columellâ albidâ, infernè incrassatâ et valdè contortâ.

Shell smooth, acutely conical, rather thick, shining, greenish horn-color; spire attenuate, sharp-pointed; sutures regularly impressed; whorls about ten, somewhat convex, carinate towards the beak, the last rather large; aperture rather small, rhomboidal, whitish within; outer lip sharp, thickened towards the margin, very much dilated and very sinuous; columella whitish, thickened below and much twisted.

*Operculum* subovate, dark brown, rather thin, with the polar point near the middle towards the base.

Proc. Acad. Nat. Sci., 1862, p. 173.

*Hab.*—Big Miami River, Ohio, J. Clark.

My cabinet and cabinets of Mr. Clark and Dr. Hartman.

Diam. .43,

Length .98 inch.

*Remarks.*—A number of these were sent to me some years since, by Mr. Clark.

They were supposed to be *Melania neglecta*, Anth., but they are not very closely allied to the species which Mr. Anthony sent to me under that name, nor are they like his figure, nor will they answer to his description. This species has a remarkably expanded outer lip, unusually thickened inside of the edge. It is nearly allied to *Whitei* herein described, but may be distinguished by being not quite so attenuate, having rather more convexity in the whorls, having a larger outer lip and slightly differing in the cut of the open channel at the base. The aperture is three-tenths the length of the shell.

TRYPANOSTOMA WHITEI. Pl. 36, fig. 85.

Testâ lævi, attenuato-conicâ, crassiusculâ, tenebroso-orneâ; spirâ valdè elevatâ; suturis regulariter impressis; anfractibus instar novenis, convexiusculis; aperturâ parvâ, subrhomboideâ, intus albidâ; labro acuto, sinuoso; columellâ infernè incrassatâ et contortâ.

Shell smooth, attenuately conical, somewhat thick, dark horn-color; spire very much raised; sutures regularly impressed; whorls about nine, slightly convex; aperture small, subrhomboidal, whitish within; outer lip acute, sinuous; columella thickened below and twisted.

Proc. Acad. Nat. Sci., 1862, p. 173.

*Hab.*—Lafayette County, and Marietta, Georgia, Rev. G. White; Farland's Creek, Mississippi, Dr. Spillman, and Tennessee, J. G. Anthony.

My cabinet and cabinets of Dr. Spillman and Mr. Anthony.

Diam. .34,

Length 1.8 inch.

*Remarks.*—From the four habitats I have sixteen specimens. There is very little difference between them. The tips are either striate or carinate. It is nearly allied to *Estabrooki*, herein described, but it is a smaller species, with a smoother and darker epidermis, and has a smaller aperture and more twist at the base of the columella. The aperture is about three-tenths the length of the shell. I am indebted, for many specimens, to the Rev. George White, after whom I name the species.

TRYPANOSTOMA ESTABROOKII. Pl. 36, fig. 86.

Testâ lævi, attenuato-conicâ, subtenui, corneâ; spirâ valdè elevatâ, supernè carinatâ; suturis regulariter impressis; anfractibus instar denis, convexis; aperturâ parvâ, subrhomboideâ, intus albidâ; labro acuto, subsinuoso; columellâ albâ et contortâ.

Shell smooth, attenuately conical, rather thin, horn-color; spire very much raised, carinate towards the apex; sutures impressed; whorls about ten, convex; aperture small, subrhomboidal, whitish within; outer lip acute, subsinuous; columella white and twisted.

*Operculum* subovate, dark brown, with polar point near to the basal margin.

Proc. Acad. Nat. Sci., 1862, p. 173.

*Hab.*—East Tennessee, President Estabrook, and Bishop Elliott; near Cleveland, Tennessee. Prof. Christy; and Monroe County, Tennessee, J. Clark.

My cabinet and cabinets of Bishop Elliott and Dr. Hartman.

Diam. .38,

Length 1.11 inch.

*Remarks.*—A number of specimens were received from the above mentioned habitats; all varying very little. It is closely allied to *Christyi* herein described, but while it nearly agrees in color, it is usually smaller and has more convex whorls. These are, in some specimens, more inflated on the lower part. It has a strong resemblance to *M. strigosa* (nobis), but is larger, and the aperture is more twisted at the base of the columella. The aperture is about one-fourth the length of the shell. I have great pleasure in naming this species after my deceased friend, President Estabrook, of Knoxville, from whom I first received it many years since.

TRYPANOSTOMA KNOXVILLENSE. Pl. 36, fig. 87.

Testâ lævi, subulari, subtenui, pallido-corneâ; spirâ attenuato-conicâ, mucronatâ; suturis regulariter impressis; anfractibus denis, convexiusculis, ad apicem carinatis, ultimo subconstricto; aperturâ parvâ, subrhomboideâ, intus albâ; labro acuto, sinuoso; columellâ infernè incrassatâ et parum contortâ.

Shell smooth, subulate, rather thin, pale horn-color; spire attenuately conical, sharp-pointed; sutures regularly impressed; whorls ten, slightly convex, carinate towards the apex, the last somewhat constricted; aperture small, subrhomboidal, white within; outer lip acute, sinuous; columella thickened below and a little twisted.

Proc. Acad. Nat. Sci., 1862, p. 173.

*Hab.*—Knoxville, Tennessee, Pres. Estabrook.

My cabinet.

Diam. .30,

Length .80 inch.

*Remarks.*—A single specimen only of this species was received from President Estabrook. It is closely allied to *Estabrookii*, herein described, but may be distinguished by the form of the inferior part of the columella and the channel being more drawn backwards. It is a smaller species, of rather lighter horn-color and the whorls are rather more bulging. The aperture is less than one-third the length of the shell.

TRYPANOSTOMA ATTENUATUM. Pl. 36, fig. 88.

Testâ lævi, subulari, subtenui, corneâ; spirâ attenuatâ; suturis impressis; anfractibus novenis, vix convexis, ultimo parvo; aperturâ parvâ, rhomboideâ, intus albidâ; labro acuto, valdè sinuoso; columellâ vix incrassatâ et contortâ.

Shell smooth, subulate, rather thin, horn-color; spire attenuate; sutures impressed; whorls nine, scarcely convex, the last small; aperture small, rhomboidal, white within; outer lip acute, very sinuous; columella slightly thickened and twisted.

*Operculum* small, ovate, dark brown, with the polar point near the base.

Proc. Acad. Nat. Sci., 1862, p. 174.

*Hab.*—Lafayette, Georgia, Rev. G. White, and Tennessee, Dr. Hartman.



My cabinet and cabinet of Dr. Hartman.

Diam. .38,

Length 1.02 inch.

*Remarks.*—Only two specimens have come under my observation. One is not full grown. In size and general outline this species has a very strong resemblance to *Melania strigosa* (nobis), but it differs much in the aperture and the direction of the base of the columella. The aperture is quite rhombic, like *Melania Alexandrensis* (nobis). The apical whorls are carinate and the aperture is about one-fifth the length of the shell.

TRYPANOSTOMA TORTUM. Pl. 36, fig. 89.

Testâ lævi, conicâ, corneâ, subcrassâ; spirâ subobtusâ-conicâ; suturis valdè impressis; anfractibus septenis, planulatis; aperturâ subgrandi, subrhomboideâ, intus albidâ vel fusca; labro acuto, vix sinuoso; columellâ valdè incurvatâ, supernè parum incrassatâ, infernè incrassatâ et valdè contortâ.

Shell smooth, conical, horn-color, rather thick; spire rather obtusely conical; sutures very much impressed; whorls seven, flattened; aperture rather large, subrhomboidal, white or brownish within; outer lip acute, scarcely sinuous; columella very much incurved, slightly thickened above, more thickened below and very much twisted.

Proc. Acad. Nat. Sci. 1862, p. 174.

*Hab.*—Little Uchee, below Columbus, Georgia, G. Hallenbeck.

My cabinet and cabinet of Mr. Hallenbeck and Dr. Lewis.

Diam. .44,

Length .96 inch.

*Remarks.*—Several specimens of this species are before me. In one of the specimens there are three or four obscure striæ about the periphery. It is probable that others may be found with this character more developed. On the upper whorls there is a raised line revolving immediately above the suture, which causes the suture to be more impressed. The columella is more than usually twisted, whence the name of the species. Two of the specimens are of a dull brown within, but have a whitish margin. The aperture is rather more than the third of the length of the shell.

TRYPANOSTOMA PALLIDUM. Pl. 36, fig. 90.

Testâ lævi, attenuato-conicâ, subcrassâ, pallido-corneâ; spirâ valdè elevatâ; suturis valdè impressis; anfractibus undenis, convexiseulis, supernè subgeniculatis; aperturâ parviuseulâ, subrhomboideâ, intus albâ; labro acuto, sinuoso; columellâ albâ et valdè contortâ.

Shell smooth, attenuately conical, rather thick, pale horn-color; spire very much raised; sutures very much impressed; whorls eleven, slightly convex, somewhat geniculate above; aperture rather small, subrhomboidal, white within; outer lip sharp, sinuous; columella white and very much twisted.

*Operculum* subovate, light chestnut brown, with the polar point on the left near the basal margin.

Proc. Acad. Nat. Sci., 1862 p. 174.

*Hab.*—Niagara Falls, New York, St. Lawrence at Montreal, E. Billings, Esq.

My cabinet and cabinet of Mr. Billings.

Diam. .46,

Length 1.36 inch.

*Remarks.*—Many years since I found two specimens of this species above the Falls, on the New York side. They were accompanied with *Melania (Trypanostoma) Niagarensis and subularis* (nobis). I hesitated when I described the above two, whether this was a new species. There is no doubt in my mind now. It is nearest allied perhaps to *Melania (Trypanostoma) Sayi*, Ward, but it is a more slender species and has a higher spire and more whorls. The aperture is rather more than the fourth of the length of the shell.

TRYPANOSTOMA PARVUM. Pl. 36, fig. 91.

Testâ lævi, crassiusculâ, conoideâ, corneâ, vittatâ vel evittatâ; spirâ conoideâ; suturis regulariter impressis; anfractibus octonis, planulatis; aperturâ parvâ, rhomboideâ, intus albidâ; labro acuto, parum sinuoso; columellâ infernè aliquantò incrassatâ et contortâ.

Shell smooth, somewhat thick, conical, horn-color, banded or without bands; spire conoidal; sutures regularly impressed; whorls eight, flattened; aperture small, rhomboidal, within whitish; outer lip acute, slightly sinuous; columella slightly thickened below and twisted.

Proc. Acad. Nat. Sci., 1862, p. 174.

*Hab.*—Knoxville, President Estabrook; and French Broad River, East Tennessee, J. Clark.

My cabinet.

Diam. .34,

Length .94 inch.

*Remarks.*—I have three specimens of this small species from French Broad River and one from Knoxville. They are all perfect, and have two bands, one broad and well defined, the lower one obsolete. It is disposed to be slightly angular on the periphery. The aperture is about one-third the length of the shell. This is among the few small species of this genus. In outline and general appearance it is allied to *T. Hartmanni*, herein described, but it is a very much smaller species and cannot be easily confounded with it.

TRYPANOSTOMA MODESTUM. Pl. 36, fig. 92.

Testâ lævi, conicâ, subtenui, virido-corneâ; spirâ subelevatâ; suturis linearibus; anfractibus instar septenis, convexiusculis, ultimo subcompresso; aperturâ parviusculâ, subrhomboideâ, intus cæruleo-albâ; labro acuto, sinuoso, expanso; columellâ infernè parum incrassatâ et contortâ.

Shell smooth, conical, rather thin, greenish horn-color; spire somewhat raised; sutures linear; whorls about seven, somewhat convex, the last somewhat compressed; aperture rather small, subrhomboidal, bluish white within; outer lip acute, sinuous, expanded; columella slightly thickened below and twisted.

Proc. Acad. Nat. Sci., 1862, p. 174.

*Hab.*—Chilogita Creek, Blount County, Tennessee, J. Clark.

My cabinet and cabinets of Mr. Clark and Dr. Hartman.

Diam. .32,

Length .80 inch.

*Remarks.*—I have had a number of this species for some years, and had considered it a variety of *Melania* (*Goniobasis*) *dubiosa* (nobis), but the difference in the outer lip, which is much more expanded, and some other characters, render it specifically different. The expanded outer lip, which is slightly thickened towards the edge, resembles that of *Whitei*, herein described, but it has a longer channel and is not so truncate at the base. It also differs in being a shorter species with a less number of whorls. None of the specimens before me have bands. There is a disposition on the apical whorls to be carinate. None of the specimens were perfect at the apex. Every one was purplish above. The aperture is about one-third the length of the shell. It is a very different shell from *Melania* (*Goniobasis*) *modesta* (nobis).

TRYPANOSTOMA MUCRONATUM. Pl. 36, fig. 93.

Testâ lævi, subulari, tenni, diaphanâ, stramineo-luteâ; spirâ exsertâ, mucronatâ; suturis leviter impressis; anfractibus senis, supernè planulatis; aperturâ parviusculâ, ovato-rhomboidêâ, intus luteo-albidâ; labro acuto, sinuato; columellâ ad basim parum incrassatâ, subeffusâ et subrecurvâ.

Shell smooth, awl-shaped, thin, diaphanous, straw yellow; spire extended, pointed; sutures slightly impressed; whorls six, flattened above; aperture rather small, ovately rhombic, yellowish white within; outer lip acute, sinuous; columella slightly thickened at the base, subeffuse and somewhat recurved.

*Melania mucronata*, Proc. Acad. Nat. Sci., 1861, p. 119.

*Operculum* ovate, spiral, light brown, with the polar point on the inner side near to the base.

*Hab.*—Big Prairie Creek, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .36,

Length .98 inch.

*Remarks.*—This is an acuminate species with about eight regular graceful whorls, which are towards the apex usually carinate. There are five specimens before me, all without bands. One of them has, on the upper whorls, a disposition to take on a brownish color. This species is allied to *Melania* (*Goniobasis*) *Ocoéensis* (nobis). It is not quite so subulate, has not quite so many whorls, and the aperture is not so quadrate. The aperture is not quite three-tenths the length of the shell.

TRYPANOSTOMA SIMPLEX. Pl. 36, fig. 94.

Testâ lævi, conicâ, suberassâ, luteo-olivaceâ; spirâ subelevatâ; suturis parum impressis; anfractibus octonis, subconvexis, ultimo subconstricto; aperturâ parvâ, constrictâ, rhomboidêâ, intus albidâ; labro acuto, sinuoso; columellâ infernè incrassatâ et contortâ.

Shell smooth, conical, rather thick, yellowish olive; spire rather elevated; sutures somewhat impressed: whorls eight, somewhat convex, the last somewhat constricted;

aperture small, constricted, rhomboidal, whitish within; outer lip acute, sinuous; columella thickened below and twisted.

Proc. Acad. Nat. Sci. 1862, p. 174.

*Hab.*—Cincinnati, Ohio, T. G. Lea.

My cabinet and cabinet of Dr. Hartman.

Diam. .33,

Length .76 inch.

*Remarks.*—Among a large number of young *Melania* (*Trypanostoma*) *canaliculata* and *conica*, Say, sent by my brother, long since, I found eight specimens of this small species. All seem to be full grown and are very nearly of the same size. They may be at once distinguished from *canaliculata* by their being much smaller, being much more narrow and having no channel or furrow on the middle of the whorl. The aperture is also much smaller. It differs entirely from *conica* in the whorls, which regularly decrease to the apex, while in that species they decrease rapidly to the apex, which is sharp-pointed. The aperture is about one-third the length of the shell. None of these specimens have bands; one is slightly brownish inside towards the base. This is very different from Mr. Say's *Melania simplex*.

TRYPANOSTOMA MINOR. Pl. 36, fig. 95.

Testâ levi, obtusè conoideâ, suberassâ, luteolâ, vittatâ; spirâ obtuso-conoideâ; suturis valdè impressis; anfractibus septenis, convexiuseulis, ultimo grandi; aperturâ grandi, subrhomboideâ, intus albâ, interdum vittatâ; labro acuto, sinuoso; columellâ incurvâ, infernè incrassatâ et parum contortâ.

Shell smooth, obtusely conoidal, rather thick, yellowish, banded; spire obtusely conical; sutures much impressed; whorls seven, somewhat convex, the last large; aperture large, subrhomboidal, white and usually banded within; outer lip acute, sinuous; columella incurved, thickened below and slightly twisted.

Proc. Acad. Nat. Sci. 1862, p. 174.

*Hab.*—Tennessee, Prof. Troost.

My cabinet and cabinet of Dr. Troost.

Diam. .32,

Length .54 inch.

*Remarks.*—Four specimens were found among a number of young shells from Prof. Troost. It is a modest little species which might easily be taken for a young *Melania conica*, Say. It is most nearly allied to *bivittata*, herein described, but may be distinguished by being wider in proportion, having a shorter spire, being less polished, and not so bright a yellow. It differs also in the brown bands being much less distinctly marked, the upper whorls showing none, while the other is beautifully banded to the apex. The two species differ in columella, *minor* having nearly half of it perpendicular, while *bivittata* has that portion twisted backwards. The bands seem to be uncertain in this species, one having two bands, two having one band and the other having no band. The aperture is nearly half the length of the shell.

## TRYPANOSTOMA PUMILUM. Pl. 36, fig. 96.

Testâ lævi, nitidâ, conoidea, subsolidâ, lutco-virescente, bivittatâ; spirâ obtuso-conoideâ; suturis valdè impressis; anfractibus septenis, subconvexis, ultimo pergrandi; aperturâ subgrandi, rhomboideâ, intus albidâ et bivittatâ; labro acuto, sinuoso; columellâ infernè incrassatâ et valdè contortâ.

Shell smooth, shining, conoidal, rather solid, yellowish green, double banded; spire obtusely conical; sutures much impressed; whorls seven, somewhat convex, the last very large; aperture rather large, rhomboidal, whitish and double-banded within; outer lip acute, sinuous; columella thickened below and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 174.

*Hab.*—Tennessee, Prof. Troost.

My cabinet.

Diam. .38,

Length .71 inch.

*Remarks.*—Two specimens of this small species came with *bivittatum*, herein described, mixed with the young of other species. It is rather larger than it, and although very close, may be distinguished by difference of size, being more pyramidal, having a darker epidermis, and in the aperture being more rhombic. Two bands only are visible on the exterior, but the interior of the larger displays a third close to the base of the columella, making a spiral turn round it. The aperture is about three-eighths of the length of the shell. It is very different from *Melania pumila* (nobis) described in Trans. Am. Phil. Soc. v. x. p. 86, which indeed belongs to the genus *Lithasia*.

## TRYPANOSTOMA BIVITTATUM. Pl. 36, fig. 97.

Testâ lævi, conoideâ, subcrassâ, luteâ, bivittatâ; spirâ obtuso-conoideâ; suturis valdè impressis; anfractibus septenis, subconvexis, ultimo grandi; aperturâ subgrandi, subrhomboideâ, intus albâ, bivittatâ; labro acuto, parum sinuoso; columellâ infernè incrassatâ et valdè contortâ.

Shell smooth, conical, rather thick, yellow, double-banded; spire obtusely conical; sutures much impressed; whorls seven, rather convex, the last one large; aperture rather large, somewhat rhomboidal, white and double-banded within; outer lip acute, somewhat sinuous; columella thickened below and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 175.

*Hab.*—Tennessee, Prof. Troost.

My cabinet.

Diam. .34,

Length .68 inch.

*Remarks.*—This is a small robust species. Five specimens came many years since from Prof. Troost, mixed with many young specimens of *M. canaliculata*, Say, to which it has some resemblance—but it may easily be distinguished by its shorter spire and larger body whorl. All the specimens have two regular deep brown bands. The aperture is about two-fifths the length of the shell. Two or three of these specimens were mixed with some young shells from Cincinnati, I think by accident, but still it is possible that they may have come from Cincinnati.

## TRYPANOSTOMA VANUXEMI. Pl. 36, fig. 98.

Testâ lævi, conoideâ, flavidâ, vel bivittatâ vel evittatâ; spirâ obtuso-conicâ; suturis impressis; anfractibus senis, convexiusculis; aperturâ parviusculâ, subrhomboideâ, intus albidâ; labro acuto, sinuoso; columellâ infernè incrassatâ et valdè contortâ.

Shell smooth, conical, yellowish, double-banded or without bands; spire obtusely conical; sutures impressed; whorls six, somewhat convex; aperture rather small, subrhomboidal, whitish within; outer lip acute, sinuous; columella thickened below and much twisted.

Proc. Acad. Nat. Sci., 1862, p. 175.

*Hab.*—South Carolina, Prof. L. Vanuxem.

My cabinet and cabinet of Prof. L. Vanuxem.

Diam. .28,

Length .69 inch.

*Remarks.*—Among other species of the *Melanidæ* given to me a long time since by my friend, the late Prof. Vanuxem, were four specimens of this. Three of them are double-banded inside and out. The fourth has no appearance of bands. One of them is about half grown and perfect to the apex. The outer lip is somewhat thickened and expanded. It is somewhat like *bivittatum*, herein described, but it differs in having a higher spire, is not so wide proportionally, and is not highly polished or so yellow as that species. The aperture is more than one-third the length of the shell.

## TRYPANOSTOMA CHAKASAHÆNSE. Pl. 36, fig. 99.

Testâ lævi, conicâ, fusco-virente, subtenui, bivittatâ; spirâ subattenuatâ; suturis valdè impressis; anfractibus instar octonis, convexis, supernè carinatis; aperturâ parvâ, rhombicâ, intus albâ et vittatâ; labro acuto, sinuoso; columellâ incurvâ, infernè incrassatâ et valdè contortâ.

Shell smooth, conical, brownish green, rather thin, double-banded; spire somewhat attenuate; sutures very much impressed; whorls about eight, convex, carinate above; aperture small, rhomboidal, white and banded within; outer lip sinuous; columella incurved, thickened below and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 175.

*Hab.*—Chakasaha River, Alabama, Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .36,

Length .87 inch.

*Remarks.*—Of eight specimens received from Dr. Spillman, three of them had transverse striæ on the periphery of the whorls reaching to the last whorl, on which two raised striæ are noticeable. In general outline and size it is near to *parvum*, herein described, but differs in being flatter on the whorls, in the bands being more distant, and in having a less twisted columella. It reminds one of *M. gracilis*, Anth., but has many distinctive characters. The aperture is about one-third the length of the shell.

## TRYPANOSTOMA TENNESSEËNSE. Pl. 36, fig. 100.

Testâ lævi, obtusè conicâ, valdè inflatâ, suberassâ, tenebroso-fuscâ; spirâ brevi, valdè obtusâ; suturis impressis; anfractibus instar senis, convexis; aperturâ magnâ, subrhomboideâ, intùs tenebrosâ; labro acuto, expanso, iuflecto et valdè sinuoso; columellâ infernè valdè incrassatâ et contortâ.

Shell smooth, obtusely conical, very much inflated, rather thick, dark brown; spire short and very obtuse; sutures impressed; whorls about six, convex; aperture large, subrhomboidal, dark within; outer lip acute, much expanded below, inflected and very sinuous; columella very much thickened below and twisted.

Proc. Acad. Nat. Sci., 1862, p. 175.

*Hab.*—Tennessee, Drs. Troost and Currey; Lebanon County, Tennessee, J. M. Safford. My cabinet and cabinets of Drs. Troost and Currey and Mr. Safford.

Diam. .47,

Length .84 inch.

*Remarks.*—I have four specimens of this species. The two largest have been in my possession for a long time. They are from Dr. Troost, and are more inflated. While the older part is dark brown, the newer part is dark green, and the interior partakes of these colors. The specimen from Mr. Safford is rather smaller and browner, is purplish within and is thickened on the outer lip near the base. All have a light line under the suture. That from Dr. Currey is about half grown, and has two broad bands. The largest specimen is figured, the lower part of the specimen is more expanded than the others, and is very remarkable in this respect. In outline it is allied to *M. pinguis* (nobis), but differs much in the form of the aperture. The aperture is nearly half the length of the shell.

## TRYPANOSTOMA KNOXENSE. Pl. 36, fig. 101.

Testâ lævi, conicâ, vel ferrugineâ vel vittatâ, suberassâ; spirâ subelevatâ, mucronatâ; suturis impressis; anfractibus octonis, convexiusculis, supernè carinatis; aperturâ parvâ, intùs vel albidâ vel fuscâ; labro acuto, sinuoso, expanso; columellâ parum incrassatâ et contortâ.

Shell smooth, conical, ferruginous or banded, rather thick, spire rather attenuate, pointed; sutures impressed; whorls eight, slightly convex, carinate above; aperture small, white or brown within; outer lip sharp, sinuous, expanded; columella slightly thickened and twisted.

Proc. Acad. Nat. Sci., 1862, p. 175.

*Hab.*—Flat Creek, Knox County, Tennessee, Prof. D. Christy.

My cabinet and cabinet of J. Clark.

Diam. .31,

Length .76 inch.

*Remarks.*—About a dozen of this little species were sent to me some years since by my deceased friend Joseph Clark. They were collected by Prof. Christy. There is great variety in the color of these specimens. Some are entirely ferruginous, others have a single light line under the sutures, others again have two well defined rather broad

brown bands. It is closely allied to *Vauvexii*, herein described, from South Carolina, but differs in having a larger aperture and a higher spire. The aperture is about one-third the length of the shell.

TRYPANOSTOMA TRIVITTATUM. Pl. 36, fig. 102.

Testâ lævi, subfusiformi, subtenui, nitidâ, olivaceâ, trivittatâ; spirâ conicâ, mucronatâ, ad apicem carinatâ; suturis linearibus; anfractibus octonis, planulatis, ultimo subgrandi; aperturâ subgrandi, rhomboideâ, intus vittatâ; labro acuto, sinuoso; columellâ parum incrassatâ et incurvâ.

Shell smooth, subfusiform, rather thin, shining, olivaceous, three-banded; spire conical, pointed, carinate at the apex; sutures line-like; whorls eight, flattened, the last one being large; aperture rather large, rhombic, banded within; outer lip acute, sinuous; columella slightly thickened and incurved.

*Operculum* ovate, dark brown, with the polar point near the base.

Proc. Acad. Nat. Sci., 1862, p. 175.

*Hab.*—Tombigbee River, Mississippi, Wm. Spillman, M. D.

My cabinet and cabinets of Dr. Spillman and Dr. Hartman.

Diam. .39,

Length .78 inch.

*Remarks.*—I have examined about twenty specimens of this species and find them differing very slightly. Every one has three bands, the two lower of which are more distinct on the outside than the upper one, while inside they are well defined and much alike. Three of the specimens are very dark, almost purple, but the bands are distinguishable inside. There is a white line immediately below the sutures. In some specimens there is a disposition to be somewhat angular on the periphery, below which there are transverse striæ in some individuals. The aperture is about three-eighths the length of the shell.

TRYPANOSTOMA TROCHULUS. Pl. 36, fig. 103.

Testâ lævi, trochiformi, valdè tumidâ, luteâ, infrâ unifasciatâ; spirâ valdè obtusâ; suturis impressis; anfractibus senis, supernè planulatis, infernè inflatis; aperturâ grandi, rhomboideâ, albidâ et unifasciatâ; labro acuto, sinuoso; columellâ infernè incrassatâ et valdè contortâ.

Shell smooth, top-shaped, very much swollen, yellow, single banded below; spire very obtuse; sutures impressed; whorls six, flattened above and inflated below; aperture large, rhomboidal, whitish and single-banded within; outer lip acute, sinuous; columella thickened below and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 175.

*Hab.*—Holston River, Tennessee, Prof. G. Troost.

My cabinet.

Diam. .37,

Length .49 inch.

*Remarks.*—A single specimen of this pretty little species was received from Prof. Troost, a long time since, with *Melania turgida* (nobis), but it is a very different



species, having a more characteristic auger-shaped mouth, and this specimen has a single band, while four specimens of *turgida* have each five bands. It is also top-shaped while the *turgida* is globose. It is not easily confounded with any other species, being wider for its length than any other *Trypanostoma* I am acquainted with. The aperture is full one-half the length of the shell, and the body whorls is nearly two-thirds the length of the whole shell.

TRYPANOSTOMA SYCAMORËNSE. Pl. 36, fig. 104.

Testâ plicatâ, conicâ, luteo-corneâ, suberassâ; spirâ attenuatâ, mucronatâ; suturis impressis; anfractibus undenis, convexiseulis, supernè carinatis, in medio plicatis; aperturâ parviuseulâ, rhomboideâ, intûs albidâ; labro acuto, sinuoso; columellâ incurvâ, infernè incrassatâ et contortâ.

Shell plicate, conical, yellowish horn-color, rather thick; spire attenuate, pointed; sutures impressed; whorls eleven, somewhat convex, carinate above, plicate in the middle; aperture rather small, rhomboidal, whitish within; outer lip acute, sinuous; columella incurved, thickened below and twisted.

Proc. Acad. Nat. Sci., 1862, p. 175.

*Hab.*—Sycamore, Claiborne County, East Tennessee, J. Lewis, M. D.

My cabinet and cabinet of Dr. Lewis.

Diam. .36,

Length .92 inch.

*Remarks.*—A single specimen only is before me. It is a rather small, very symmetrical species. The seven upper whorls are carinate, the three middle ones are furnished with numerous rather obscure folds, the lower whorl is smooth. In outline it resembles *labiatum*, herein described, but cannot be confounded with that species which is not plicate, nor yellowish, and the form of the lower part of the aperture is very different. The aperture is little more than the fourth of the length of the shell.

TRYPANOSTOMA DUX. Pl. 36, fig. 105.

Testâ carinatâ, pyramidatâ, crassâ, rufo-fuscescente; spirâ valdè elevatâ; suturis parum impressis; anfractibus instar novenis, planulatis; aperturâ subgrandi, rhombicâ, intûs pallido salmoniâ; labro acuto, sinuoso; columellâ incrassatâ et valdè contortâ.

Shell carinate, pyramidal, thick, reddish brown; spire much raised; sutures slightly impressed; whorls about nine, flattened; aperture rather large, rhombic, pale salmon color within and very much twisted.

*Operculum* subpyriform, dark brown, with polar point near to the basal line.

Proc. Acad. Nat. Sci., 1862, p. 170.

*Hab.*—Tennessee River, W. Spillman, M. D. Fox River, Illinois, J. Sampson; Oostenaula, Rev. G. White; Tuscumbia, B. Pybas.

My cabinet and cabinets of Dr. Spillman and Mr. Sampson.

Diam. .75.

Length 1.80 inch.

*Remarks.*—This is the largest species of *Trypanostoma* of our country which I have seen. It is nearly two inches long and is athletic. It is closely allied to *Melania* (*Trypanostoma*) *canaliculata* and *undulata*, Say, which two may indeed be only varieties of each other. It has a carina like each of them, and this is sometimes slightly nodulous like the latter, and there is a slight furrow-like impression above the carina which reminds one of the former. The whorls are remarkably flat and the color of the epidermis is more brownish. Three specimens out of six before me are more or less banded inside. The specimen from Tuscumbia is whitish inside and has two indistinct bands. It is an imperfect specimen, and may really not belong to this species. The aperture is more than one-fourth the length of the shell.

TRYPANOSTOMA THORNTONII. Pl. 36, fig. 106.

Testâ carinatâ, pyramidatâ, subcrassâ, corneâ, vel vittatâ vel evitatâ; spirâ regulariter elevatâ; suturis parum impressis; anfractibus instar denis, planulatis; aperturâ parviusculâ, rhomboideâ, intus albidâ; labro acuto, valdè sinnoso; columellâ infernè incrassâ et valdè contortâ.

Shell carinate, pyramidal, rather thick, horn-color, banded or not banded; spire regularly elevated; sutures somewhat impressed; whorls about ten, flattened; aperture rather small, rhombic, white within; outer lip acute, very sinuous; columella thickened below and very much twisted.

*Operculum* ovate, dark brown, with the polar point near to the base.

Proc. Acad. Nat. Sci., 1862, p. 170.

*Hab.*—Tuscumbia, Alabama, L. B. Thornton Esq., and Rev. G. White; Chattanooga, Tennessee, J. Clark.

My cabinet and cabinets of Mr. Thornton, and Dr. Hartman.

Diam. .62,

Length 1.37 inch.

*Remarks.*—This appears to be a common species about Tuscumbia and up the Tennessee River. I have about sixty specimens before me. They came with a large number mixed up with *Mel.* (*Trypanostoma*) *undulata*, Say, but were easily separated from that species. They are always smaller, and none have undulations. Like *undulata* they are usually banded, only eight are without bands entirely. Some specimens have a single broad revolving band on all the whorls, some have several bands, and others again have a capillary line visible on the inside only. Four are dark purplish green, the color being caused by the broad bands on the inside. It is nearly allied to *T. moriformi*, herein described, but is not cylindrical. The specimens are usually of a very regular pyramid with a short base. The carina of the periphery is usually strong, but not always so. In this it is near to *Melania* (*Trypanostoma*) *filum* (nobis), but it is more slender than that species. The aperture is about one-third the length of the shell. Most of the specimens are slightly channelled on the lower whorl. I name it after L. B. Thornton, Esq., to whom I am indebted for many fine specimens of this and other shells.

## TRYPANOSTOMA TROOSTII. Pl. 36, fig. 107.

Testâ carinatâ, conoideâ, valdè inflatâ, vel luteo-corneâ vel viridescente, vel vittatâ vel evittatâ; spirâ elevatâ; suturis valdè et irregulariter impressis; anfractibus instar novenis, subimpressis, interdum canaliculatis; aperturâ grandi, rhomboideâ, intus albidâ, interdum vittatâ; labro acuto, sinuoso; columellâ infernè incrassatâ et valdè contortâ

Shell carinate, conical, very much inflated, yellowish horn-color or greenish, banded or without bands; sutures irregularly and very much impressed; whorls about nine, rather impressed, sometimes channelled; aperture large, rhomboidal, whitish and sometimes banded within; outer lip acute, sinuous; columella thickened below and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 171.

*Hab.*—Tennessee, Prof. G. Troost; Florence, Alabama, Rev. G. White; Oostenaula River, Georgia, Bishop Elliott, and Fox River, near New Harmony, Indiana, J. Sampson.

My cabinet and cabinets of Bishop Elliott and Mr. Sampson.

Diam, .64.

Length 1.29 inch.

*Remarks.*—I have five specimens before me; that, from the late Prof. Troost (after whom I have great pleasure in naming it,) I have had for a long time. It is one of the the largest species we have in the United States. It is perhaps nearest to *Melania (Trypanostoma) canaliculata*, Say. It is, however, more inflated, the aperture is larger and the columella more extended. All the specimens are not channelled, but all are more or less carinate at the periphery. Two of the specimens are obscurely banded inside, and one very much banded inside and out. The old specimens are thickened inside the edge of the outer lip. The aperture is more than one-third the length of the shell.

## TRYPANOSTOMA CLARKII. Pl. 36, fig. 108.

Testâ obtusè carinatâ, conicâ, subcrassâ, tenebroso-olivâ; spirâ elevatâ; suturis valdè impressis; anfractibus instar octonis, planulatis; aperturâ parviusculâ, rhomboideâ, intus albidâ; labro acuto, sinuoso; columellâ albâ et contortâ.

Shell obtusely carinate, conical, rather thick, dark olive; spire raised; sutures very much impressed; whorls about eight, flattened; aperture rather small, rhomboidal, within whitish; outer lip acute, sinuous; columella white and twisted.

*Operculum* ovate, dark brown, with the polar point near the basal margin.

Proc. Acad. Nat. Sci., 1862, p. 171.

*Hab.*—French-broad and Tellico Creeks, Tennessee, J. Clark and Prof. Christy; Florence, Alabama, Rev. G. White; Noxubee River Mississippi, Dr. Spillman; Clinch River, Tennessee, Dr. Warder, and Coosa, Cahawba and Alabama Rivers, Alabama. Dr. Showalter.

My cabinet and cabinets of Mr. White, and Drs. Spillman and Showalter.

Diam. .46,

Length 1.13 inch

*Remarks.*—This species has the color of *Spillmani*, herein described, but it is a

smaller and thicker species, and has a distinct carina. It is also less attenuate. The specimen from Clinch River is pale horn-color. Those from Tellico Creek are nearly all furnished with 2 to 4 bands. Two of the three from French Broad are of a deep purple. The aperture is about one-third the length of the shell.

I have great pleasure in naming this after my deceased friend, Joseph Clark, to whom I am indebted for many species brought by Prof. Christy.

TRYPANOSTOMA INCURVUM. Pl. 36, fig. 109.

Testâ carinatâ, conoideâ, subtenui, corneâ; spirâ subelevatâ; suturis regulariter impressis; anfractibus octonis, planulatis, infernè obsoletè striatis; aperturâ parviusculâ, rhomboideâ, intus albidâ; labro acuto, sigmoideo; columellâ valdè contortâ.

Shell carinate, conical, rather thin, horn-color; spire somewhat elevated; sutures regularly impressed; whorls eight, flattened, obscurely striate below; aperture rather small, rhombical, whitish within; outer lip acute, extremely sinuous; columella very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 171.

*Hab.*—Florence, Alabama, Rev. G. White.

My cabinet and cabinet of Mr. White.

Diam. .37,

Length .89 inch.

*Remarks.*—Among the *Melanidæ* sent to me by Mr. White, I found three specimens of this species which being near to *Thorntonii*, herein described, evidently was supposed to be the same species. It is however, a smaller, more slender and thinner species, and the remarkable sinuous edge of the outer lip at once marks the difference. The inward curve, starting at once in that direction from the suture, turns forward before it reaches the periphery of the whorl and again curves to the base, making a complete sigmoid curve. The aperture is about one-third the length of the shell.

TRYPANOSTOMA POSTELLII. Pl. 36, fig. 110.

Testâ carinatâ, pyramidatâ, suberassâ, corneâ; spirâ regulariter conicâ; suturis valdè impressis; anfractibus octonis, vel planulatis vel impressis, ultimo parviusculo; aperturâ parvissimâ, rhomboideâ, intus albidâ; labro acuto, valdè sinuoso; columellâ infernè incrassatâ et valdè contortâ.

Shell carinate, pyramidal, rather thick, horn-color; spire regularly conical; whorls eight, flattened, the last rather small; aperture very small, rhomboidal, whitish within; outer lip acute, very sinuous; columella thickened below and very much twisted.

Proc. Acad. Nat. Sci. 1862, p. 171.

*Hab.*—Tennessee River, J. Postell; North Alabama, Prof. Tuomey.

My cabinet and cabinets of Mr. Postell and Dr. Hartman.

Diam. .35,

Length .85 inch.

*Remarks.*—I have from Mr. Postell eight specimens, and from Professor Tuomey five. They vary very little, but most of them are imperfect at the apex or outer lip. This species very closely resembles *Thorntonii*, herein described, but is a much smaller species, with a smaller aperture and compressed whorls. All the specimens before

me are more or less angulate on the periphery. None have bands. The aperture is about two-ninths the length of the shell. I name this after Mr. Postell, to whom I am indebted for specimens of this and many other new species of *Mollusca*.

TRYPANOSTOMA TUOMEYI. Pl. 36, fig. 111.

Testâ carinâtâ, crassiusculâ, elevato-conicâ, tenebroso-fuscâ; spirâ elevato-conicâ; suturis vix impressis; anfractibus instar denis, planulatis, infernè obsoletè striatis; aperturâ parvâ, rhomboideâ, intùs tenebrosâ; labro acuto, sinuoso; columellâ infernè parum incrassatâ et valdè contortâ.

Shell carinate, somewhat thick, high conical, dark brown; spire attenuate conical; sutures scarcely impressed; whorls about ten, flattened; aperture small, rhomboidal, very dark within; outer lip sharp, sinuous; columella a little thickened below and very much contorted.

Proc. Acad. Nat. Sci., 1862, p. 171.

*Hab.*—North Alabama, Prof. Tuomey; Florence, Alabama, Rev. G. White.

My cabinet and cabinet of Mr. White.

Diam. .45,

Length 1.23 inch.

*Remarks.*—I have about a dozen specimens before me from the two habitats. In outline and size it is perhaps nearest to *Melania* (*Trypanostoma*) *elongata* (nobis) from West Tennessee, but it is easy to distinguish it from that species, by its being rather more slender, and its being darker. In outline and color it is very close to *Melania*, (*Trypanostoma*) *Brumbyi* (nobis), but it differs in the form of the mouth and in not being striate. The aperture is rather more than one-fourth the length of the shell. I have great pleasure in dedicating this species to my deceased friend, Prof. Tuomey, to whom I am greatly indebted for many new and interesting species collected by himself while engaged in his geological survey of the State of Alabama.

TRYPANOSTOMA FLORENCENSE. Pl. 36, fig. 112.

Testâ subcarinâtâ, turritâ, subcrassâ, tenebroso-fuscâ vel luteo-corneâ; obsoletè vittatâ vel evittatâ; spirâ valdè elevatâ; suturis leviter impressis; anfractibus instar undenis, parum convexis; aperturâ parviusculâ, rhomboideâ, intùs cæruleo-albâ; labro acuto, sinuoso; columellâ albidâ et valdè contortâ.

Shell subcarinate, turritid, rather thick, dark brown or yellowish horn-color; spire very much raised; sutures slightly impressed; whorls about eleven, slightly convex; aperture rather small, rhombic, within bluish white; outer lip acute, sinuous; columella whitish and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 171.

*Hab.*—Florence, Alabama, Dr. Spillman; Tuscumbia, L. B. Thornton, Esq.

My cabinet and cabinets of Dr. Spillman and Mr. Thornton.

Diam. .59,

Length 1.65 inch.

*Remarks.*—This is a large, rather slim species. Among eight specimens, the longest is one inch and six-tenths. It is nearly allied to *Melania*, (*Trypanostoma*) *elongata*,

(nobis), but is not carinate like that species, nor are the whorls so flat. The two specimens from Florence, are larger, and very dark brown. Of the six from Tusculumbia, four are yellowish, and two are banded and greenish. Two of the yellowish ones are disposed to salmon-color inside. There is a slight disposition above the periphery to flatness or indentation. The aperture is more than the fourth of the length of the shell.

TRYPANOSTOMA ALABAMENSE. Pl. 36, fig. 113.

Testâ carinatâ, crassiusculâ, subfusiformi, tenebroso-corneâ; spirâ subattenuatâ; suturis regulariter impressis; anfractibus instar octonis, planulatis, infernè striatis; aperturâ parviusculâ, rhomboideâ, intus albidâ; labro acuto, sinuoso; columellâ infernè incrassatâ et valdè contortâ.

Shell carinate, somewhat thick, subfusiform, dark horn-color; spire somewhat attenuate; sutures regularly impressed; whorls about eight, flattened, striate below; aperture rather small, rhomboidal, whitish within; outer lip acute, sinuous; columella thickened below and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 171.

*Hab.*—North Alabama, Prof. Tuomey; Florence, Alabama, Rev. G. White.

My cabinet.

Diam. .46.

Length 1.11 inch.

*Remarks.*—This species is allied to *Florencense*, herein described, in outline, but is a much smaller species, less exserted in the spire, of a much lighter color and with fewer whorls. The three specimens before me differ but little in size or color, neither has a perfect apex, and therefore the character or the exact number of the upper whorls cannot be ascertained. They all have a few indistinct revolving striæ below the periphery of the last whorl. The aperture is about one-third the length of the shell.

TRYPANOSTOMA LIGATUM. Pl. 36, fig. 114.

Testâ carinatâ, subfusiformi, suberassâ, inflatâ, nitidâ, vittatâ vel evittatâ, luteo-olivâ; spirâ obtusè conicâ; suturis impressis; anfractibus septenis, convexiusculis, ultimo pergrandi et ligato apud peripherium; aperturâ grandî, rhomboideâ, intus obsoletè vittatâ; labro acuto, sinuoso; columellâ infernè incrassatâ, ad basim rufo-maculatâ, valdè contortâ.

Shell carinate, subfusiform, rather thick, inflated, shining, with or without bands, yellowish olive; spire obtusely conical; sutures impressed; whorls seven, slightly convex, the last very large, corded on the periphery; aperture large, rhomboidal, obscurely banded within; outer lip acute, sinuous; columella thickened below, with reddish spots at the base, and much contorted.

Proc. Acad. Nat. Sci., 1862, p. 171.

*Hab.*—Tennessee, Prof. Troost; Cumberland River, C. T. Downie; North Alabama, Prof. Tuomey; Ohio River, at Cincinnati, U. P. James.

My cabinet and cabinets of Dr. Hartman and Mr. James.

Diam. .38,

Length .71 inch.

*Remarks.*—This is a short thick species with a fine natural olivaceous polish. A specimen from Prof. Troost has been in my possession many years, and is the most perfect. It has two obscure bands inside. Another I recently obtained from Dr. Hartman, who received it from Prof. Tuomey. A third is an old eroded specimen, quite brown, sent by Mr. Downie. After the above description was made, I received from Mr. James four specimens, neither of them entirely mature, which he took in the Ohio River at Cincinnati. Two only have the ligatures round the periphery of the last whorl. Two have four bands; one has two well-defined bands and two are without. One of the two without bands is of a very dark brown, and the other very light brown. The aperture is nearly one-half the length of the shell. The obsolete bands within are dark brown, but the spot at the base of the columella is of a bright reddish color. The upper part of the whorls, which are slightly rounded, are of a yellowish color. Very different from the description of *Melania ligata*, described by Menke, Synopsis, p. 82.

TRYPANOSTOMA PYBASI. Pl. 36, fig. 115.

Testâ obtusè carinatâ, obtusè conicâ, solidâ, bivittatâ, viridi-fuscâ; spirâ obtusâ; suturis valdè impressis; anfractibus iustar octonis, convexiusculis; aperturâ parvâ, rhombicâ, intus albâ et vittatâ; labro acuto, valdè sinuoso; columellâ infernè incrassatâ et valdè contortâ.

Shell obtusely carinate, obtusely conical, solid, double-banded, greenish brown; spire obtuse; sutures much impressed; whorls about eight, slightly convex; aperture small, rhombic, white and banded within; outer lip acute and very sinuous; columella thickened below and very much twisted.

Proc. Acad. Nat. Sci., 1862. p. 172.

*Hab.*—Tuscumbia, Alabama, B. Pybas.

My cabinet and cabinets of Mr. Pybas and Dr. Hartman.

Diam. .46,

Length 1.05 inch.

*Remarks.*—Quite a number of specimens were sent by Mr. Pybas, which are all very nearly alike. Some are darker than others. The angle on the periphery of the whorls is obtuse, and in many specimens obsolete. The lower whorl is usually flattened, sometimes impressed, quite making a channel. It is near to *T. moriformi* herein described, but is not so turgid, is of a darker color and has usually two dark bands inside; *moriformi* usually have a thin band but sometimes none. The length of the aperture is not quite one-third the length of the shell. I name this after Mr. B. Pybas, to whom I am indebted for it and many fine species from his vicinity.

TRYPANOSTOMA SUBULÆFORME. Pl. 36, fig. 116.

Testâ carinatâ, subulari, subtenui, corneâ; spirâ attenuato-conicâ; suturis valdè impressis; anfractibus denis, infernè plauulatis, supernè carinatis; aperturâ parvâ, subrhomboideâ, intus albidâ; labro acuto, sinuoso; columellâ parum incrassatâ et contortâ.

Shell carinate, subulate, rather thin, horn-color; spire attenuately conical; sutures very much impressed; whorls ten, flattened below and carinate above; aperture small, subrhomboidal, whitish within; outer lip acute, sinuous; columella slightly thickened and twisted.

*Operculum* ovate, dark brown, with the polar point near the base slightly on the left.

Proc. Acad. Nat. Sci., 1862, p. 174.

*Hab.*—Knoxville, Tennessee, Prof. Troost and W. Spillman, M. D.

My cabinet and cabinets of Dr. Troost and Dr. Spillman.

Diam. .39,

Length 1.07 inch.

*Remarks.*—This species is nearly allied to *Melania (Trypanostoma) bicostata*, Anth., and in outline and size very close to *Melania (Trypanostoma) Ocoéensis* (nobis). From *bicostata*, it may be distinguished by the difference in the aperture, in being more subulate, and in having the carina less marked. The channel of *bicostata* is more retrorse and more angular at the point. The aperture is about one-fourth the length of the shell. Two of the three specimens before me are without any bands, the third has a well-defined brown band within the aperture. It is nearly the same in outline as *attenuatum* herein described, but differs in the form of the aperture and in being carinate.

TRYPANOSTOMA OLIVACEUM. Pl. 36, fig. 117.

Testâ carinatâ, subfusiformi, subcrassâ, olivaceâ; spirâ subobtusâ; suturis impressis; anfractibus instar octonis, planulatis; aperturâ subgrandi, rhomboideâ, intus albidâ; labro acuto, sinuoso; columellâ infernè incrassatâ et valdè contortâ.

Shell carinate, subfusiform, rather thick, olivaceous; spire rather obtuse; sutures impressed; whorls about eight, flattened; aperture rather large, rhomboidal, whitish within; outer lip sharp, sinuous; columella thickened below and very much twisted.

*Operculum* ovate, dark brown, with polar point near to the base.

Proc. Acad. Nat. Sci., 1862, p. 172.

*Hab.*—Tombigbee River, Mississippi, W. Spillman, M. D.

My cabinet and cabinets of Dr. Spillman and Dr. Hartman.

Diam. .50,

Length 1.06 inch.

*Remarks.*—Dr. Spillman sent me quite a number of this species. In outline and size it is very near to *Strephobasis olivaria* (nobis), but it differs in the base of the columella, which separates it from the genus *Strephobasis*, and it is more flattened on the whorls, and is not banded; except in rare cases it has an obscure small band near the base. The olive-green hue of the epidermis is very constant. The carina generally leaves a thread-like line along the suture. The aperture is about one-third the length of the shell.

TRYPANOSTOMA MORIFORME. Pl. 36, fig. 118.

Testâ sulcatâ, subcylindraceâ, solidâ, uno-vittatâ, corneâ, spirâ obtusè conicâ; suturis impressis; anfractibus instar novenis, impressis, canaliculatis; aperturâ parviusculâ, rhombicâ, intus albâ et univittatâ; labro acuto, valdè sinuoso; columellâ infernè incrassatâ et valdè contortâ.



Shell sulcate, subcylindrical, solid, single-banded, horn-color; spire obtusely conical; sutures impressed; whorls about nine, impressed canaliculate; aperture rather small, rhombic, white within, with a single band; outer lip acute, very sinuous; columella thickened below and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 172.

*Hab.*—Oostenaula River, near Rome, Georgia, Rev. G. White; Tennessee River, Dr. Spillman; Tuscumbia, Alabama, B. Pybas.

My cabinet and cabinets of Mr. White, Dr. Spillman, Mr. Pybas and Dr. Hartman.  
Diam. .52, Length 1.08 inch.

*Remarks.*—This is a well characterized species. I have nearly forty specimens from different habitats before me. It is nearly allied to *Melania (Trypanostoma) infrafasciata*, Anthony, but it differs in being more solid and being subcylindrical as well as having a more contracted aperture. It has very much the same kind of fine line near the base. It is not quite so angular. The aperture is not quite one-third the length of the shell. It belongs to the group of which *Melania (Trypanostoma) canaliculata*, Say, may be considered the type.

TRYPANOSTOMA VIRIDE. Pl. 36, fig. 119.

Testâ subsulcatâ, subcrassâ, subfusiformi, olivaceâ; spirâ obtusè conicâ; suturis valdè impressis; anfractibus septenis, convexis, ultimo subcanaliculato; aperturâ subgrandi, rhomboideâ, intus vel purpureâ vel albidâ; labro acuto, sinuoso; columellâ infernè incrassatâ et parum contortâ.

Shell subsulcate, somewhat thick, subfusiform, olivaceous; spire obtusely conical; sutures much impressed; whorls seven, convex, the last slightly canaliculate; aperture rather large, rhomboidal, purple or whitish within; outer lip acute, sinuous; columella thickened below and slightly twisted.

Proc. Acad. Nat. Sci., 1862, p. 172.

*Hab.*—Tennessee, Prof. Troost.

My cabinet and cabinet of Dr. Hartman.  
Diam. .48, Length .89 inch.

*Remarks.*—I have about a dozen specimens before me, all of which have the same olive-green hue. They have been in my possession a long time, and I had put them among the young of *Melania (Trypanostoma) canaliculata*, Say. I have now no doubt but that they are distinct from that large species. None of them are half the size, the color is darker and they are wider in proportion. The revolving furrow above the periphery of the last whorl is hardly observable in some specimens. Every one of my specimens has a purplish brown spot at the base of the columella, and in some specimens this color pervades the whole of the interior. The aperture is more than a third of the length of the shell.

## TRYPANOSTOMA LEWISII. Pl. 36, fig. 120.

Testâ sulcatâ, subtenui, elevato-conicâ, tenebroso-fuscâ vel corneâ, vittatâ; spirâ attenuatâ; suturis parum impressis; anfractibus instar undenis, planulatis; aperturâ parvâ, subrhomboideâ, intus vittatâ; labro acuto, parum sinuoso; columellâ infernê parum incrassatâ et valdè contortâ.

\* Shell sulcate, somewhat thin, high, conical, dark brown or horn-color, banded; spire very much drawn out; sutures slightly impressed, whorls about eleven, flattened; aperture small, subrhomboidal, banded within; outer lip acute, slightly sinuous; columella slightly thickened below and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 172.

*Hab.*—Peoria, Illinois, J. Lewis, M. D.

My cabinet and cabinet of Dr. Lewis.

Diam. .47,

Length 1.12 inch.

*Remarks.*—I have three specimens before me, all of which differ slightly. Two are dark brown and they are purple within. The third is light horn-color, with light brown bands covering the greater part of the whorls. The upper whorls of all three are carinate. It is allied to *Melania (Trypanostoma) annulifera*, Con., but it is a smaller shell, more attenuate, and the aperture is more rounded at the base. The aperture is about one-fourth the length of the shell. I have great pleasure in calling this after my friend Dr. Lewis, of Mohawk, New York, who has aided me greatly by sending me very many new shells from our fresh waters.

## TRYPANOSTOMA CANALITIUM. Pl. 36, fig. 121.

Testâ canaliculatâ, conicâ, crassiusculâ, corneâ, obsoletè vittatâ; spirâ regulariter conicâ, subelevatâ, ad apicem bivittatâ; suturis impressis; anfractibus planulatis, instar septenis, ultimo canaliculato; aperturâ parvâ, rhomboideâ, intus vel albâ vel salmoniâ et vittatâ; labro acuto et sigmoideo; columellâ contortâ, ad basim recurvâ.

Shell canaliculate, conical, rather thick, horn-color, obscurely banded; spire regularly conical, somewhat raised, double-banded towards the point; sutures impressed; whorls about seven, flattened, the last canaliculate; aperture small, rhomboidal, white or salmon, and banded within; outer lip sharp and sigmoid; columella twisted, recurved at the base.

Proc. Acad. Nat. Sci. 1862, p. 175.

*Hab.*—Yellowleaf Creek, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter, M. D.

Diam. .43,

Length .99 inch.

*Remarks.*—Three specimens are before me all of the same size, and having the appearance of half-grown *Melania (Trypanostoma) canaliculata*, Say, but they are mature and evidently distinct. The channel above the middle of the whorl is smaller, but well characterized. In the form of the aperture they are very much the same, being auger-shaped like *Cerithium*. It is very nearly allied to *Melania (Trypanostoma)*

*infrafasciata*, Anth., from Tennessee, but may be distinguished by its channel above the middle of the whorls, and in having three bands visible in the interior, while the *infrafasciata* has but one, as described by Mr. Anthony, and none are on the superior whorls, as all our three have. The aperture is about three-tenths the length of the shell.

TRYPANOSTOMA SHOWALTERII. Pl. 36, fig. 122.

Testâ striatâ, interdum lævi, valdè exsertâ, crassâ, subcylindraceâ, vel corneâ vel fuscâ, interdum infernè vittatâ; spirâ valdè elevatâ; suturis valdè impressis; anfractibus novenis, subplanulatis; aperturâ parvâ, rhomboideâ, intûs vel albidâ vel salmoniâ; labro acuto, parum sinuoso; columellâ infernè incrassatâ et valdè contortâ.

Shell striate, sometimes smooth, much drawn out, subcylindrical, thick, horn-color or brown, sometimes banded below; spire much raised; sutures much impressed; whorls nine, somewhat flattened; aperture small, rhomboidal, whitish or salmon color within; outer lip sharp, somewhat sinuous; columella thickened below and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 172.

*Hab.*—Cahawba River, Alabama, E. R. Showalter, M. D.; Tuscaloosa, Alabama, Dr. Budd; Oostanula River, Georgia, Rev. G. White and Bishop Elliott.

My cabinet and cabinets of Dr Showalter, Bishop Elliott, Dr. Hartman, and Dr. Budd.

Diam. .46,

Length 1.38 inch.

*Remarks.*—This is a very remarkable species, having a high subcylindrical spire and a small aperture. Six from the Oostenaula are all more or less striate, two of them having a well defined revolving band near the base on the inside, one has an obsolete band, and the remaining three are without a band. Three of these specimens are of a bright horn-color, the others are dark brown, and one has indistinct bands above the dark one. The thickened part of the columella in three specimens is of a light salmon. Three of the four from Cahawba River are slightly striate, the fourth smooth. These have no bands and are all white on the columella. The aperture is about one-fourth the length of the shell. I have great pleasure in naming this after Dr. Showalter, who has done so much in the development of the *Mollusca* of his State.

This species is closely allied to *Melania (Trypanostoma) Ordii*, (nobis), but it is more attenuate and more cylindrical.

TRYPANOSTOMA ANTHONYI. Pl. 36, fig. 123.

Testâ rugoso-striatâ, pyramidatâ, crassâ, luteo-olivaceâ; spirâ elevatâ; suturis rugoso-impressis; anfractibus instar novenis, planulatis; aperturâ subgrandi, rhomboideâ, intûs albâ; labro acuto, sinuoso; columella infernè incrassatâ et valdè contortâ.

Shell rugosely striate, pyramidal, thick, yellowish olive; spire raised; sutures ru-

gously impressed; whorls about nine, flattened; aperture rather large, rhomboidal, white within; outer lip acute, sinuous; columella thickened below and very tortuous.

*Operculum* subovate, dark brown, with the polar point near to the base on the left.

Proc. Acad. Nat. Sci., 1862, p. 172.

*Hab.*—Tennessee, J. G. Anthony; Warrior River and Yellow Leaf Creek, Alabama, Dr. Showalter; Fox River, Indiana, J. Sampson.

My cabinet and cabinets of Mr. Anthony, Dr. Showalter, Dr. Hartman and Mr. Sampson.

Diam. .63,

Length 1.43 inch.

*Remarks.*—A number of specimens of this fine large species is before me from various habitats. It is allied to *Melania (Trypanostoma) canaliculata*, Say, but it may easily be distinguished from it by the absence of a regular canal, and being a less ponderous shell. The color, too, is more of a yellow green; usually there are three or four rather coarse striæ about the middle of the whorl, which form irregular canals. The canal at the base is wide and much recurved. Some specimens are almost entirely smooth, and some are  $1\frac{1}{2}$  inches long. The aperture is about one-third the length of the shell. I name this after Mr. J. G. Anthony, to whom I am indebted for several fine specimens, and many other species from Tennessee.

TRYPANOSTOMA STRIATUM. Pl. 36, fig. 124.

Testâ striatâ, subulari, subtenui, corneâ; spirâ elevatâ; suturis impressis; anfractibus instar octonis, convexiusculis, ultimo subparvo; aperturâ parvâ, subrhomboideâ, intus albidâ; labro acuto, valdè sinuoso, expanso; columellâ parum incrassatâ et valdè sinuosâ.

Shell striate, subulate, rather thin, horn-color; spire raised; sutures impressed; whorls about eight, somewhat convex, the last rather small; aperture small, subrhomboidal, whitish within; outer lip acute, very sinuous, expanded; columella somewhat thickened and very sinuous.

Proc. Acad. Nat. Sci., 1862, p. 173.

*Hab.*—Florence, Alabama, B. Pybas.

My cabinet and cabinets of Mr. Pybas and Dr. Hartman.

Diam. .31,

Length .95 inch.

*Remarks.*—Nearly a dozen of this species were received among a number of small shells from Mr. Pybas. It is not an attractive species, being dull horn-color and without bands. The upper whorls are covered with revolving striæ which rarely extend to the last one, except a single one on the upper part of this whorl. It has much the form and size of *Melania (Trypanostoma) strigosa*, (nobis), but may at once be distinguished by the difference in the form of the aperture, the base of the columella of *striatum* being rounded, while *strigosa* is nearly straight. The length of the aperture is about three-tenths the length of the shell.

## TRYPANOSTOMA MONILIFERUM. Pl. 36, fig. 125.

Testâ tuberculatâ, crassâ, pyramidatâ, vel lnteolâ vel virente, vittatâ vel evittatâ; spirâ elevato-pyramidatâ; suturis irregulariter impressis; anfractibus instar denis, planulatis, infernè striatis, interdum obsolete sulcatis, ad peripheriam tuberculatis; aperturâ subgrandi, rhomboideâ, intus vel albidâ vel salmoniâ, plerumquè bivittatâ; labro acuto, valdè sinuoso; columellâ infernè incrassatâ et valdè contortâ.

Shell tuberculate, thick, pyramidal, yellowish or greenish, banded or without bands; spire high, pyramidal; sutures irregularly impressed; whorls about ten, flattened, striate below, sometimes obscurely sulcate, tuberculate on the periphery; aperture rather large, rhomboidal, within either white or salmon and generally double banded; outer lip acute, very sinuous; columella thickened below and very much twisted.

*Operculum* ovate, very dark-brown, with the polar point near the base.

Proc. Acad. Nat. Sci., 1862, p. 172.

*Hab.*—Tennessee, Prof. Troost and Mr. Anthony; Florence, Alabama, Rev. G. White, Mr. Pybas and Mr. Thornton; Cumberland River, Dr. Powell; Ohio River, near the mouth, in Illinois, J. Ronaldson; New Harmony, Indiana, Mr. Carley and Mr. Sampson; Warrior River, Alabama, Prof. Brumby.

My cabinet and cabinets of Prof. Troost, Mr. Anthony, Mr. Carley, Mr. Anthony and Dr. Hartman.

Diam. .67,

Length 1.53 inch.

*Remarks.*—This is among the largest species of the *Melanidæ* which inhabit the waters of the United States. It has usually been considered a variety of *Melania* (*Trypanostoma*) *undulata*, Say, but it is easily distinguished by its being longer and narrower in the outline, in having a greater number of whorls, and in having more and smaller tubercles on the periphery of the last whorl. This usually has twelve or thirteen, while *undulata* has seven or eight. Few individuals are without bands, and there are usually two broad ones more distinct within than without. These two bands are sometimes separated into four. The three or four first whorls are usually carinate. The tubercles, which are usually beautifully defined, are highly ornamental, but usually do not exist above the ultimate and penultimate whorls. This species seems to be widely distributed, and few or none of our species are more beautiful. There is usually a revolving raised line above and parallel with the row of tubercles. The color of the epidermis varies much. Some specimens are of a rich straw yellow, and others are greenish, while others again are of a deep olive brown, with a fine natural polish. Some have the upper band so broad that a single whitish line is visible under the suture. This may be remarked more particularly in the specimens from the vicinity of New Harmony. The aperture is about one-third the length of the shell.

## Genus GONIOBASIS.

## GONIOBASIS OSCULATA. Pl. 37, fig. 126.

Testâ lævi, pupæformi, subelevatâ, subcrassâ, luteo-fuscâ, quadrivittatâ; spirâ subelevatâ; suturis valdè et irregulariter impressis; anfractibus septenis, convexiusculis; aperturâ parvâ, constrictâ, subellipticâ, intus albidâ et vittatâ; labro acuto; columellâ albâ, inflectâ, ad basim contortâ et subangulatâ.

Shell smooth, pupæform, somewhat raised, rather thick, yellowish brown, four-banded; spire somewhat raised; sutures very much and irregularly impressed; whorls seven, somewhat convex; aperture small, constricted, subelliptical, whitish within and banded; outer lip acute; columella white, bent in, twisted and subangular at the base.

*Operculum* small, ovate, thin, dark brown, with the polar point near the base.

Proc. Acad. Nat. Sci. 1862, p. 263.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .37,

Length .89 inch.

*Remarks.*—A species very closely allied to *Melania* (*Goniobasis*) *Alabamensis*, (nobis), but it may be distinguished by its being smaller, more constricted, and being slightly more cylindrical. The bands are smaller and not quite so well expressed. When I received the first specimen, I considered it a small variety of *Alabamensis*, but having received others from Dr. Showalter, I cannot but consider it a distinct species inosculating on the other. The aperture is about one-third the length of the shell.

## GONIOBASIS BRUMBYI. Pl. 37, fig. 127.

Testâ lævi, attenuatâ, subtenui, cinereâ, quadrivittatâ; spirâ attenuatâ, ad apicem carinatâ; suturis valdè impressis; anfractibus instar octonis, convexiusculis; aperturâ parvâ, subrhomboideâ, intus albidâ et quadrivittatâ; labro acuto; columellâ inflectâ, ad basim obtusè angulatâ.

Shell smooth, attenuate, rather thin, ash-grey, four-banded; spire drawn out, carinate at the apex; sutures very much impressed; whorls about eight, slightly convex; aperture small, subrhomboidal, whitish and four-banded within; outer lip acute; columella bent in, obtusely angular at base.

Proc. Acad. Nat. Sci., 1862, p. 263.

*Hab.*—Alabama, Prof. Brumby.

My cabinet.

Diam. .32,

Length .74 inch.

*Remarks.*—Two specimens were sent to me among other species, by the late Prof. Brumby, of Columbia, South Carolina. One is but little more than half grown, and is more perfect in the epidermis and in the aperture. It is very closely allied to *Melania* (*Goniobasis*) *Kirtlandiana*, (nobis), but it is more attenuate and has bands

which I have never seen on *Kirtlandiana*. Both the specimens before me have four bands, the two middle ones being nearer to each other. The aperture of the mature specimen is not quite one-third the length of the shell, while that of the younger is more than the third, and it is also more angular at the base, the older one not being entirely perfect. I dedicate this species to the late Prof. R. T. Brunby, to whom I am indebted for it.

GONIOBASIS GROSVENORII. Pl. 37, fig. 128.

Testâ lævi, subattenuatâ, tenui, corneâ, fulgidâ, evittatâ; spirâ subattenuatâ, mucronatâ, ad apicem carinatâ; suturis regulariter et valdè impressis; anfractibus octonis, convexis; aperturâ parvâ, subrotundâ, intùs albidâ; labro acuto, parum sinuoso; columellâ inflectâ, tenni et contortâ.

Shell smooth, subattenuate, thin, horn-color, bright, without bands; spire subattenuate, pointed, carinate at the apex; sutures regularly and very much impressed; whorls eight, convex; aperture small, subrotund, white within; outer lip acute, slightly sinuous; columella bent in, thin and contorted.

Proc. Acad. Nat. Sci., 1862, p. 263.

*Hab.*—Fox River, Illinois, H. C. Grosvenor; and Quincy, Ohio, J. Clark.

My cabinet and cabinet of Mr. Grosvenor.

Diam. .29,

Length .79 inch.

*Remarks.*—I have about a dozen specimens from Quincy, and one from Fox River. The former are fresh, and of a dark horn-color. The latter is whitish and probably bleached, being evidently a dead shell. It is allied to *M. varicosa*, Ward, and is very much the same outline and size, but it has no veins and has no light line below the sutures. The aperture is not quite one-third the length of the shell. I name it after Mr. Grosvenor, to whom I am indebted for the specimen from Fox River, and many other species.

GONIOBASIS PARVA. Pl. 37, fig. 129.

Testâ lævi, conicâ, tenui, corneâ, evittatâ; spirâ subelevatâ, mucronatâ; suturis impressis; anfractibus septenis, planulatis; aperturâ parviusculâ, intùs albidâ, subrhomboideâ; labro acuto et sinuoso; columellâ inflectâ et parum incrassatâ.

Shell smooth, conical, thin, horn-color, without bands; spire somewhat raised, sharp-pointed; sutures impressed; whorls seven, flattened; aperture rather small, whitish within, subrhomboidal; outer lip acute and sinuous; columella bent in and somewhat thickened.

Proc. Acad. Nat. Sci., 1862, p. 264.

*Hab.*—Georgia, Right Rev. Stephen Elliott.

My cabinet and cabinet of Bishop Elliott.

Diam. .27,

Length .66 inch.

*Remarks.*—This is a small species of which I received only three specimens, neither of them entirely perfect. It is very near to *Melania* (*Goniobasis*) *lævis* (nobis), but it is

more attenuate, having a higher spire and rather smaller aperture. The aperture is about two-fifths the length of the shell.

GONIOBASIS SPINELLA. Pl. 37, fig. 130.

Testâ lævi, valdè attenuatâ, tenui, tenebroso-olivâ, evittatâ; spirâ valdè elevatâ, mucronatâ; suturis regulariter impressis; anfractibus instar novenis, planulatis; aperturâ parvissimâ, ovatâ, intùs albidâ; labro acuto, parum sinuoso; columellâ inflectâ et infernè parum incrassatâ.

Shell smooth, very much attenuate, thin, dark olive, without bands; spire very much raised, sharp-pointed; sutures regularly impressed; whorls about nine, flattened; aperture very small, ovate, whitish within; outer lip acute, slightly sinuous; columella bent in and slightly thickened below.

Proc. Acad. Nat. Sci. 1862, p. 264.

*Hab.*—Sycamore, Claiborne County, Tennessee, J. Lewis, M. D.

My cabinet.

Diam. .20,

Length .67 inch.

*Remarks.*—A single specimen only was received from Dr. Lewis. It is nearly of the size of *Melania (Goniobasis) terebralis* (nobis), but is a slimmer and darker colored species. It is very nearly of the same outline of *Melania (Goniobasis) strigosa* (nobis), but much smaller, slimmer and darker color. The specimen before me has neither folds nor angle on the apical whorls. Below the sutures there is a line of a lighter green. The aperture is about one-fifth the length of the shell.

GONIOBASIS ESTABROOKII. Pl. 37, fig. 131.

Testâ lævi, conicâ, subtenui, rufo-corneâ, evittatâ; spirâ attenuato-conicâ, mucronatâ; suturis impressis; anfractibus denis, convexiseulis; aperturâ parviseulâ, ovatâ, intùs albidâ; labro acuto, parum sinuoso; columellâ inflectâ.

Shell smooth, conical, rather thin, reddish horn-color, without bands; spire attenuately conical, sharp-pointed; sutures impressed; whorls ten, somewhat convex; aperture rather small, ovate, whitish within; outer lip acute, slightly sinuous; columella bent in.

*Operculum* ovate, light brown, with the polar point to the left of the centre, towards the basal margin.

Proc. Acad. Nat. Sci., 1862, p. 264.

*Hab.*—Knoxville, Tennessee, President Estabrook.

My cabinet.

Diam. .34,

Length .89 inch.

*Remarks.*—I received from President Estabrook, nine specimens of this species. They were all covered with a black deposit of oxide of iron. This being removed, the epidermis was found to be smooth and shining, and of a reddish horn-color, in-



clining to yellow. It is very closely allied to *Melania (Goniobasis) dubiosa* (nobis), but differs in the aperture being slightly more constricted and in being rather longer, having one more whorl. It is also near to *castanea* (nobis), but is larger and not chestnut brown. The aperture is about one-third the length of the shell. I dedicate this species to the late President Estabrook of Knoxville, Tennessee.

GONIOBASIS PRAIRIENSIS. Pl. 37, fig. 132.

Testâ lævi, elongato-fusiforâ, tenui, olivaceâ, fulgidâ, quadrivittatâ; spirâ elevatâ, mucronatâ; suturis regulariter impressis; anfractibus novenis, planulatis; aperturâ submagnâ, subrhomboideâ, intus albidâ et quadrivittatâ; labro acuto et sinuoso; columellâ inflectâ et contortâ.

Shell smooth, elongately fusiform, thin, olivaceous, shining, four-banded; spire raised, sharp-pointed; sutures regularly impressed; whorls nine, flattened; aperture rather large, subrhomboidal, whitish and four-banded within; outer lip acute, and sinuous; columella bent in and twisted.

*Operculum* ovate, dark brown, with polar point on the left, one-fourth above the basal margin.

Proc. Acad. Nat. Sci., 1862, p. 264.

*Hab.*—Big Prairie Creek, Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter, and Dr. Hartman.

Diam. .35,

Length .85 inch.

*Remarks.*—Among some twenty specimens before me, there is no difference in form or markings, except that some have the bands slightly broader than others. The two middle bands are rather closer together, and the under one of these two is generally the smaller. It was sent to me by Dr. Showalter under the name of *M. grata*, Anth., but while it has the four bands like that species, it is more slender, is not yellow, has a less aperture and one more whorl, and is more fusiform. The aperture is rather more than one-third the length of the shell.

GONIOBASIS ETOWAHENSIS. Pl. 37, fig. 133.

Testâ lævi, conoideâ, tenui, tenebrosâ, bivittatâ; spirâ subelevatâ; suturis impressis; anfractibus septenis, convexiusculis; aperturâ submagnâ, subrhomboideâ, intus tenebrosâ et latè bivittatâ; labro acuto et sinuoso; columellâ inflectâ et valdè contortâ.

Shell smooth, conoidal, thin, dark, double-banded; spire somewhat raised; sutures impressed; whorls seven, slightly convex; aperture rather large, subrhomboidal, dark and broadly banded within; outer lip acute and sinuous; columella bent in and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 264.

*Hab.*—Etowah River, Georgia, J. Postell.

My cabinet and cabinet of Mr. Postell.

Diam. .30.

Length .74 inch.

*Remarks.*—A single specimen only was sent to me by Mr. Postell. At first sight it would be taken for *Melania (Goniobasis) gracilior*, Anth., having the same dark hue, made so by the two broad, dark brown bands. It differs from it in being less conical, in having a larger aperture which is more angular at the basal margin. The two broad bands cover nearly two-thirds of the last whorl, leaving a yellowish interspace. In this specimen there is a brown elongate spot at the base of the columella. The aperture is about three-eighths the length of the shell.

GONIOBASIS DRAYTONII. Pl. 37, fig. 134.

Testâ lævi, conoideâ, crassiusculâ, tenebroso-castaneâ, evittatâ vel obsolete vittatâ; spirâ subelevatâ; suturis valdè impressis; anfractibus instar senis, convexis; aperturâ parvâ, ovatâ, intus tenebroso-fuscâ; labro acuto, parum sinuoso; columellâ valdè inflectâ et contortâ.

Shell smooth, conoidal, somewhat thick, dark chestnut brown, without bands, or obscurely banded; spire somewhat raised; sutures very much impressed; whorls about six, convex; aperture small, ovate, dark brown within; outer lip acute, slightly sinuous; columella very much bent in and twisted.

*Operculum* subrotund, thin, light brown, with the polar point well towards the middle on the left.

Proc. Acad. Nat. Sci., 1862, p. 264.

*Hab.*—Fort George, Oregon, J. Drayton; also at Walla.

My cabinet and cabinet of Smithsonian Institution.

Diam. .27,

Length .68 inch.

*Remarks.*—A number of these specimens were sent to me by Prof. J. Henry, Secretary of the Smithsonian Institution, having been collected by the late Mr. Drayton, and to his memory I dedicate it. It is allied to *Melania (Goniobasis) nigrina* (nobis), but it is not so polished and is a much thicker shell. Some of the specimens before me have a thickened outer lip, with a lighter margin. The deep color within is made by broad obscure bands. Some of the specimens have a white thickening in the interior at the base, and some have a lighter brown mark on the exterior at the base of the axis.

GONIOBASIS NEWBERRYI. Pl. 37, fig. 135.

Testâ lævi, ovato-conicâ, subtenui, tenebroso-fuscâ, trivittatâ, infernè suturis luteâ; spirâ subelevatâ; suturis valdè impressis; anfractibus senis, inflatis; aperturâ parviuseulâ, ovato-rotundatâ, intus albidâ, vittatâ; labro inflato; columellâ albidâ, incurvatâ.

Shell smooth, ovately conical, rather thin, dark brown, triple-banded, yellow below the sutures; spire somewhat raised; sutures much impressed; whorls six, inflated; aperture rather small, ovately rounded, whitish and banded within; outer lip inflated; columella whitish, incurved.

*Operculum* ovate, rather thin, dark brown, with the polar point near the inner inferior edge.

Proc. Acad. Nat. Sci., March 20, 1860.

*Hab.*—Upper des Chutes River, Oregon Territory, J. S. Newberry, M. D.

My cabinet and cabinet of Dr. Newberry.

Diam. .30,

Length .64 inch.

*Remarks.*—This is a rather small species, very nearly allied to *Melania* (*Goniobasis*) *Taitiana* (nobis), from Claiborne, Alabama, but differs in being rather more inflated, of a darker color, and having three dark bands instead of four. The bands in *Newberryi* are broad and dark, sometimes running into each other, while the *Taitiana* has thinner ones of a lighter color. In some specimens of the latter the bands are absent, but I have seen no specimen of the former without bands. These give a dark appearance to the shell, which is well relieved by the yellow margin under the sutures. I have great pleasure in naming it after Dr. Newberry, the discoverer of it.

GONIOBASIS TENEBROVITTATA. Pl. 37, fig. 136.

Testâ lævi. elevato-conicâ, subtenui, flavescente vel vittatâ vel evittatâ; spira subelevatâ; suturis parvum impressis; anfractibus planulatis; aperturâ subgrandi, subrhomboideâ, intus albidâ; labro acuto, parum sinuoso; columellâ aliquantò inflectâ.

Shell smooth, high conical, rather thin, yellowish, banded or without bands; spire somewhat raised; sutures slightly impressed; whorls flattened; aperture rather large, subrhomboidal, whitish within; outer lip acute, slightly sinuous; columella somewhat bent in.

*Operculum* ovate, dark brown, with the polar point near the edge above the basal margin.

Proc. Acad. Nat. Sci., 1862, p. 264.

*Hab.*—Coosa River, W. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .43,

Length 1.07 inch.

*Remarks.*—This species is allied to *Melania* (*Goniobasis*) *grata*, Anth., which puts on many phases. It may be at once distinguished, however, by *grata* being more pointed, having a more yellow epidermis and narrower bands. Two out of ten specimens before me, have a greenish epidermis, and are without bands. One specimen has a purplish interior. The prevailing character of the bands is, two being proximate in the middle, and two, one above the other below, being more removed. The two middle ones are sometimes closed, forming a single broad band. The aperture is more than one-third the length of the shell.

## GONIOBASIS NIGRINA. Pl. 37, fig. 137.

Testâ lævi, parvâ, conicâ, subtenui, nigricanti, politâ; spirâ subelevatâ; suturis inpressis; anfractibus, regulariter convexis; aperturâ parvâ, ovatâ, supernè angulatâ, intùs tenebroso-purpureâ; columellâ incurvâ, purpureâ.

Shell smooth, small, conical, rather thin, nearly black, polished; spire somewhat elevated; sutures impressed; whorls regularly convex; aperture small, ovate, angular above, dark purple within; columella incurved, purple.

*Operculum* dark brown, the polar point being low down and near to the left margin.

Proc. Acad. Nat. Sci. vol. 8, p. 80.

*Hab.*—Clear Creek, Shasta County, California, Dr. Trask.

My cabinet and cabinet of Dr. Trask.

Diam. .23,

Length .67 inch.

*Remarks.*—A number of good specimens with their opercula, were sent to me by Dr. Trask. In form, size and color, this species is very like to *Melania semicarinata*, Say, from Georgia and South Carolina. It may be distinguished at once by not having the carination of that species which is usually strongly marked. It is not quite so high in the spire, and the aperture is more rounded at the base. In all the specimens of *nigrina* which I received, the apex is worn off. In the half grown ones I can see no disposition to carination or plication in the upper whorls. I should suppose that in perfect specimens, the number of whorls would be found to be about seven, and that the aperture would be about the third of the length of the shell. In some of the specimens there is a disposition to put on a few fine striæ, and in most of them there is a very small angular line running below the suture. I am not acquainted with Dr. Gould's *Melania silicula* and *bulbosa* from Oregon, described in the Proc. Boston Soc. Nat. Hist. July, 1847; but from the descriptions, I have no doubt that they are different from both species herein described.

## GONIOBASIS SPILLMANII. Pl. 37, fig. 138.

Testâ lævi, fusiformi, tenui, virido-corneâ, fulgidâ, evittatâ; spirâ obtusè conoideâ; suturis linearibus; anfractibus instar senis, planulatis, infrâ suturis subimpressis; aperturâ magnâ, rhomboideâ, intùs diaphanâ; labro acuto, parum sinuoso; columellâ parum inflectâ et tenui.

Shell smooth, fusiform, thin, greenish horn-color, shining, without bands; spire obtusely conical; sutures linear; whorls about six, flattened, somewhat impressed below the sutures; aperture large, rhomboidal, diaphanous within; outer lip acute, slightly sinuous; columella slightly bent in and thin.

Proc. Acad. Nat. Sci., 1862, p. 264.

*Hab.*—Tennessee River, W. Spillman. M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .39,

Length .94 inch.

*Remarks.*—Only three specimens were received from Dr. Spillman, two of which are little more than half grown. In outline it is near to *Melania (Goniobasis) gracilis* (nobis), but it is more *fusiform*, rather larger and not so thick. The color is very nearly the same. There is a slight disposition to angulation on the periphery of the whorls. The aperture is about four-tenths the length of the shell. I dedicate this species to Dr. Spillman, who has done so much to elucidate the natural history of the Southern States.

GONIOBASIS FLAVA. Pl. 37, fig. 139.

Testâ lævi, obtuso-conicâ, subtenui, flavâ, trivittatâ; spirâ obtuso-conicâ; suturis valdè impressis; anfractibus instar senis, convexiusculis; aperturâ parviusculâ, ovatâ, intûs albâ et trivittatâ; labro acuto, parum sinuoso; columella incurvâ, incrassatâ.

Shell smooth, obtusely conical, rather thin, yellow, three-banded; spire obtusely conical; sutures very much impressed; whorls about six, somewhat convex; aperture rather small, ovate, white and three-banded within; outer lip acute, slightly sinuous; columella bent in and thickened.

*Operculum* ovate, dark brown, with the polar point near to the edge and above the basal margin.

Proc. Acad. Nat. Sci., 1862, p. 264.

*Hab.*—Benton County? N. W. Alabama, G. Hallenbeck.

My cabinet and cabinet of Mr. Hallenbeck.

Diam. .35,

Length .88 inch.

*Remarks.*—A single specimen, only, of this pretty species, was sent to me by Mr. Hallenbeck. It cannot be confounded with any other species known to me. It reminds one of *Melania grata*, Anth., but it has a rounder base, is not fusiform, and has but three bands, which are well marked inside and out. The three bands are equidistant and of equal size. The upper part of the columella is thickened, and in this specimen the color of the upper band is extended over part of this callus. The aperture is rather more than one-third the length of the shell.

GONIOBASIS ANTHONYI. Pl. 37, fig. 140.

Testâ lævi, obtuso-conicâ, subtenui, micanti, tenebroso-castaneâ, evittatâ; spirâ obtusâ; suturis impressis; anfractibus instar senis, convexiusculis; aperturâ subgrandi, elongato-rhombicâ, intûs fuscescente; labro acuto, ad marginum albido et parum incrassato; columellâ incurvâ et valdè contortâ.

Shell smooth, obtusely conical, rather thin, shining, dark chestnut brown, without bands; spire obtuse; sutures impressed; whorls about six, somewhat convex; aperture rather large, elongately rhombic, brownish within; outer lip acute, white

towards the margin and slightly thickened; columella bent in and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 264.

*Hab.*—Tennessee, J. G. Anthony.

My cabinet and cabinet of Mr. Anthony.

Diam. .33,

Length .77 inch.

*Remarks.*—A single specimen of this species was sent to me some years since by Mr. Anthony, who collected it in Tennessee, but I am not aware in what part. I then thought it might be a variety of *Melania* (*Goniobasis*) *perfusca* (nobis), but it is a smaller species with a longer aperture. It has the smooth, dark chestnut brown and polished epidermis of *Melania* (*Goniobasis*) *nitens* (nobis), but is larger and has a longer aperture. In the specimen before me there is a line of light brown below the suture. On the inside there are two obscure brownish bands, but none are apparent on the outside. The aperture is nearly half the length of the shell. I name this after Mr. J. G. Anthony, who kindly sent it to me with other specimens.

GONIOBASIS GABBIANA. Pl. 37, fig. 141.

Testâ lævi, subfusiformi, subtenui, corneâ, evittatâ; spirâ parum exsertâ, mucronatâ; suturis impressis; anfractibus instar octouis, convexis, varicosis; aperturâ parviuseulâ, subrhomboideâ, intus albidâ; labro acuto, parum sinuoso; columellâ incurvâ et contortâ.

Shell smooth, subfusiform, rather thin, horn-color, without bands; spire slightly elevated, sharp-pointed; sutures impressed; whorls about eight, convex and varicose; aperture rather small, subrhomboidal, whitish within; outer lip acute, slightly sinuous; columella bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 265.

*Hab.*—Tennessee, Prof. G. Troost; Alabama, Prof. Tuomey.

My cabinet and cabinet of Dr. Hartman.

Diam. .25,

Length .54 inch.

*Remarks.*—I have only seen two specimens and indeed I have some doubts if that from Alabama be not specifically distinct. That from the late Prof. Troost I consider the type. It has been in my possession many years. They are very much the same in outline and size, and both have veiny lines on the body whorl. That from Alabama is, however, slightly more inflated, is of a darker color, and has plicæ on the apical whorls with striæ beneath. It also has a less number of whorls by two. When more specimens shall be found from both habitats, and these differences be found to be persistent, I would consider them as distinct species. The aperture is about one-half the length of the shell. I name this after my young friend, Mr. W. M. Gabb, who has done much to advance the conchology of our country.

## GONIOBASIS BRIDGESIANA. Pl. 37, fig. 142.

Testâ lævi, fusiformi, subinflatâ, subtenui, melleâ, evittatâ; spirâ obtusè conicâ, ad apicem carinatâ; suturis linearibus; anfractibus instar septenis, planulatis; aperturâ magnâ, subrhomboideâ, intus albidâ; labro acuto, vix sinuoso; columellâ subinflectâ, infernè et supernè incrassatâ et parum contortâ.

Shell smooth, fusiform, somewhat inflated, rather thin, honey-yellow, without bands; spire obtusely conical, carinate at the apex; sutures linear; whorls about seven, flattened; aperture large, subrhomboidal, whitish within; outer lip acute, scarcely sinuous; columella somewhat bent in, thickened above and below and slightly twisted.

Proc. Acad. Nat. Sci., 1862, p. 265.

*Hab.*—Cahawba River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .40,

Length .83 inch.

*Remarks.*—A single specimen only was received from Dr. Showalter. It was considered by him to be *Melania gravis*, Anth., but it does not answer to his description. It is allied to *Melania (Goniobasis) mellea* (nobis), but differs in being more regularly fusiform, in not being so much inflated, nor having so sharp an apex, and the whorls are flatter. The interior of this specimen is slightly disposed to yellowness. There is no appearance of bands on this specimen, and I doubt if it will be found banded. The aperture is nearly one-half the length of the shell. I dedicate this species to my friend R. Bridges, M. D., who has done so much to promote the knowledge of our zoology.

## GONIOBASIS INTERCEDENS. Pl. 37, fig. 143.

Testâ lævi, fusiformi, subtenui, melleâ, fulgidâ, evittatâ; spirâ conoideâ, mucronatâ, ad apicem carinatâ; suturis linearibus; anfractibus octonis, planulatis, varicosis; aperturâ submagnâ, rhomboideâ, intus albidâ; labro acuto, vix sinuoso; columellâ subinflectâ, parum incrassatâ, infernè subrectâ.

Shell smooth, fusiform, rather thin, honey-yellow, bright, without bands; spire conoidal, sharp-pointed, carinate at the apex; sutures linear; whorls eight, flattened, varicose; aperture rather large, rhomboidal, whitish within; outer lip acute, scarcely sinuous; columella slightly bent in, somewhat thickened, nearly straight below.

Proc. Acad. Nat. Sci., 1862, p. 265.

*Hab.*—Cahawba River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Drs. Showalter and Hartman.

Diam. .30,

Length .69 inch.

*Remarks.*—This species is very closely allied to *Melania (Goniobasis) mellea* and *Bridgesiana* herein described. It is the same color, but may be distinguished by its being more slender and having a higher spire. It has also a less twisted columella. In the interior there is a slight disposition to yellowness. Neither of the two speci-

mens before have any appearance of bands. The larger of the two is not complete on the outer lip, but the smaller one is perfectly so, and shows a disposition to thickening on the inner edge. The aperture is about nearly one-half of the length of the shell.

GONIOBASIS OHIOENSIS. Pl. 37, fig. 144.

Testâ lævi, conicâ, subtenui, evittatâ; spirâ obtusè conicâ, mucronatâ, ad apicem carinatâ; suturis valdè impressis; anfractibus iustar novenis, convexis; aperturâ parvâ, subrotundâ, intus albâ; labro acuto, vix sinuoso; columellâ inflectâ, valdè incrassatâ.

Shell smooth, conical, somewhat thin, without bands; spire obtusely conical, sharp-pointed, carinate at the apex; sutures very much impressed; whorls about nine, convex; aperture small, somewhat rounded, white within; outer lip acute, scarcely sinuous; columella bent in, very much thickened.

Proc. Acad. Nat. Sci., 1862, p. 265.

*Hab.*—Yellow Springs, Ohio.

My cabinet.

Diam. .31,

Length .65 inch.

*Remarks.*—Many years since two specimens of this species were brought by a member of my family from the Yellow Springs, of Ohio, a much frequented watering place. They are both dead specimens, but are well preserved in form, while the epidermis has been entirely removed. The columella is remarkably thick, and the edge stands off from the whorls, displaying an impression at the axis amounting nearly to an umbilicus. It is nearly allied to *Grosvenorii* herein described, but may be distinguished in having a shorter spire, less impressed sutures, a thicker columella, and having an umbilical impression. The outer lip also is not so sinuous and the whorls are not so attenuate. It has affinities to *Melania (Goniobasis) varicosa*, Ward, but has a different aperture and has no veins. The aperture is about two-sevenths the length of the shell.

GONIOBASIS CINEREA. Pl. 37, fig. 145.

Testâ lævi, conoideâ, tenui, cinereâ, fulgidâ; spirâ obtusè conicâ, mucronatâ, ad apicem carinatâ; suturis valdè impressis; anfractibus octonis, convexiusculis; aperturâ submagnâ, subrhomboideâ, intus cæruleo-albâ; labro acuto, parum sinuoso; columellâ incurvâ, parum incrassatâ et purpurecente.

Shell smooth, conical, thin, ash-gray, bright; spire obtusely conical, sharp-pointed, carinate at the apex; sutures very much impressed; whorls eight, somewhat convex; aperture rather large, subrhomboidal, bluish white within; outer lip acute, somewhat sinuous; columella bent in, slightly thickened and purplish.

Proc. Acad. Nat. Sci., 1862, p. 265.

*Hab.*—South Carolina, Prof. L. Vanuxem.

My cabinet.

Diam. .25.

Length .60 inch.



*Remarks.*—A single specimen, of this gracefully formed species, was among a number of shells given to me by my friend, the late Prof. Vanuxem. The exact habitat was not given. It is a thin subdiaphanous species of an ashen gray, with a remarkably thin epidermis. There is an obscure appearance of a band towards the upper portion of the whorls and a purple oblique marking at the interior of the base of the axis. It is allied to *Ohioensis* herein described, but it is more slender, thinner, and has a more elongate aperture. The aperture is six-sixteenths the length of the shell.

GONIOBASIS VANUXEMII. Pl. 37, fig. 146.

Testâ lævi, fusiformi, suberassâ, tenebroso-corneâ; spirâ obtusè conoideâ; suturis impressis; anfractibus septenis, subconvexis; aperturâ magnâ, subrhomboideâ, intus albidâ vel purpureâ; labro acuto, parum sinuoso; columellâ incurvâ, supernè et infernè incrassatâ.

Shell smooth, fusiform, rather thick, horn-color; spire obtusely conical; sutures impressed; whorls seven, slightly convex; aperture large, subrhomboidal, white or purple within; outer lip acute, slightly sinuous; columella bent in, thickened above and below.

*Operculum* ovate, very thin, light-brown, with the polar point near to the base on the left.

Proc. Acad. Nat. Sci., 1862. p. 265.

*Hab.*—North Fork of the Holston River, Virginia, Prof. L. Vanuxem.

My cabinet and cabinet of Dr. Hartman.

Diam. .27,

Length .54 inch.

*Remarks.*—Many years before the decease of my lamented friend Prof. Vanuxem, he gave me a number of mollusca collected during his journeys in South Carolina and Western Virginia. Among them was quite a number of this little species which I now dedicate to him. It is nearly allied to *Melania* (*Goniobasis*) *Niagarensis* (nobis), but is a small species with a shorter spire, and is straighter at the base of the columella. The aperture is rather more than one-third the length of the shell.

GONIOBASIS SPARTANBURGENSIS. Pl. 37, fig. 147.

Testâ lævi, fusiformi, subtenui, virido-corneâ, fulgidâ, vittatâ vel evittatâ; spirâ acutè conicâ, ad apicem carinatâ; suturis impressis; anfractibus octonis, planulatis; aperturâ submagnâ, elongato-rhomboidèâ, intus albidâ; labro acuto, vix sinuoso; columellâ parum incurvâ, infernè incrassatâ.

Shell smooth, fusiform, rather thin, greenish horn-color, bright, banded or without bands; spire acutely conical, carinate at the apex; sutures impressed; whorls eight, flattened, aperture rather large, elongately rhomboidal, white within; outer lip acute, scarcely sinuous; columella slightly bent in, thickened below.

*Operculum* ovate, thin, brown, with the polar point near to the base on the left margin.

Proc. Acad. Nat. Sci. 1862. p. 265.

*Hab.*—Spartanburg District, South Carolina, Prof. L. Vanuxem; Marietta, Ohio, Dr. Hildreth; Wabash River, Indiana, H. C. Grosvenor.

My cabinet and cabinets of Dr. Hildreth and Mr. Grosvenor.

Diam. .23.

Length .54 inch.

*Remarks.*—I have seven specimens from Spartanburg, seven from Marietta and two from the Wabash. This small graceful species has a wide geographical distribution, I can see very little difference between the specimens of the different habitats. The two from the Wabash are very much smaller and thinner, and may be much younger, but they differ in having a purplish columella which is not observable in the others. One of them has a remarkable row of brown spots under the sutures on the body whorl. The other is without spots or bands. Usually this species has two bands; six of the seven from Marietta are two-banded. Of the seven from Spartanburg two only are double-banded. The others are without bands. The species is very nearly allied to *Melania* (*Goniobasis*) *ovoides* (nobis), but it is more elongate and the aperture is less effuse. The aperture is not quite half the length of the shell.

GONIOBASIS AURICOMA. Pl. 37, fig. 148.

Testâ lævi, fusiformi, subtenui, melleâ, vittatâ; spirâ valdè obtusâ; suturis linearibus; anfractibus quinis, vix convexis; aperturâ pergrandi, subrhomboideâ, intus flavescente; labro acuto, vix sinuoso; columellâ incurvâ, parum incrassatâ.

Shell smooth, fusiform, rather thin, honey-yellow, banded; spire very obtuse; sutures linear; whorls five, scarcely convex; aperture very large, subrhomboidal, yellowish within; outer lip acute, scarcely sinuous; columella bent in and slightly thickened.

Proc. Acad. Nat. Sci., 1862, p. 265.

*Hab.*—Tennessee River, Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .25,

Length .46 inch.

*Remarks.*—A single specimen only of this little species was received among a large number of mollusca from Dr. Spillman. It reminds one of *Melania* (*Goniobasis*) *carneola*, Anth., but it is a large and more robust species, and has not the plicæ of that species. It has also affinities to *Melania* (*Goniobasis*) *fusiformis* (nobis), but differs in color, has a higher spire and a less incurved columella. The specimen of *auricoma* before me has four bands, the three lower ones are broad, equidistant and not very distinct. The upper one is more distant and very indistinct. Under the microscope may be observed in this specimen numerous, very minute, impressed revolving lines. The aperture is little more than half the length of the shell.

GONIOBASIS GEORGIANA. Pl. 37, fig. 149.

Testâ lævi, fusiformi, inflatâ, subcrassâ, luteâ, fulgidâ, vittatâ; spirâ valdè obtusâ; suturis impressis; anfractibus quinis, convexis; aperturâ grandî, subrhomboideâ, intus albidâ et vittatâ; labro acuto, recto; columellâ incurvâ, incrassatâ, parum contortâ.

Shell smooth, fusiform, inflated, rather thick, yellowish, bright, banded; spire very obtuse; sutures impressed; whorls five, convex; aperture large, subrhomboidal, whitish and banded within; outer lip acute, straight; columella bent in, thickened and somewhat twisted.

*Operculum* subovate, dark brown, with the polar point near to the base on the left margin.

Proc. Acad. Nat. Sci., 1862, p. 265.

*Hab.*—North Georgia.

My cabinet and cabinet of Smithsonian Institution.

Diam. .26,

Length .57 inch.

*Remarks.*—Among a number of *Melanidæ* from the Smithsonian Institution, were two small specimens which have the same outline and same form of aperture, but which differ much in color. That which is described above seems to me to be the normal character and will serve as the type. This has three well-defined bands, the middle one of which is the broadest, and it has a character which I have not seen in any of our *Melanidæ*, that is, longitudinal, whitish maculations, which are dispersed over the body whorl, and seem under the microscope to be slightly raised on the surface. The second specimen is horn-color and has no bands. In outline this species is closely allied to *Melania (Goniobasis) Nickliniana* (nobis), but is not so pointed at the apex, is not so inflated in the body whorl, and differs in color. The aperture is quite half the length of the shell.

GONIOBASIS VAUXIANA. Pl. 37, fig. 150.

Testâ lævi, fusiformi, subtenui, viridi; spirâ valdè obtusâ; suturis parum impressis; anfraetibus quibus, supernè planulatis et carinatis; aperturâ pergrandi, lato-rhomboidêâ; labro acuto, recto; columellâ parum incurvâ.

Shell smooth, fusiform, rather thin, green; spire very obtuse; sutures somewhat impressed; whorls five, flattened, carinate above; aperture very large, widely rhomboidal; outer lip acute, straight; columella somewhat bent in.

Proc. Acad. Nat. Sci., 1862, p. 265.

*Hab.*—Coosa River, Alabama. Prof. Brumby.

My cabinet.

Diam. .31,

Length .58 inch.

*Remarks.*—Two specimens were sent to me many years since by Prof. Brumby, and I then considered them to be a variety of *Melania (Goniobasis) Nickliniana*, (nobis). They differ, however, in being more angular at the base of the aperture, in being thinner, and in having the upper whorls carinate. The two specimens before me are different in the color and markings. The one from which the diagnosis is made is of a darker green and has not four well-defined bands like the other, but it has two broad, indistinct ones above and below, and the lower half of the columella

is purplish. The aperture is more than half the length of the shell. I dedicate this species to my friend, W. S. Vaux, Esquire, who has done so much to promote the objects of our Academy.

GONIOBASIS WHITEI. Pl. 37, fig. 151.

Testâ lævi, fusiformi, crassâ, valdè inflatâ, luteo-fuscâ, fulgidâ, trivittatâ; spirâ valdè obtusâ; suturis parum impressis; anfractibus quinis, supernè planulatis, ultimo ventricoso; aperturâ pergrandi, lato-rhomboidèâ; labro acuto, recto; columellâ incurvâ incrassatâ et contortâ.

Shell smooth, fusiform, thick, very much inflated, yellowish brown, bright, three-banded; spire very obtuse; sutures somewhat impressed; whorls five, flattened above, the last being ventricose; aperture very large, widely rhomboidal; outer lip acute, straight, columella bent in, thickened and twisted.

Proc. Acad. Nat. Sci., 1862, p. 266.

*Hab.*—Georgia, Rev. George White.

My cabinet and cabinet of Mr. White.

Diam. .35,

Length .61 inch.

*Remarks.*—Two specimens were received among Mr. White's shells, but the part of Georgia was not designated, from where he obtained them, probably towards the North. In outline it closely resembles *Nickliniana*, as well as *Vauxiana*, herein described. It is rather more obtuse in the apex than *Nickliniana*, and not so round at the base, and it has bands which the other has not. Both the specimens are furnished with three equidistant brown bands, obscure outside, but well defined inside. The older of these two has a thickening inside of the outer lip, and the bands do not extend to the margin. The aperture is more than the half the length of the shell. I dedicate this species to the Rev. George White, who has done much to elucidate a knowledge of the Mollusca of his State.

GONIOBASIS BINNEYANA. Pl. 37, fig. 152.

Testâ lævi, obtuso-fusiformi, subtenui, valdè inflatâ, tenebroso-olivâ, obsoletè vittatâ; spirâ depressâ; suturis impressis; anfractibus quinis, supernè planulatis, ultimo ventricoso; aperturâ pergrandi, sub-ovatâ, intùs tenebrosâ; labro acuto, parum sinuoso; columellâ incrassatâ, ad basim maculatâ.

Shell smooth, obtusely fusiform, rather thin, very much inflated, dark olive, obscurely banded; spire depressed; sutures impressed; whorls five, flattened above, the last one ventricose; aperture very large, subovate, dark within; outer lip acute, slightly sinuous; columella thickened, spotted at the base.

Proc. Acad. Nat. Sci. 1862, p. 266.

*Hab.*—Coosa River, Alabama, Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .29,

Length .53 inch.

*Remarks.*—Only two specimens were received from Dr. Spillman. The smaller one is rather the thicker. It has very much the outline of *Lithasia Showalterii* (nobis), and at first I thought it was only a variety of that species, but the absence of a callus above and below on the columella, and a channel at the base preclude its being a *Lithasia*. It is nearly allied to *Melania* (*Goniobasis*) *fusiformis* (nobis), but differs in being more ovate, in having a shorter spire, larger aperture, and in being of a darker color. The aperture is more than half the length of the shell. I dedicate this species to Mr. W. G. Binney, who has done so much to elucidate American conchology.

## GONIOBASIS TUOMEYI. Pl. 37, fig. 153.

Testâ lævi, fusiformi, crassiusculâ, luteo-olivâ, vittatâ vel evittatâ; spirâ obtuso-conicâ, ad apicem minutè plicatâ; suturis impressis; anfractibus instar senis, supernè planulatis, ultimo subventricoso; aperturâ grandi, rhomboideâ, intus albidâ; labro acuto, parum sinuoso; columellâ incrassatâ, incurvâ et contortâ.

Shell smooth, fusiform, slightly thick, yellowish olive, banded or without bands; spire obtusely conical, minutely plicate at the apex; sutures impressed; whorls about six, flattened above, the last one ventricose; aperture large, rhomboidal, whitish within; outer lip acute, somewhat sinuous; columella thickened, bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 266.

*Hab.*—North Alabama, Prof. M. Tuomey.

My cabinet and cabinet of Dr. Hartman.

Diam. .35,

Length .70 inch.

*Remarks.*—My friend the late Prof. Tuomey, sent to me during his geological survey of the State of Alabama, many new *Mollusca*, most of which I described at the time. Some were laid over for more leisure and further examination. Among them was a number of this species which I now dedicate to his memory with peculiar gratification. He was an ardent student of nature, and warm and generous in his friendships. This species varies very much. None of the specimens have perfect tips, but some are nearly so, and display on the apical whorls very minute and close plicæ. Some have minute venations on the body whorl. They are generally without bands, yet some have two bands, but more frequently only one, which is about one-third of the whorl below the suture. It is rather broad and distinct inside and out. In outline and size it is closely allied to *Melania* (*Goniobasis*) *gracilis* (nobis), but it is not so high in the spire nor is it so yellow. The aperture is about one-half the length of the shell.

## GONIOBASIS FABALIS. Pl. 37, fig. 154.

Testâ lævi, ellipticâ, crassâ, luteâ, quadrivittatâ; spirâ valdè obtusâ; suturis irregulariter impressis; anfractibus quaternis, supernè convexiusculis, ultimo pergrandi; aperturâ magnâ, subrhomboideâ, intus albidâ et vittatâ; labro acuto, vix sinuoso; columellâ infernè et supernè incrassatâ

Shell smooth, elliptical, thick, yellow, four-banded; spire very obtuse; sutures irregularly impressed; whorls four, somewhat convex above, the last one very large; aperture large, subrhomboidal, whitish and banded within; outer lip acute, scarcely sinuous; columella thickened above and below.

Proc. Acad. Nat. Sci., 1862, p. 266.

*Hab.*—Tennessee River, W. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .34,

Length .64 inch.

*Remarks.*—Among the *Melanidæ* sent by Dr. Spillman with simply the habitat Tennessee River, were four of this species. I presume they are from that part of the River which is in or near to Alabama. All the three specimens are very similar in color, size and bands. It is one of that group which approaches the genus *Lithasia* by the thickening of the columella above and below, but it has no channel. It is allied to *Melania* (*Goniobasis*) *elliptica* (nobis) and *Melania* (*Goniobasis*) *auriculæformis* (nobis), but differs from the former in being smaller and having a less constricted aperture; from the latter in being larger and having a more obtruded spire and in the bands. The aperture is about half the length of the shell.

GONIOBASIS GIBBEROSA. Pl. 37, fig. 155.

Testâ lævi, subfusiformi, crassâ, pallido-castaneâ vel rufo-castaneâ, vittatâ vel evittatâ; spirâ obtusâ; suturis irregulariter impressis; anfractibus gibberosis, supernè convexiusculis, ultimo pergrandi; aperturâ pergrandi, rhomboideâ, intùs albâ; labro acuto, sinuoso; columellâ incurvâ, supernè et infernè incrassatâ.

Shell smooth, subfusiform, thick; spire obtuse; sutures irregularly impressed; whorls hump-backed, slightly convex above, the last one very large; aperture very large, rhomboidal, white within; outer lip acute, sinuous; columella bent in, thickened above and below.

*Operculum* ovate, dark brown, with the polar point near to the base, on the inner edge.

Proc. Acad. Nat. Sci., 1862, p. 266.

*Hab.*—Alabama River, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter, and Dr. Hartman.

Diam. .48,

Length 1.03 inch.

*Remarks.*—Four specimens of this remarkable species are before me. They were sent by Dr. Showalter to Dr. Hartman who called my attention to them and sent them for examination. The species is singular for the four to six hump-like elevations which exist on the upper half of each of the whorls and which leave flattish spaces between, on one of which spaces the shell will always rest when the specimen is moved on a flat surface. One of the specimens has four distinct bands, one has these obsolete, the two remaining ones are without bands. The only species to which this has close

affinities is *Melania* (*Goniobasis*) *lasalis* (nobis), it having somewhat like irregular elevations, but it is a smaller and thinner species with a greenish epidermis and thick close bands. None of the four specimens before me have more than three perfect whorls remaining, the upper ones (perhaps six originally) are worn off. The length of the aperture is about one-half that of the shell.

GONIOBASIS LYONII. Pl. 37, fig. 156.

Testâ plicatâ, supernè striatâ et ad apicem carinatâ, luteolâ, subtenui, valdè exsertâ; spirâ attenuatâ, mucronatâ; suturis irregulariter impressis; anfractibus novenis, convexiusculis; aperturâ parviusculâ, subrhomboideâ, intus albidâ; labro acuto, sinuoso; columellâ incurvâ, incrassatâ, parum contortâ.

Shell folded, striate above, carinate at the apex, yellowish, very thin, very much drawn out; spire attenuate, sharp-pointed; sutures irregularly impressed; whorls nine, slightly convex; aperture rather small, subrhomboidal, whitish within; outer lip acute, sinuous; columella bent in, thickened and slightly twisted.

Proc. Acad. Nat. Sci., 1862, p. 266.

*Hab.*—Grayson County, Kentucky, S. S. Lyon.

My cabinet and cabinet of Mr. Lyon.

Diam. .30,

Length .92 inch.

*Remarks.*—A single specimen of this species was among the *Melanidæ* collected by Mr. Lyon in the geological survey of Kentucky. It was accompanied by *Melania* (*Goniobasis*) *Deshaysiana* (nobis), to which it is closely allied in some of its characters. It differs in having two or three more whorls, in being more cancellate above, by the striae decussating the longitudinal ribs, and particularly in the lower part of the columella being nearly straight, while that part in *Deshaysiana* is oblique to the right. The ribs are pretty close and slightly curved, the inner margin of the outer lip is slightly thickened. The aperture is rather less than one-third the length of the shell. I dedicate this with great pleasure to Mr. Lyon, Civil Engineer and State Geologist.

GONIOBASIS PYBASII. Pl. 37, fig. 157.

Testâ plicatâ, valdè exsertâ, luteolâ, tenui, vittatâ; spirâ attenuatâ, mucronatâ; suturis impressis; anfractibus septenis, planulatis; aperturâ ovato-rhomboidê, intus albidâ et vittatâ; labro acuto, sinuoso; columellâ parum incurvâ, parum incrassatâ et contortâ.

Shell folded, very much drawn out, yellowish, thin, banded; spire attenuate, sharp-pointed; sutures impressed; whorls seven, flattened; aperture ovately rhomboidal, whitish and banded within; outer lip acute, sinuous; columella slightly bent in, somewhat thickened and twisted.

Proc. Acad. Nat. Sci., 1862, p. 266.

*Hab.*—Tuscumbia, Alabama. B. Pybas.

My cabinet and cabinet of Mr. Pybas.

Diam. .31,

Length .82 inch.

*Remarks.*—I found four specimens among numerous *Melanidæ* sent to me by Mr. Pybas. It is allied to *Melania (Goniobasis) Deshaysiana* (nobis), but it is more slender, has bands and has not the granulations of that shell on the upper part of the whorls. It differs from *Lyonii* herein described, in having a longer aperture, being thicker, not being striate, and in having bands. It is evident that this species usually has four well marked revolving bands, the two middle ones being approximate. The broadest is at the bottom. In this character it is very like to *Melania (Goniobasis) grata*, Anth., and it reminds one of *Melania (Goniobasis) laqueata*, Say. In one of the specimens an indistinct fifth band is observable. The folds are not very strongly marked and do not extend to the body whorl. They are not very close, are slightly curved and incline to the left. The aperture is more than one-third the length of the shell. I dedicate this species with great pleasure to Mr. B. Pybas, of Tusculumbia, who has sent me many new mollusca from his vicinity.

GONIOBASIS DUTTONII. Pl. 37, fig. 158.

Testâ plicatâ, conoideâ, dilutè rufo-luteâ, crassâ, bivittatâ; spirâ conoideâ; suturis irregulariter impressis; anfractibus instar septenis, subconvexis; aperturâ ovato-rhomboidê, intûs albâ et lato-vittatâ; labro acuto, sinuoso; columellâ incurvâ, incrassatâ et valdè contortâ.

Shell folded, conoidal, pale reddish yellow, thick, double-banded; spire conoidal; sutures irregularly impressed; whorls about seven, somewhat convex; aperture ovately rhomboidal, white and double-banded within; outer lip acute, sinuous; columella bent in, thickened and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 266.

*Hab.*—Maury County, Tennessee, T. R. Dutton; Grayson County, Kentucky, S. S. Lyon.

My cabinet and cabinet of Mr. Lyon.

Diam. .38,

Length .80 inch.

*Remarks.*—This is a well marked species, allied to *Pybasii*, herein described, and to *Melania (Goniobasis) laqueata*, Say. It is a stouter shell than either, and may at once be distinguished from them by its two well defined brown bands, the upper one of which is the larger. The folds are rather indistinct, close, not curved, and inclining to the right. The specimen from Maury County, Tennessee, is more robust, and has a shorter spire than that from Kentucky. The aperture is about three-eighths the length of the shell. I name this after Mr. T. R. Dutton, who sent it to me long since with other mollusca from Tennessee. This must not be confounded with the shell which I called *Melania Duttoniana*, Trans. Am. Phil. Soc. vol. 8, pl. 6, which is really a *Lithasia*.



## GONIOBASIS DOOLYENSIS. Pl. 37, fig. 159.

Testâ plicatâ, subcylindraceâ, tenebroso-corneâ vel subcinereâ, tenui, evittatâ; spirâ attenuatâ; suturis irregulariter impressis; anfractibus instar novenis, convexiusculis; aperturâ parvâ, ovato-rhomboidêâ, intus albidâ; labro acuto, sinuoso; columellâ valdè incurvâ, in medio impressâ et valdè contortâ.

Shell folded, subcylindrical, dark horn color or somewhat ash grey, thin, without bands; spire drawn out; sutures irregularly impressed; whorls about nine, slightly convex; aperture small, ovately rhomboidal, whitish within; outer lip acute, sinuous; columella very much bent in, impressed in the middle and very much twisted.

Proc. Acad. Nat. Sci. 1862, p. 266.

*Hab.*—Tennessee, Prof. Troost; near Vienna, Dooly County, Georgia, in a small stream tributary to Flint River, Rev. George White.

My cabinet and cabinets of Mr. White and Dr. Hartman.

Diam. .32,

Length .91 inch.

*Remarks.*—I have a number of specimens from Mr. White, and one a long time since from Prof Troost. It belongs to the group of which *Melania (Goniobasis) costulata* (nobis) may be considered the type, but it is more cylindrical and has more distant folds. It is also allied to *Melania (Goniobasis) decora* (nobis), but is more cylindrical, has more distant folds, and has no cancellate striæ. The folds are curved and incline slightly to the left. The aperture is not quite one-third the length of the shell. Some specimens are disposed to be slightly brownish inside.

## GONIOBASIS VIENNAENSIS. Pl. 37, fig. 160.

Testâ plicatâ, subfusiformi, olivaceâ, subtenui, evittatâ; spirâ regulariter conicâ; suturis irregulariter impressis; anfractibus septenis, planulatis; aperturâ subgrandi, rhomboidêâ, intus cæruleo-albâ; labro acuto, sinuoso; columellâ incurvâ, infernè incrassatâ, parum contortâ.

Shell folded, subfusiform, olivaceous, rather thin, without bands; spire regularly conical; sutures irregularly impressed; whorls seven, flattened; aperture rather large, rhomboidal, bluish white within; outer lip acute, sinuous; columella bent in, thickened and somewhat twisted below.

Proc. Acad. Nat. Sci., 1862, p. 267.

*Hab.*—Near Vienna, Dooly County, Georgia, in a small stream tributary to Flint River, Rev. G. White.

My cabinet and cabinets of Mr. White and Dr. Hartman.

Diam. .36,

Length .90 inch.

*Remarks.*—A number of this species came with *Doolyensis*, herein described, but it is quite a different species. It is regularly conical, while the other is subcylindrical, and the ribs are more numerous and closer, and are not quite so much curved. The aperture is also larger. It is allied to *Melania (Goniobasis) Deshaysiana* (nobis), but while it is nearly of the same outline it differs in being wider, also in color, and it has

no decussating revolving striae. The aperture is more than one-third the length of the shell.

GONIOBASIS STRENUA. Pl. 37, fig. 161.

Testâ plicatâ, subfusiformi, fusco-olivaceâ, subtenui, evittatâ; spira subelevatâ; suturis valdè impressis; anfractibus instar septenis, planulatis; aperturâ subgrandi, ovato-rhomboidêâ, intûs albidâ; labro acuto, subsinuoso; columellâ incurvâ et contortâ.

Shell folded, subfusiform, brownish olive, rather thin, without bands; spire somewhat raised; sutures very much impressed; whorls about seven, flattened; aperture rather large, ovately rhomboidal, whitish within; outer lip subsinuuous; columella bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 267.

*Hab.*—Benton County, North West Alabama, G. Hallenbeck.

My cabinet and cabinet of Mr. Hallenbeck.

Diam. .44,

Length 1.01 inch.

*Remarks.*—Two specimens only were procured by Mr. Hallenbeck, and these are before me. The smaller one is rather lighter in color and inclines to be more brown. It is allied to *Melania* (*Goniobasis*) *athleta*, Anth., but is a shorter shell, with two or three less number of whorls. It also differs in being of a greenish color, and in having fewer and more distant folds. It also differs in the base of the columella being more direct. In our shell the folds are lost in a carinate edge above the suture. In the body whorl there are minute venations. Immediately below the suture there is a line of lighter color. The aperture is four-tenths the length of the shell.

GONIOBASIS SPARUS. Pl. 37, fig. 162.

Testâ plicatâ, subattenuatâ, pallido-flavescente, subcrassâ, evittatâ; spirâ attenuatâ, mucronatâ; suturis irregulariter impressis; anfractibus octonis, convexiusculis; aperturâ submagnâ, ovato-rhomboidêâ, intûs albâ; labro acuto, sinuoso; columellâ parum incurvâ, supernè luteâ, infernè albâ, contortâ.

Shell folded, somewhat drawn out, pale yellow, somewhat thick, without bands; spire attenuate, sharp-pointed; sutures irregularly impressed; whorls eight, slightly convex; aperture rather large, ovately rhomboidal, white within; outer lip acute, sinuous; columella somewhat bent in, yellow above and white below, twisted.

Proc. Acad. Nat. Sci., 1862, p. 267.

*Hab.*—Tennessee, Dr. Currey and President Lindsley.

My cabinet.

Diam. .28,

Length .74 inch.

*Remarks.*—This is a graceful sharp-pointed species, closely allied to *Deshaysiana* (nobis), but is rather more slender, is a little more inflated below the sutures and is rather more solid in its structure. It has the same striae along the upper part of the whorls which decussate the folds. It is more ovate in the aperture, the base not

being so angular. The folds on the upper whorls are close and well defined, but disappear below. They are slightly curved, and the aperture is about one-third the length of the shell.

GONIOBASIS DIFFICILIS. Pl. 37, fig. 163.

Testâ plicatâ, subattenuatâ, tenebroso-olivâ vel fuscescente, subtenui, evittatâ; spirâ attenuatâ, mucronatâ; suturis irregulariter impressis; anfractibus instar octonis, convexiuseulis; aperturâ parviuseulâ, ovato-rhomboidêâ, intus albidâ; labro acuto, subsinuoso; columellâ incurvâ, incrassatâ et contortâ.

Shell folded, somewhat attenuate, dark olive or brownish, rather thin, without bands; spire attenuate, sharp-pointed; sutures regularly impressed; whorls about eight, slightly convex; aperture rather small, ovately rhomboidal, whitish within; outer lip acute, subsinuuous; columella bent in, thickened and twisted.

Proc. Acad. Nat. Sci. 1862, p. 267.

*Hab.*—Tennessee, Dr. Edgar.

My cabinet.

Diam. .31,

Length .82 inch.

*Remarks.*—This is one of the *Melania (Goniobasis) Deshayiana* group, and is nearly allied to *sparus* herein described, but may at once be distinguished from that species by being flatter on the whorls, and in being of a darker color. There is but a single adult specimen before me, the apical whorls of which are eroded. Some of the young specimens are perfect to the apex, and the upper whorls present close folds slightly curved and decussate, with revolving striae. These are hardly perceptible on the adult specimen. In outline it resembles *Melania (Goniobasis) columella* (nobis), but differs in the color and in the form of the lower part of the columella. The aperture is about one-third the length of the shell.

GONIOBASIS BAIRDIANA. Pl. 37, fig. 164.

Testâ plicatâ, subattenuatâ, tenebroso-fuscâ, subcrassâ, univittatâ; spirâ subattenuatâ, mucronatâ; suturis impressis; anfractibus octonis, convexiuseulis; aperturâ parviuseulâ, ovato-rhomboidêâ, intus albidâ et univittatâ; labro acuto, vix sinuoso; columellâ incurvâ, parum incrassatâ et valdè contortâ.

Shell folded, somewhat drawn out, dark brown, rather thick, single-banded; whorls subattenuate, sharp-pointed; sutures impressed; whorls eight, slightly convex; aperture rather small, ovately rhomboidal, whitish within and single-banded; outer lip sharp, scarcely sinuous; columella bent in, somewhat thickened and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 267.

*Hab.*—Columbia River at Fort George, Oregon, J. Drayton.

My cabinet and cabinet of Smithsonian Institution.

Diam. .26,

Length .66 inch.

*Remarks.*—In size, color and outline this is nearly allied to *Draytonii*, herein described, but may at once be distinguished by that species having no folds, and in being more convex in the whorls. It cannot be confounded with *Melania* (*Goniobasis*) *Newberryi* (nobis), which is shorter, more inflated, and has two bands. The *Bairdiana* has five or six apical whorls, furnished with close, regular, well formed perpendicular folds. The lower whorls have two or three very minute revolving striæ immediately below the suture, where the color is lighter. There is a disposition to thickening on the inner margin of the outer lip, and along this edge a little coloring of brown is observable. The aperture is nearly the third of the length of the shell. I have great pleasure in dedicating this interesting little species to my friend Prof. Spencer F. Baird of the Smithsonian Institution, to whom I am greatly indebted for many kind services, and who has done so much for the advancement of the Natural Sciences of our country.

GONIOBASIS INCLINANS. Pl. 37, fig. 165.

Testâ valdè plicatâ, subattenuatâ, tenebroso-fuscâ, subtenui, obsoletè vittatâ; spirâ subattenuatâ, mucronatâ; suturis sulcatis; anfractibus octonis, planulatis, plicis inclinantis indutis; aperturâ parvâ, rhomboideâ, intùs dilutè fuscescente; labro acuto, sinuoso; columellâ valdè incurvâ, fusco-rufescente et valdè contortâ.

Shell very much folded, somewhat drawn out, rather thin, obscurely banded; spire subattenuate, sharp-pointed; sutures furrowed; whorls eight, flattened, covered with oblique folds; aperture small, rhomboidal, pale brown within; outer lip acute, sinuous; columella very much bent in, brownish red and very much twisted.

*Operculum* ovate, very thin light brown, with the polar point nearer to the centre than usual.

Proc. Acad. Nat. Sei., 1862, p. 267.

*Hab.*—New Albany, Georgia, Rev. G. White; Etowah, J. Postell; Tusculumbia, Alabama, B. Pybas.

My cabinet and cabinets of Mr. White, Mr. Postell, Mr. Pybas and Dr. Hartman.  
Diam. .27, Length .68 inch.

*Remarks.*—A large number of this species was sent to me by Mr. White and Mr. Pybas. They were generally incrustated with carbonate of lime, which was easily removed. It has some resemblance to *Melania* (*Goniobasis*) *Deshaysiana*, but it is a smaller species, with numerous folds much inclining to the left, and generally covering all the whorls. These folds are crossed by revolving striæ which form numerous nodes, giving a general rough appearance to the surface. Below the suture there is generally a light line. There is usually a dark band at the base of the columella more distinct inside, and sometimes several indistinct ones may be observed above. It reminds one of *Melania* (*Goniobasis*) *Edgariana* (nobis), but that is a much larger

species, and different in color and folds. The aperture is about one-fourth the length of the shell.

GONIOBASIS INDUTA. Pl. 37, fig. 166.

Testâ valdè plicatâ, conicâ, subtenui, politâ, tenebrosâ, quadrivittatâ; spirâ conoideâ, mucronatâ; suturis valdè impressis; anfractibus octonis, planulatis, plicis erectis indutis; aperturâ parvâ, rhomboideâ, intus albidâ et quadrivittatâ; labro acuto, subsinuoso; columellâ incurvâ et contortâ.

Shell very much folded, conical, rather thin, polished, dark, four-banded; spire conoidal, sharp-pointed; sutures very much impressed; whorls eight, flattened, clothed with erect folds; aperture small, rhomboidal, whitish and four-banded within; outer lip acute, subsinuuous; columella bent in and twisted.

*Operculum* ovate, thin, light brown, with the polar point well inside of the left margin.

Proc. Acad. Nat. Sci., 1862, p. 267.

*Hab.*—Near Vienna, Dooly County, Georgia, Rev. G. White.

My cabinet and cabinets of Mr. White, and Dr. Hartman.

Diam. .31,

Length .76 inch.

*Remarks.*—This is a very ornate little species, being covered with close perpendicular ribs and four dark brown revolving bands, which give the shell a dark appearance, although the ground is yellow. The two middle bands are approximate, and the lowest band is the strongest. Immediately below the suture there is usually a light line. It belongs to the group of which *Melania* (*Goniobasis*) *Deshaysiana* (nobis), may be considered the type, but is nearest allied to *inclimans* herein described. It is nearly of the same size and outline, but the regular perpendicular folds and the distinct bands distinguish it at once. The apical whorls are disposed to be carinate. The aperture is one-third the length of the shell. The specimens were all incrustated with black oxide of iron, which, being removed, the epidermis was found to be smooth and polished. One or two revolving striæ immediately under the suture decussate the folds.

GONIOBASIS LINDSLEYI. Pl. 37, fig. 167.

Testâ plicatâ, cylindræco-conicâ, subtenui, luteo-corneâ, evittatâ; spirâ conoideâ; suturis irregulariter et valdè impressis; anfractibus planulatis, plicis erectis indutis; aperturâ parviusculâ, rhomboideâ, intus cæruleo-albâ; labro acuto, sinuoso; columellâ incurvâ et contortâ.

Shell folded, cylindrico-conical, rather thin, yellowish horn-color, without bands; spire conoidal; sutures irregularly and very much impressed; whorls flattened; clothed with erect folds; aperture rather small, rhomboidal, bluish white within; outer lip acute, sinuous; columella bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 267.

*Hab.*—Tennessee, President Lindsley and Dr. Edgar.

My cabinet and cabinet of President Lindsley.

Diam. .31,

Length .80 inch.

*Remarks.*—A few imperfect specimens only are before me, and the number of whorls cannot be ascertained—probably eight. It is allied to *Melania (Goniobasis) costulata* (nobis), but it is more cylindrical, and has the folds further apart. The aperture is probably one-third the length of the shell. It has two or three decussating striæ immediately under the suture which make small nodes. I dedicate this species to my friend President Lindsley, of Nashville, who sent it to me with many other shells from the streams of Tennessee.

GONIOBASIS THORNTONII. Pl. 38, fig. 168.

Testâ rugoso-plicatâ, conoideâ, subtenui, corneâ, evittatâ; spirâ conoideâ; suturis irregulariter et valdè impressis; anfractibus convexiusculis, plicis flexis distantibus indutis; aperturâ submagnâ, rhomboideâ, intus albâ; labro acuto, sinuoso; columellâ subincurvâ, incrassatâ et contortâ.

Shell roughly folded, conoidal, rather thin, horn-color, without bands; spire conical; sutures irregularly and very much impressed; whorls slightly convex, clothed with distant bent folds; aperture rather large, rhomboidal, white within; outer lip acute, sinuous; columella somewhat bent in and twisted.

*Operculum* ovate, thin, brown, with the polar point one-third from the base on the left of the centre.

Proc. Acad. Nat. Sci., 1862, p. 268.

*Hab.*—Tuscumbia, L. B. Thornton, Esq.; Florence, Alabama, Rev. G. White.

My cabinet and cabinets of Mr. Thornton and Dr. Hartman.

Diam. .38,

Length .87 inch.

*Remarks.*—Some dozen specimens, most of them imperfect, are before me. The number of whorls could not be ascertained—probably eight. The folds are large, distant and curving to the right; about the middle of the whorl there is a line which decussates the fold, making a node. It belongs to the group of which *Melania (Goniobasis) costulata* (nobis), may be considered the type, and it closely resembles *Lindsleyi* herein described, but differs in not being cylindrical, in having larger and more distinct ribs and a larger aperture. The aperture is rather more than one-third the length of the shell. I name this after L. B. Thornton, Esquire, Attorney at Law, Tuscumbia, who very kindly has sent to me many fine specimens from his vicinity.

GONIOBASIS INTERVENIENS. Pl. 38, fig. 169.

Testâ plicatâ, conoideâ, subtenui, tenebroso-corneâ vel fuscâ, vel bivittatâ vel evittatâ; spirâ obtusâ conoideâ; suturis irregulariter et valdè impressis; anfractibus instar senis, planulatis, plicis parum flexis; aperturâ subgrandi, rhomboideâ; intus albâ vel vittatâ vel fuscâ; labro acuto, sinuoso; columellâ incurvâ et parum contortâ.

Shell folded, conical, rather thin, dark horn-color or brown, double-banded or without bands; spire obtusely conical; sutures irregularly and very much impressed; whorls about six, flattened, with slightly bent folds; aperture rather large, rhom-

boidal, white, brown or banded within; outer lip acute, sinuous; columella bent in and somewhat twisted.

Proc. Acad. Nat. Sci. 1862, p. 268.

*Hab.*—North Alabama, Prof. Tuomey.

My cabinet and cabinet of Dr. Hartman.

Diam. .32,

Length .74 inch.

*Remarks.*—Some half dozen specimens were among the shells received from Prof. Tuomey obtained during his geological survey. This is rather a small species between *Melania (Goniobasis) costulata* (nobis), and *Melania (Goniobasis) Edgariana* (nobis). It has a less number of folds than the former, and about the same number as the latter, but these folds differ in not being so much raised and protruded above as in *Edgariana*, nor is the spire so high. The interior is usually white, sometimes double-banded, and one of the specimens is dark-brown. The aperture is nearly half the length of the shell.

GONIOBASIS CONTINENS. Pl. 38, fig. 170.

Testâ plicatâ, conoideâ, subtenui, lateo-corneâ, evittatâ; spirâ regulariter conicâ; suturis impressis; anfractibus instar septenis, convexiusculis, plicis aliquantò flexis; aperturâ parviuseulâ, ovato-rhomboidêâ, intùs cæruleo-albâ; labro acuto, vix sinuoso; columellâ parum incurvâ et contortâ.

Shell folded, conical, rather thin, yellowish horn-color, without bands; spire irregularly conical; sutures impressed; whorls about seven, somewhat convex, with folds slightly bent; aperture rather small, ovately rhomboid, bluish white within; outer lip acute, scarcely sinuous; columella somewhat bent in and twisted.

*Operculum* ovate, thin, light brown, with the polar point well removed from the margin and towards the base.

Proc. Acad. Nat. Sci., 1862, p. 268.

*Hab.*—North Alabama, Prof. Tuomey.

My cabinet and cabinet of Dr. Hartman.

Diam. .29,

Length .79 inch.

*Remarks.*—I have eight specimens before me of this modest little species. They were taken by Prof. Tuomey during his Geological Survey of Alabama many years since. The folds are not on the body whorl; they incline to the left. It is allied to *Melania (Goniobasis) acuta* (nobis), but is not so small nor so pointed, and it is more of a horn-color. The aperture is about one-third the length of the shell.

GONIOBASIS CEREÆ. Pl. 38, fig. 171.

Testâ plicatâ, conoideâ, subtenui, cereâ, evittatâ; spirâ conoideâ; suturis impressis; anfractibus senis, subconvexis, plicis minutis; aperturâ grandiusculâ, elongato-rhomboidêâ, intùs albidâ; labro acuto, sinuoso; columellâ incurvâ et contortâ.

Shell folded, conical, rather thin, wax-colored, without bands; spire conical;

sutures impressed; whorls six, somewhat convex, with small folds; aperture rather large, elongately rhomboidal, whitish within; outer lip acute, sinuous; columella bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 268.

*Hab.*—Tennessee, Prof. Troost; and Duck Creek, Tennessee, J. Clark.

My cabinet and cabinet of Mr. Clark.

Diam. .26,

Length .64 inch.

*Remarks.*—Two specimens only are before me. That from Mr. Clark which I believe was collected by Prof. Christy, is of a lighter color than the other, which is brownish, and may even prove to be a distinct species, as it is slimmer and is rather smaller in the aperture. The folds are delicate, inclining to the right, and do not reach to the body whorl. There are indistinct striæ on the upper part of the whorls decussating the folds. It is about the size and nearly the same outline as *inosculata* herein described, but that is a carinate species with a somewhat differently formed aperture. The aperture is more than one-fourth the length of the shell.

GONIOBASIS VIRIDICATA. Pl. 38, fig. 172.

Testâ plicatâ, subattenuatâ, tenui, viridescente, evittatâ; spirâ conoideâ, subattenuatâ; suturis impressis; anfractibus instar septenis, planulatis, plicis suberebris; aperturâ parvissimâ, rhomboideâ, intus cæruleo-âlbâ; labro acuto, parum sinuoso; columellâ incurvâ, supernè flavescente, infernè albidâ, contortâ.

Shell folded, somewhat drawn out, thin, greenish, without bands; spire conical, exerted; sutures impressed; whorls about seven, flattened, with rather close folds; aperture very small, rhomboidal, bluish white within; outer lip acute, somewhat sinuous; columella bent in, yellowish above, whitish below and twisted.

Proc. Acad. Nat. Sci. 1862, p. 268.

*Hab.*—Grayson County, Kentucky, S. S. Lyon.

My cabinet and cabinet of Mr. Lyon.

Diam. .24.

Length .64 inch.

*Remarks.*—Three specimens were sent to me by Mr. Lyon, taken on his geological survey of Kentucky. It is a graceful greenish little species with the folds inclining to the left, and with a paler line below the suture. The body whorl has no folds, but is in two of the specimens covered with minute irregular veins. The middle whorls are plicate, while the apical whorls are carinate and striate. It is about the size of *cerea* herein described, but differs in outline and other characters. In outline it is near *Doolyensis*, herein described, but is a much smaller species, and differs in the folds and the aperture. The aperture is about one-third the length of the shell.

GONIOBASIS LEIDYANA. Pl. 38, fig. 173.

Testâ plicatâ, fusiformi, subtenui, luteo-corneâ, evittatâ; spirâ obtuso-conicâ; suturis linearibus; an-



fractibus senis, planulatis; aperturâ pergrandi, ovato-rhomboidêâ, intus albidâ; labro acuto, tenui; columellâ incurvâ, ad basim contortâ.

Shell folded, fusiform, rather thin, yellowish horn-color, without bands; spire obtusely conical; sutures linear; whorls six, flattened; aperture very large, ovately rhomboidal, whitish within; outer lip acute, thin; columella bent in, twisted at the base.

*Operculum* ovate, thin, brown, with the polar point close on the left margin, near to the base.

Proc. Acad. Nat. Sci., 1862, p. 268.

*Hab.*—Benton County? North West Alabama, G. Hallenbeck.

My cabinet and cabinet of Mr. Hallenbeck.

Diam. .39,

Length .80 inch.

*Remarks.*—Two specimens were sent by Mr. Hallenbeck for my examination. Both have imperfect plicæ on the spire which is very obtuse, and both are evidently adults. The upper whorls are carinate, but the inferior whorl closes on the angle so as to obliterate the carination. On the body whorl this angulation is nearly obsolete. It has nearly the outline of *Melania* (*Goniobasis*) *abrupta* (nobis), but that species is not plicate and is a thicker shell. The aperture is one-half the length of the shell. I dedicate this species to my friend Joseph Leidy, M. D., who has done so much for American Zoology and comparative Anatomy.

GONIOBASIS ABBEVILLENSIS. Pl. 38, fig. 174.

Testâ plicatâ, conoideâ, suberassâ, castaneâ, fulgidâ, evittatâ; spirâ conicâ; suturis linearibus; anfractibus septenis, convexiusculis, ferè planulatis, ad apicem carinatis et striatis; aperturâ grandiusculâ, ovato-rhomboidêâ, intus subochraceâ; labro acuto, vix sinuoso; columellâ incrassatâ et contortâ.

Shell folded, conical, rather thick, chestnut-color, shining, without bands; spire conical, sutures linear; whorls seven, somewhat convex, nearly flat, carinate and striate at the apex; aperture slightly large, ovately rhomboidal, somewhat ochraceous within; outer lip acute, scarcely sinuous; columella thickened and twisted.

Proc. Acad. Nat. Sci., 1862, p. 268.

*Hab.*—Abbeville District, South Carolina, J. P. Barratt, M. D.

My cabinet and cabinet of Dr. Barratt.

Diam. .30,

Length .63 inch.

*Remarks.*—This is a pretty species with very regular spire and folds. It is allied to *Melania* (*Goniobasis*) *Deshaysiana* (nobis), but is a smaller species. Its chestnut brown color reminds one of *Melania* (*Goniobasis*) *castanea* (nobis), but it is not so elongate and is thicker. The aperture is more than one-third the length of the shell.

GONIOBASIS AMENA. Pl. 38, fig. 175.

Testâ plicatâ, subfusiformi, crassâ, dilutè castanea, evittatâ; spirâ obtusè conoideâ; suturis irregulariter

impressis; anfractibus instar senis, subconvexis, ad apicem striatis; aperturâ grandî, ovato-rhomboidcâ, intûs albidâ; labro acuto, parum sinuoso; columellâ incrassatâ, incurvâ et contortâ.

Shell folded, subfusiform, thick, pale chestnut-color, without bands; spire obtusely conical; sutures irregularly impressed; whorls about six, somewhat convex; striate at the apex; aperture large, ovately rhomboidal, whitish within; outer lip acute, slightly sinuous; columella thickened, incurved and twisted.

*Operculum* ovate, thin, light-brown, with the polar point on the left margin near the base.

Proc. Acad. Nat. Sci., 1862, p. 268.

*Hab.*—North Alabama, Prof. Tuomey.

My cabinet and cabinet of Dr. Hartman.

Diam. .29,

Length .70 inch.

*Remarks.*—A number of these species was sent to me by the late Prof. Tuomey, but the older ones are very imperfect, being generally decollate. Most of them are young. The largest is nine-tenths of an inch long, but it is too imperfect to figure. The folds are close, regular and are oblique to the right. On the upper whorls there are one or two striæ which cut the folds as in *Melania* (*Goniobasis*) *Deshaysiana* (nobis). The aperture is nearly half the length of the shell.

#### GONIOBASIS PAUPERCULA. Pl. 38, fig. 176.

Testâ plicatâ, subcylindraceâ, subtenui, castaneâ vel tenebroso-olivâ, evittatâ; spirâ breviusculâ; suturis impressis; anfractibus convexiuseulis, supernè plicatis, ad apicem striatis; aperturâ parvâ, ovato-rhomboidcâ, intûs albidâ; labro acuto, parum sinuoso; columellâ incurvâ et parum contortâ.

Shell folded, subcylindrical, rather thin, chestnut-color or dark olive, without bands; spire rather short, sutures impressed; whorls somewhat convex, folded above and striate at the apex; aperture small, ovately rhomboidal, whitish within; outer lip acute, slightly sinuous; columella bent in and slightly twisted.

*Operculum* ovate, thin, light brown, with the polar point well in from the margin and above the base.

Proc. Acad. Nat. Sci., 1862, p. 268.

*Hab.*—North Alabama, Prof. Tuomey.

My cabinet and cabinet of Dr. Hartman.

Diam. .27,

Length .63 inch.

*Remarks.*—I have quite a number of this small species sent many years since by Prof. Tuomey, not a single one with an entirely perfect apex, being usually decollate at the second whorl from the base. Most of them, therefore, do not exhibit the folds which are only on the upper whorls; there they are pretty close and perpendicular. They were all covered with black oxide of iron, which on being removed exhibits a smooth brown or greenish epidermis. The aperture is probably not one-third the length of the shell.

## GONIOBASIS PROLETARIA. Pl. 38, fig. 177.

Testâ plicatâ, obtusè conoideâ, subtenui, corneâ, evittatâ; spirâ obtusè conicâ; suturis impressis; anfractibus instar senis; convexiusculis, supernè plicatâ; aperturâ grandiusculâ, subrhomboideâ, intûs albidâ; labro acuto, sinuoso; columellâ incurvâ, incrassatâ et contortâ.

Shell folded, obtusely conical, rather thin, horn-color, without bands; spire obtusely conical; sutures impressed; whorls about six, slightly convex, folded above; aperture somewhat large, subrhomboidal, whitish within; outer lip acute, sinuous; columella bent in, thickened and twisted.

Proc. Acad. Nat. Sci. 1862, p. 268.

*Hab.*—Florence, Alabama River, Rev. G. White.

My cabinet and cabinet of Mr. White.

Diam. .31,

Length .65 inch.

*Remarks.*—A single specimen only was received, and that far from being perfect. The epidermis of it is very thin and most of it removed. It is nearly of the size and somewhat like *paupercula* herein described, but is more conical and has larger and more distant folds, which are very slightly inclined to the left. The aperture is more than one-third the length of the shell.

## GONIOBASIS INCONSTANS. Pl. 38, fig. 178.

Testâ plicatâ, subfusiformi, subtenui, corneâ vel olivaceâ vel tenebroso-fuscâ, vittatâ vel evittatâ; spirâ obtusè conicâ; suturis impressis; anfractibus senis, convexiusculis, supernè plicatâ; aperturâ grandiusculâ, subrhomboideâ, intûs albidâ vel dilutè purpureâ vel vittatâ; labro acuto, parum sinuoso; columellâ incurvâ et contortâ.

Shell folded, subfusiform, rather thin, horn-color, olivaceous or dark brown, banded or without bands; spire obtusely conical; sutures impressed; whorls six, somewhat convex, folded above; aperture somewhat large, subrhomboidal, whitish within, pale purple or banded; outer lip acute, slightly sinuous; columella bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 269.

*Hab.*—Etowah River, J. Postell.

My cabinet and cabinets of Mr. Postell and Dr. Hartman.

Diam. .26,

Length .60 inch.

*Remarks.*—This is a small and very variable species, varying from light horn-color to dark brown, a few having two broad bands. The folds rarely reach to the body whorl, but they cover the upper whorls, and are somewhat distant and nearly straight. Some of the specimens closely resemble *proletaria*, herein described, in form, but this has a more pointed apex, and is more fusiform. The aperture is not quite one half the length of the shell.

## GONIOBASIS MEDIOCRIS. Pl. 38, fig. 179.

- Testâ plicatâ, subfusiformi, subtenui, cinereâ, fulgidâ, vittatâ; spirâ conoideâ; suturis irregulariter impressis; anfractibus senis, plauulatis; aperturâ grandiusculâ, rhomboideâ, intûs albidâ et vittatâ; labro acuto, sinuoso; columellâ incurvâ, incrassatâ et contortâ.

Shell folded, subfusiform, rather thin, ash-color, shining, banded; spire conical; sutures irregularly impressed; whorls six, flattened; aperture somewhat large, rhomboidal, whitish and banded within; outer lip sinuous; columella bent in, thickened and twisted.

Proc. Acad. Nat. Sci. 1862, p. 269.

*Hab.*—Tennessee, Dr. Edgar, and President Lindsley.

My cabinet.

Diam. .23,

Length .57 inch.

*Remarks.*—A single specimen was among a number of shells simply labelled, "Tennessee." This is a well characterized little species, which cannot be confounded with any I know. It has two obscure bands, one of which shows on the whorls of the spire, which is covered with rather distant folds, which curve to the right. The spire embellished with folds, and a colored band reminds one of some of the small *Mitræ*. The aperture is nearly one half the length of the shell.

## GONIOBASIS CRISPA. Pl. 38, fig. 180.

Testâ plicatâ et transversè striatâ, fusiformi, suberassâ, luteolâ, crispatâ, evittatâ; spirâ obtusâ; suturis irregulariter impressis; anfractibus instar senis, convexiusculis; aperturâ grandi, ovato-rhomboideâ, intûs albidâ; labro acuto, vix sinuoso; columellâ parum incurvâ et contortâ.

Shell folded and transversely striate, fusiform, rather thick, yellowish, crisped, without bands; spire obtuse; sutures irregularly impressed; whorls about six; somewhat convex; aperture large, ovately rhomboidal; whitish within; outer lip acute, scarcely sinuous; columella slightly bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 269.

*Hab.*—Florence, Alabama, Rev. G. White.

My cabinet and cabinet of Mr. White.

Diam. .30,

Length .62 inch.

*Remarks.*—A single specimen only was found among the numerous shells kindly sent to me some years since by Mr. White. The folds are rather close, well-defined, and incline to the left, reaching half way down the body whorl, and are crossed by transverse striæ, which cover the whole surface, and cause the upper portion to be clathrate. The aperture is nearly half the length of the shell.

## GONIOBASIS ORNATELLA. Pl. 38, fig. 181.

Testâ plicatâ, fusiformi, crassiusculâ, luteo-corneâ, vittatâ; spirâ obtuso-conoideâ; suturis irregulariter et

valdè impressis; anfractibus instar senis, convexis; aperturâ grandi, ovato-rhomboidêâ, albidâ et obsoletè vittatâ; labro acuto, vix sinuoso; columellâ parum incurvâ et contortâ.

Shell folded, fusiform, rather thick, yellowish horn-color, banded; spire obtusely conical; sutures irregularly and very much impressed; whorls about six, convex; aperture large, ovately rhomboidal, whitish, and obscurely banded; outer lip acute, scarcely sinuous; columella slightly bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 269.

*Hab.*—Tennessee, Coleman Sellers.

My cabinet.

Diam. .27,

Length .53 inch.

*Remarks.*—A single specimen was among a number of *Melanidæ* kindly given to me by Mr. Sellers a long time since, one of which I then named after him. This pretty little species is ornamented with regular folds, which are slightly curved, and incline to the right. These folds cease at the middle of the body whorl, being cut by an indented line below the suture, causing a granulation. In this specimen are five bands which are indistinct. It has nearly the same outline as *crispa*, herein described, but it is smaller, is not clathrate above, and the folds are not so strong. The aperture is about half the length of the shell.

GONIOBASIS OLIVELLA. Pl. 38, fig. 182.

Testâ plicatâ, fusiformi, suberassâ, olivaceâ, fulgidâ, cvittatâ; spirâ obtuso-conoideâ; suturis irregulariter et valdè impressis; anfractibus instar quinis, convexiusculis; aperturâ grandi, rhomboidêâ, albidâ; labro acuto, vix sinuoso; columellâ incurvâ et contortâ.

Shell folded, fusiform, rather thick, olivaceous, shining, without bands; spire obtusely conical; sutures irregularly and very much impressed; whorls about five, somewhat convex; aperture large, rhomboidal, whitish; outer lip acute, scarcely sinuous; columella bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 269.

*Hab.*—Tennessee, Prof. Troost.

My cabinet.

Diam. .31,

Length .60 inch.

*Remarks.*—I have two specimens before me varying little but in size. It is a well characterized species, having folds, more or less distinct on all the whorls. These folds are rather close, and incline to the left. In one of the specimens there are two lines which cut the folds immediately under the suture. In outline it is near to *ornatella*, herein describd, but it cannot be confounded with that species, which is of a different color and is banded. The aperture is nearly the half of the length of the shell.

GONIOBASIS PURPURELLA. Pl. 38, fig. 183.

Testâ plicatâ, conoideâ, tenui, purpurecente, fulgidâ, vittatâ vel cvittatâ; spirâ conoideâ; suturis im-

pressis; anfractibus instar septenis, planulatis; aperturâ grandiusculâ, rhomboideâ, intus tenebrosâ; labro acuto, vix sinuoso; columellâ incurvâ et contortâ.

Shell folded, conical, thin, purplish, shining, banded or without bands; spire conical; sutures impressed; whorls about seven, flattened; aperture somewhat large, rhomboidal, dark within; outer lip acute, scarcely sinuous; columella bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 269.

*Hab.*—Caney Fork River, Tennessee, J. Lewis, M. D.

My cabinet and cabinet of Dr. Lewis.

Diam. .22,

Length .48 inch.

*Remarks.*—Several specimens were sent to me by Dr. Lewis for examination, nearly all more or less imperfect. They are usually without bands, but when banded the number is four, the two middle being approximate. An impressed line under the suture cuts the folds, forming a row of granules. The folds are close, inclining a little to the right. Below the suture some specimens have a light line. This species is nearly allied to *Melania (Goniobasis) Sellersiana* (nobis), but differs in being more pointed in having bands, and especially in having granules along the sutures. The aperture is more than one third the length of the shell.

#### GONIOBASIS CINERELLA. Pl. 38, fig. 184.

Testâ plicatâ, subfusiformi, tenui, luteo-cinereâ, evittatâ; spirâ obtusè conoideâ; suturis irregulariter impressis; anfractibus senis, convexiusculis; aperturâ grandiusculâ, ovato-rhomboideâ, intus albidâ; labro acuto, vix sinuoso; columellâ incurvâ et parum contortâ.

Shell folded, subfusiform, thin, pale, ash-color, without bands; spire obtusely conical; sutures irregularly impressed; whorls six, slightly convex; aperture somewhat large, ovately rhomboidal, whitish within; outer lip acute, scarcely sinuous; columella bent in and slightly twisted.

Proc. Acad. Nat. Sci., 1862, p. 269.

*Hab.*—Tennessee, Coleman Sellers.

My cabinet.

Diam. .23,

Length .49 inch.

*Remarks.*—A single specimen only was received from Mr. Sellers. It came with two young *Melania (Goniobasis) rugosa* (nobis), which it resembles, but this little species is not clathrate over the whole of the upper whorls, having only two transverse striae, which cut the folds below the suture, forming granules. The folds are close and thick, and nearly straight. The aperture is nearly half the length of the shell.

#### GONIOBASIS CHRISTYL. Pl. 38, fig. 185.

Testâ plicatâ, vel striatâ vel granulatâ, fusiformi, subcrassâ, inflatâ, luteo-olivaceâ, vittatâ; spirâ obtusè conoideâ; suturis impressis; anfractibus quinis, convexiusculis; aperturâ pergrandi, ovato-rhomboidê, intus vittatâ; labro acuto, vix sinuoso; columellâ incrassatâ, parum contortâ.

Shell folded, striate or granulate, fusiform, rather thick, inflated, yellowish olive, banded; spire obtusely conical, sutures impressed; whorls five, slightly convex; aperture very large, ovately rhomboidal, banded within; outer lip sharp, scarcely sinuous; columella thickened, slightly twisted.

*Operculum* ovate, thin, brown, with the polar point well removed from the left margin and the base.

Proc. Acad. Nat. Sci., 1862, p. 269.

*Hab.*—Valley River, Cherokee City, N. C., Prof. David Christy.

My cabinet and cabinets of Prof. Christy, J. Clark, Dr. Hartman and Dr. Lewis.

Diam. .37,

Length .67 inch.

*Remarks.*—I have about a dozen of this species from Mr. Clark, collected by Prof. Christy in North Carolina. All the specimens are nearly of the same size and outline, and have the same bands, usually four, but they differ much in the exterior. Some have no striæ, but those which have cut the irregular folds and form granules. Usually, there are four bands indistinct on the outside, but well marked within, the two middle ones being approximate. The upper band is the largest, and the callus above is often purple. Some specimens have five or six bands. It reminds one of *Melania* (*Goniobasis*) *basalis* (nobis), but that shell is not so much inflated, nor has its folds, striæ or granules like this. The aperture is more than half the length of the shell. I name this after Prof. David Christy, who collected it, with many interesting shells, while in the north-western part of North Carolina.

GONIOBASIS INSTABILIS. Pl. 38, fig. 186.

Testâ plicatâ vel lævi, fusiformi, crassâ, subinflatâ, vittatâ vel evittatâ, olivaceâ; spirâ conoideâ; suturis impressis; anfractibus instar quinæ, convexiusculis; aperturâ grandî, ovato-rhomboidæ. intus vittatâ; labro acuto, vix sinuoso; columellâ incrassatâ, parum incurvâ et contortâ.

Shell folded or smooth, fusiform, thick, somewhat inflated, banded or not banded, olivaceous; spire conical; sutures impressed; whorls about five, slightly convex; aperture large, ovately rhomboidal, banded within; outer lip acute, scarcely sinuous; columella thickened, somewhat bent in and twisted.

*Operculum* ovate, thin, light brown, with the polar point well removed from the left margin and the base.

Proc. Acad. Nat. Sci., 1862, p. 269.

*Hab.*—Twenty-one miles north of Murphy, and other places in Cherokee County, Georgia, Prof. David Christy.

My cabinet and cabinets of Prof. Christy, J. Clark and Dr. Hartman.

Diam. .32,

Length .64 inch.

*Remarks.*—I have a number of these from several habitats in Cherokee County, North Carolina. From the different habitats there is a great variety of character, about half seem to be plicate, the others perfectly smooth; the folds not being on the upper whorls, but commencing on the body whorls or the penultimate, and these folds are

on the shoulder, and somewhat curved and close. Some are lighter green and white inside, being without bands. The bands are usually four in number, with the two middle ones approximate. The smooth, green, elongate varieties look very much like *Melania (Goniobasis) Saffordii* (nobis), but it cannot be confounded with that species. The dark banded varieties might be mistaken for the *Melania (Goniobasis) subangulata*, Anth. The aperture is about half the length of the shell.

GONIOBASIS GERHARDTI. Pl. 38, fig. 187.

Testâ carinatâ, fusiformi, tenui, fulgidâ, lutèò-virente, quadrivittatâ; spirâ regulariter conicâ; suturis impressis; anfractibus senis, planulatis, ultimo grandi; aperturâ magnâ, rhomboideâ, intûs albidâ et vittatâ; labro acuto, parum sinuoso; columellâ incurvâ, infernè parum incrassatâ.

Shell carinate, fusiform, thin, shining, yellowish-green, four-banded; spire regularly conical; aperture small, rhomboidal, whitish and banded within; outer lip acute, slightly sinuous; columella bent in, slightly thickened below.

*Operculum* ovate, thin, dark brown, with the polar point on the left above the base.

Proc. Acad. Nat. Sci., 1862, p. 270.

*Hab.*—Chattanooga River, Georgia, Alexander Gerhardt, Coosa River, Alabama, Dr. Spillman.

My cabinet and cabinets of Mr. Gerhardt, Dr. Spillman, Smithsonian Institution, and Dr. Hartman.

Diam. .36,

Length .72 inch.

*Remarks.*—From the two habitats, I have a number of specimens, nearly all of which are young. The largest, one of which will be figured, were from the Smithsonian Institution, kindly sent to me by Prof. Henry, the Secretary, having been received from Mr. Gerhardt. Those from Dr. Spillman were smaller, and generally much darker. It is a beautiful, regular, and graceful species. The young are very acutely angular, having on the periphery a very dark raised line. There are four bands which are remarkably uniform, being nearly the same in every specimen. The two middle ones are close together, the upper of the two being the larger. The upper one is near to the suture above; the lower one is broad and near the base. At the base of the columella the area is usually quite yellow. A few young ones from the Coosa are without bands. In the number and position of the bands we are reminded of *Melania (Goniobasis) suavis* (nobis), and *Melania (Goniobasis) grata*, Anth., but this is a much thinner and a carinate species. The aperture is about half the length of the shell. I name this after Mr. Alexander Gerhardt, who has done much to elucidate the zoology of his district in North Georgia.

GONIOBASIS INFUSCATA. Pl. 38, fig. 188.

Testâ carinatâ, fusiformi, subtenui, fulgidâ, tenebrosâ, nigricante, trivittatâ; spirâ conoideâ; suturis impressis; anfractibus instar senis, supernè planulatis, ultimo grandi; aperturâ submagnâ, rhomboideâ, intûs albidâ vel fuscâ, trivittatâ; labro acuto, parum sinuoso; columellâ incurvâ, infernè aliquantò incrassatâ.



Shell carinate, fusiform, rather thin, shining, dark, nearly black, three-banded; spire conical, sutures impressed; whorls about six, flattened above, the last one large; aperture rather large, rhomboidal, whitish or brown, and three-banded within; outer lip acute, slightly sinuous; columella bent in, slightly thickened below.

Proc. Acad. Nat. Sci., 1862, p. 270.

*Hab.*—Georgia, Rev. G. White, Coosa River, Alabama, Dr. Spillman.

My cabinet and cabinets of Mr. White and Dr. Spillman.

Diam. .37,

Length .82 inch.

*Remarks.*—A single specimen only from each of the habitats was received. That from Mr. White is the larger and is not so dark, the epidermis being olive-brown, and the interior being whitish with the three bands well-defined. That from Dr. Spillman is of so dark a brown, that it has the appearance of being entirely black, but in the inside, the three bands may be distinguished, but the exterior is totally and intensely dark. In outline it is nearly the same with *Gerhardtii*, herein described, but differs in the number and character of the bands. The aperture is not quite half the length of the shell.

GONIOBASIS MUTABILIS. Pl. 38, fig. 189.

Testâ carinatâ vel plicatâ vel striatâ, subfusiformi, suberassâ, luteo-virente, quadrivittatâ vel evittatâ; spirâ obtusè conoidâ; a nfraetibus senis, planiusculis; aperturâ subgrandi, rhomboideâ, intus albida; labro acuto, vix sinuoso; columellâ incurvâ, incrassatâ, parum contortâ.

Shell carinate, plicate or striate, subfusiform, somewhat thick, yellowish-green, four-banded, or without bands; spire obtusely conical; whorls six, slightly flattened; aperture rather large, rhomboidal, whitish within; outer lip acute, scarcely sinuous; columella bent in, thickened, somewhat twisted.

*Operculum* ovate, thin, dark-brown, with the polar point well removed from the left margin.

Proc. Acad. Nat. Sci., 1862, p. 270.

*Hab.*—Butts County, Georgia, Rev. G. White.

My cabinet and cabinets of Mr. White and Dr. Hartman.

Diam. .31,

Length .65 inch.

*Remarks.*—This is a most variable species, most are carinate, but many are striate, and some are plicate, and on a few neither of these characters can be observed, the surface being entirely smooth. All are disposed to carination on the apical whorls. Many are without bands, but most are four-banded, having the two medial bands approximate. All were more or less covered with the black oxide of iron. In outline it is nearly allied to *Melania* (*Goniobasis*) *Lecontiana* (nobis), but it is not so fusiform, nor so large, nor is it always plicate, as that species is. Some of the specimens are entirely white inside, and thickened, but usually they are four-banded. In several

instances there is an indistinct fifth band. The aperture is more than one-third the length of the shell.

GONIOBASIS CRUDA. Pl. 38, fig. 190.

Testâ carinatâ, subfusiformi, subtenui, fulgidâ, tenebroso-fuscâ, obsoletè vittatâ; spirâ obtusâ; suturis parvum impressis; anfractibus superne planulatis, ultimo grandi; aperturâ submagnâ, rhomboideâ, intus tenebrosâ; labro acuto, vix sinuoso; columellâ parum incurvâ, vix incrassatâ.

Shell carinate, subfusiform, rather thin, shining, dark-brown, obscurely banded; spire obtuse; sutures slightly impressed; whorls flattened above, the last one large; aperture rather large, rhomboidal, dark within; outer lip acute, scarcely sinuous; columella slightly incurved, scarcely thickened.

Proc. Acad. Nat. Sci., 1862, p. 270.

*Hab.*—Tennessee River, Dr. Spillman.

My cabinet and cabinet of Dr. Spillman.

Diam. .38,

Length .68 inch.

*Remarks.*—Only two specimens were received from Dr. Spillman, both much worn at the apex. Two of the lower whorls only are perfect. The bands on both are imperfect and obscure. They may be considered to be three, one being on the periphery of the whorl. One is much darker in the interior than the other, and has a dark purple mark at the base of the columella. It has very much the form of *Melania* (*Goniobasis*) *perfusca* (nobis), but differs in size, in aperture, and in carination. The character of the upper whorls cannot be ascertained by these specimens, nor the proportion of the aperture, but it must be nearly one half the length of the shell.

GONIOBASIS RUBELLA. Pl. 38, fig. 191.

Testâ carinatâ, subulatâ, subtenui, rubicundâ, evittatâ; spirâ attenuatâ; suturis valdè impressis; anfractibus otonis, subconvexis; aperturâ parvissimâ, subrhomboideâ, intus vel albidâ vel rubidâ; labro acuto, sinuoso; columellâ parum incurvâ et contortâ.

Shell carinate, awl-shaped, rather thin, reddish, without bands; spire attenuate; sutures very much impressed; whorls eight, somewhat convex; aperture very small, subrhomboidal, whitish or reddish within; outer lip acute, sinuous; columella slightly bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 270.

*Hab.*—Near Murphy, Cherokee county, North Carolina, Prof. Christy.

My cabinet and cabinets of Mr. Clark and Dr. Hartman.

Diam. .23,

Length .68 inch.

*Remarks.*—I have eight specimens before me, sent some years since by my late friend Mr. Clark, being part of the collection made by Prof. Christy. In form and size this species is very near to *Melania* (*Goniobasis*) *teres* (nobis), but it differs in being carinate, and having striæ which in all the specimens reach more than half way

down from the apex. *Teres* is not striate. In the aperture there is also a difference. The aperture is about two-sevenths the length of the shell.

GONIOBASIS MACELLA. Pl. 38, fig. 192.

Testâ carinatâ, subulatâ, tenui, olivaceâ, evittatâ; spirâ subattenuatâ; suturis valdè impressis; anfractibus septenis, convexiusculis; aperturâ parvissimâ, subrhomboideâ, intùs albidâ, ad basim maculatâ; labro acuto, parum sinuoso; columellâ incurvâ et aliquantò contortâ.

Shell carinate, awl-shaped, thin, olivaceous, without bands; spire subattenuate; sutures very much impressed; whorls seven, somewhat convex; aperture very small, subrhomboidal, whitish within; spotted at the base; outer lip acute; slightly sinuous; columella bent in and slightly twisted.

*Operculum* ovate, thin, light brown, with the polar point well in from the left of margin.

Proc. Acad. Nat. Sci., 1862, p. 270.

*Hab.*—Coosa River, Alabama. Prof. Brumby.

My cabinet.

Diam. .22.

Length .62 inch.

*Remarks.*—This is a little species received from Professor Brumby a long time since. It is closely allied to *rubella*, herein described, but differs in being somewhat smaller, in color, in having rather flatter whorls and in having a brown elongate spot at the base of the columella inside. The few specimens before me are minutely veined on the lower whorl. The upper whorls are carinate and substriate. The aperture is about one-fourth the length of the shell.

GONIOBASIS RUBIGINOSA. Pl. 38, fig. 193.

Testâ carinatâ, aliquantulum subulatâ, subtenui, fulgidâ, rubiginosâ, obsoletè vittatâ; spirâ subattenuatâ; suturis impressis; anfractibus instar senis, convexis; aperturâ parvissimâ, subrhomboideâ, intùs dilutè rubiginosâ et obsoletè bivittatâ; labro acuto, sinuoso; columellâ parum incurvâ et contortâ.

Shell carinate, somewhat awl-shaped, rather thin, shining, reddish, obscurely banded; spire subattenuate; sutures very much impressed; whorls about six, convex; aperture very small, subrhomboidal, pale reddish and obscurely double-banded within; outer lip acute, sinuous; columella slightly bent in and twisted.

*Operculum* broadly ovate, dark brown, with the polar point near the left margin above the base.

Proc. Acad. Nat. Sci. 1862, p. 270.

*Hab.*—Oregon, W. Newcomb, M. D.

My cabinet and cabinet of Dr. Newcomb.

Diam. .27,

Length .74 inch.

*Remarks.*—Two specimens only were sent to me by Dr. Newcomb. The four upper

whorls are carinate, and a small thread-like line below runs parallel with the more raised one. The two obscure bands are near to each other and are in the middle of the whorl. In outline it is near to *Melania (Goniobasis) nigrina* (nobis), but it is a larger species with a less polished surface and of a very much lighter color. It differs entirely in being carinate. In both these specimens the whorls are slightly depressed below the suture, which modifies the outer lip. One of the specimens has an obscure brownish spot inside at the base of the columella. The aperture is about two-sevenths the length of the shell.

GONIOBASIS UCHEËNSIS. Pl. 38, fig. 194.

Testâ carinatâ, obtusè conoideâ, subtenui, corneâ, evittatâ; spirâ obtusâ; suturis impressis; anfractibus instar senis, planulatis; aperturâ submagnâ, ovato-rhomboidêâ, intûs albidâ; labro acuto, parum sinuoso; columellâ incurvâ, aliquantò contortâ.

Shell carinate, obtusely conical, rather thin, horn-color, without bands; spire obtuse; sutures impressed; whorls about six, flattened; aperture rather large, ovately rhomboidal, whitish within; outer lip acute, somewhat sinuous; columella bent in and somewhat twisted.

*Operculum* ovate, light brown, with the polar point near to the left margin above the base.

Proc. Acad. Nat. Sci., 1862, p. 270.

*Hab.*—Little Uchee River, below Columbus, Georgia, G. Hallenbeck.

My cabinet and cabinets of Mr. Hallenbeck and Dr. Hartman.

Diam. .24,

Length .58 inch.

*Remarks.*—This is a very small species, nearly allied to *Melania (Goniobasis) proxima*, Say, but may be distinguished by its smaller size, its lighter color, its shorter spire, and its having a raised line above and below the carina on the upper whorls. The aperture is rather more than one-third the length of the shell.

GONIOBASIS INOSCULATA. Pl. 38, fig. 195.

Testâ carinatâ, conoideâ, subtenui, luteo-corneâ, evittatâ; spirâ subelevatâ; suturis impressis; anfractibus instar septenis, convexiusculis; aperturâ submagnâ, rhomboidêâ, intûs albidâ; labro acuto, sinuoso; columellâ subincurvâ, infernè incrassatâ.

Shell carinate, conical, rather thin, yellowish horn-color, without bands; spire somewhat raised; sutures impressed; whorls about seven, a little convex; aperture rather large, rhomboidal, whitish within; outer lip acute, sinuous; columella somewhat bent in and thickened below.

*Operculum* subrotund, thin, light brown, with the polar point on the left near the edge.

Proc. Acad. Nat. Sci. 1862, p. 270.

*Hab.*—Little Uchee River, below Columbus, Georgia, G. Hallenbeck.

My cabinet and cabinets of Mr. Hallenbeck and Dr. Hartman.

Diam. .30,

Length .74 inch.

*Remarks.*—Nearly a dozen of this species was mixed up with the *Uchénsis*, herein described. It is closely allied, but may be distinguished by the form of the aperture, which is much more rhombic. It is also of a lighter color, and the outer lip is more sinuous. The aperture is more than the length of the shell.

GONIOBASIS BARRATTII. Pl. 38, fig. 196.

Testâ carinatâ, subfusiformi, subtenui, virido-corneâ vel rufo-corneâ, obsoletè vittatâ vel evittatâ; spirâ obtuso-conoideâ; suturis valdè impressis; anfractibus septenis, convexiusculis, ad apicem plicatis; aperturâ submagnâ, subrhomboideâ, intus albidâ vel obsoletè vittatâ; labro acuto, vix sinuoso; columellâ parum incurvâ et contortâ.

Shell carinate, subfusiform, rather thin, greenish or reddish horn-color, obscurely banded, or without bands; spire obtusely conical; sutures very much impressed; whorls seven, slightly convex, folded at the apex; aperture rather large, subrhomboidal, whitish or obscurely banded within; outer lip acute, scarcely sinuous; columella somewhat bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 271.

*Hab.*—Abbeville District, South Carolina, J. P. Barratt, M. D.

My cabinet and cabinets of Dr. Barratt and Dr. Hartman.

Diam. .25,

Length .53 inch.

*Remarks.*—A number of specimens were sent to me by Dr. Barratt many years since. In outline all the specimens are very much the same, but they differ in some having the apical whorls obscurely plicate, while others are only carinate. All the specimens are carinate down to the last whorl. In very few specimens can the bands be seen on the outside, but usually two bands are visible on the inside near the middle. In some specimens four bands are observable. Usually the four apical whorls are obscurely plicate. The aperture is more than one third the length of the shell. It is nearly allied to *Melania (Goniobasis) tenebrosa* (nobis), but it is more slender, has higher carinæ, and is plicate. I dedicate this to the late Dr. Barratt, from whom I have formerly received many interesting specimens of the mollusca of South Carolina and Georgia.

GONIOBASIS RUBRICATA. Pl. 38, fig. 197.

Testâ carinatâ, conoideâ, subtenui, rufo-fuscâ, politâ, evittatâ; spirâ subelevatâ; suturis valdè impressis; anfractibus instar septem, convexis; aperturâ submagnâ, rhomboideâ, intus dilutè rubidâ; labro acuto, vix sinuoso; columellâ incurvâ, parum incrassatâ.

Shell carinate, conical, rather thin, reddish-brown, polished, without bands; spire somewhat raised; sutures very much impressed; whorls about seven, convex; aper-

ture rather large, rhomboidal, pale reddish within; outer lip acute, scarcely sinuous; columella bent in, somewhat thickened.

*Operculum* ovate, dark-brown, with the polar point near the base on the left.

Proc. Acad. Nat. Sci., 1862, p. 271.

*Hab.*—Tennessee, Prof. Troost.

My cabinet and cabinets of Prof. Troost and Dr. Hartman.

Diam. .29,

Length .71 inch.

*Remarks.*—These specimens sent to me long since by the late Prof. Troost are nearly all truncate. I formerly considered them a variety of *Melania* (*Goniobasis*) *proxima*, Say, but it is a larger species, more exerted, and has a peculiar appearance in the whorls of the spire assimilating to a coiled rope. Several young specimens are perfect to the apex, which shows that all are more or less carinate, but very obtusely so. The decollate specimens have no appearance of a carina on the lower whorls. All the specimens were covered with the black oxide of iron, which being removed, the epidermis is found to be smooth, polished, and bright reddish-brown. Usually the upper part of the whorl is slightly impressed, which gives to the curve of the whorl a peculiar form. The columella is usually light-brown, and some specimens have a whiteness about the middle portion. The aperture is about two-sevenths the length of the shell.

#### GONIOBASIS BENTONIENSIS. Pl. 38, fig. 198.

Testâ carinatâ, plicatâ, striatâ, conoideâ, subtenui, virido-corneâ, evittatâ; spirâ elevatâ, conoideâ; suturis valdè impressis; anfractibus septenis, convexiusculis; aperturâ parviusculâ, ovato-rhomboidê, intûs albidâ; labro acuto, vix sinuoso; columellâ incurvâ, parum contortâ.

Shell carinate, folded, striate, conical, greenish horn-color, without bands; spire raised, conical; sutures very much impressed; whorls seven, slightly convex; aperture rather small, ovately rhomboidal, whitish within; outer lip acute, scarcely sinuous; columella bent in, somewhat twisted.

Proc. Acad. Nat. Sci., 1862, p. 271.

*Hab.*—Benton County? North Alabama, G. Hallenbeck.

My cabinet and cabinet of Mr. Hallenbeck.

Diam. .39,

Length .93 inch.

*Remarks.*—There are two specimens before me sent by Mr. Hallenbeck. He is not positively certain that they were found in Benton County. Both these have revolving striæ over all the whorls. The upper whorls have folds, which, where they cut the striæ, are raised into obtuse nodes. The larger striæ on the body whorl are represented on the inside by white lines. It is rare that any species is carinate, plicate and striate at the same time. It is allied to *Melania* (*Goniobasis*) *Boylkiniana* (nobis), but is not tuberculate, nor is it so large. The aperture is about one-third the length of the shell.

## GONIOBASIS SHASTAENSIS. Pl. 38, fig. 199.

Testâ striatâ, subcylindraceâ, subtenui, tenebroso-corneâ, fasciatâ; spirâ elevatâ, ad apicem plicatâ; suturis valdè impressis; anfractibus convexis; aperturâ parvâ, ovatâ, intûs albidâ; columellâ lævi, incurvatâ et recurvatâ.

Shell striate, subcylindrical, rather thin, dark horn-color, banded; spire elevated, folded at the apex; sutures very much impressed; whorls convex; aperture small, ovate, white within; columella smooth, incurved and recurved.

*Operculum* ovate, the polar point being near the left side and below the middle.

*Melania Shastaensis*, Lea, Proc. Acad. Nat. Sci., April 1st, 1856.

*Hab.*—Shasta and Scott Rivers, California, Dr. Trask; and Fort Umpqua, O. T., Smithsonian Institution.

My cabinet and cabinets of the Smithsonian Institution.

Diam. .34,

Length 1.05 inch.

*Remarks.*—Nearly thirty specimens of this species were kindly sent to me by Dr. Trask. The form and size of this species is very much the same as *Melania (Goniobasis) Virginica*, Say. It differs in the form of the aperture, in having but a single revolving wide band, and in being more cylindrical. The *Shastaensis* varies like the *Virginica*, in being very uncertain as to striation. Some of the specimens are covered with minute revolving striæ, while others are almost entirely destitute of them. In every specimen before me, there is a broad revolving brown band on the middle of the whorls, more or less distinct, and always with more intense color on the superior whorls. This band often becomes obsolete on the inferior whorls, but when that is not the case, it may be seen within the aperture also. A few of the specimens have the columella slightly purple. Every specimen in my possession has the apex eroded, so that the number of whorls cannot be with certainty stated. I should suppose the number to be nine or ten. Some of them are sufficiently perfect to show several upper whorls with regular folds. The aperture is probably rather more than one-fourth the length of the shell.

## GONIOBASIS NEGATA. Pl. 38, fig. 200.

Testâ striatâ, ellipticâ, subconicâ, crassâ, luteolâ, quadrivittatâ; spirâ obtusè conicâ; suturis valdè et irregulariter impressis; anfractibus senis, convexiusculis, ultimo grandi; aperturâ parviuseulâ, ovatâ, intûs albidâ et quadrivittatâ; labro acuto, incrassato; columellâ inflectâ, incrassatâ, ad basim obtusè angulatâ.

Shell striate, elliptical, subconical, thick, yellowish, four-banded; spire obtusely conical; sutures very much and very irregularly impressed; whorls six, somewhat convex, the last large; aperture rather small, ovate, white within, and four-banded; outer lip sharp, slightly thickened; columella bent in, thickened, obtusely angular at the base.

*Operculum* ovate, rather thin, light-brown, with the polar point near to the base.

Proc. Acad. Nat. Sci., 1862, p. 271.

*Hab.*—Coosa River, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .35,

Length .68 inch.

*Remarks.*—This species is very nearly allied to *Melania* (*Goniobasis*) *Vanuxemiana* (nobis), having coarse striæ over the whole of the whorls. But it is smaller, rather more elliptical, and has more striæ, the number being about ten. These striæ are rounded, with an intervening groove, and cover the whole of the whorls. The bands are obscure on the outside of both the specimens before me, but are well-defined inside. It has some resemblance to *Melania* (*Goniobasis*) *Coosacensis* (nobis), but is a much smaller species, and is more constricted in the whorls and in the aperture. The aperture is nearly half the length of the shell.

GONIOBASIS ELLIOTTII. Pl. 38, fig. 201.

Testâ obsoletè striatâ, subobtusò-conoideâ, suberassâ, vel flavescente vel fuscèscente, evittatâ; spirâ subobtusâ; suturis valdè impressis; anfractibus instar senis, convexiusculis; aperturâ magnâ, ovato rhomboideâ, intùs vel albidâ vel fuseâ; labro acuto, parum sinuoso; columellâ parum incurvâ, incrasatâ et parum contortâ.

Shell obscurely striate, rather obtusely conical, somewhat thick, yellowish or brownish, without bands; spire rather obtuse; sutures very much impressed; whorls about six, slightly convex; aperture large, ovately rhomboidal, whitish or brown within; outer lip sharp, slightly sinuous; columella slightly bent in, thickened and somewhat twisted.

*Operculum* subovate, thin, dark-brown, with the polar point on the edge near the base.

Proc. Acad. Nat. Sci., 1862, p. 271.

*Hab.*—Fannin County, Georgia, Bishop Elliott; Uchee and Little Uchee Rivers, Alabama, G. Hallenbeck and Dr. Gesner.

My cabinet and cabinets of Bishop Elliot, Mr. Hallenbeck, Dr. Gesner, Dr. Lewis and Mr. Anthony.

Diam. .41,

Length .94 inch.

*Remarks.*—I have quite a number of this species. It is well marked, and not easily confounded with any other I know. The interior of some specimens are dark-brown, with a white thickened margin on the outer lip; others are light-brown, inclining to obscure bands, while about one-half of all are white. The apical whorls are usually carinate. The body whorl has generally two or three obscure transverse striæ about the periphery, below which, towards the base, they are closer and coarser. There is a strong disposition in some specimens to a depression below the suture. The



aperture is about three-eighths the length of the shell. I dedicate this to the Right Reverend Stephen Elliot, who has done so much to develop the Zoology of Georgia.

GONIOBASIS FLAVESCENS. Pl. 38, fig. 202.

Testâ striatâ, interdum granulatâ et plicatâ, subcylindraccâ, flavescente, crassâ; spirâ obtusè conoideâ; suturis irregulariter impressis; anfractibus convexiuseulis, ultimo pergrandi; aperturâ grandi, subrhomboideâ, intus vittatâ vel albâ; labro acuto, vix sinuoso; columellâ incurvâ, supernè valdè incrassatâ et contortâ.

Shell striate, sometimes granulate and folded, subcylindrical, yellowish, thick; spire obtusely conical; sutures irregularly impressed; whorls slightly convex, the last very large; aperture large, subrhomboidal, banded or white within; outer lip sharp, scarcely sinuous; columella bent in, very much thickened above and twisted.

*Operculum* ovate, rather thick, brown, with the polar point near the left margin above the base.

Proc. Acad. Nat. Sci., 1862, p. 271.

*Hab.*—Oconee and Tennessee Rivers, Tennessee, Rev. G. White.

My cabinet and cabinets of Mr. White and Dr. Hartman.

Diam. .43,

Length .97 inch.

*Remarks.*—Quite a number of specimens were sent to me by Mr. White, and among them there is great variation. They are allied on one side to *Tryoniana*, herein described, and on the other to *Melania* (*Goniobasis*) *brevis*, (nobis.) It is a larger species than the latter, and smaller and more cylindrical than the former. Brown bands are more or less observable in the interior of about half the specimens before me. The callus above is usually thick and often colored. One specimen only is entirely brown inside. The aperture is more than one-third the length of the shell, none have the apex sufficiently perfect to ascertain the number of whorls. There are probably about six. There is a close affinity between this and *Melania* (*Goniobasis*) *Holstonia* (nobis,) which, however, is more robust, of a different color and more granulate.

GONIOBASIS HALLENBECKII. Pl. 38, fig. 203.

Testâ tuberculatâ, infernè transversè striatâ, turrîtâ, subtenui, luteo-corneâ vel olivaccâ, vittata vel evittatâ; spirâ elevato-turrîtâ; suturis valdè impressis; anfractibus octonis, carinatis, ad peripheriam compresso-tuberculatis; aperturâ magnâ, ovato-rhomboideâ; intus albidâ; labro crenulato, sinuoso; columellâ incurvâ, parum incrassatâ et valdè contortâ.

Shell tuberculate, transversely striate below, turreted, rather thin, pale horn-color or olivaceous, banded, or without bands; spire elevately turreted; sutures very much impressed; whorls eight, carinate, with compressed tubercles at the periphery; aperture large, ovately rhomboidal, whitish within; outer lip crenulate, sinuous; columella bent in, slightly thickened, and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 271.

*Hab.*—Randall's Creek, near Columbus, Georgia, G. Hallenbeck.

My cabinet and cabinets of Mr. Hallenbeck and Dr. Hartman.

Diam. .47,

Length 1.24 inch.

*Remarks.*—This is a very beautiful species, having some resemblance in outline to *Melania* (*Goniobasis*) *Boylkiniana* (nobis), but it is larger, has more tubercles, and a more elevated spire. Many specimens are disposed to be plicate, and on the periphery where these folds traverse the raised striæ, a compressed tubercle is caused. These are sometimes repeated obscurely by the inferior striæ. Most of the specimens before me are banded, but many are entirely free from bands. Usually, there are four bands, rarely five, two being visible on the upper whorls. The lower band near to the base of the columella is usually well defined. The aperture is about one-third the length of the shell. I have great pleasure in dedicating this fine species to Mr. Hallenbeck, who has done much to develop the natural history of Georgia.

GONIOBASIS CANBYI. Pl. 38, fig. 204.

Testâ tuberculatâ, plicatâ, infernè transversè striatâ, turritâ, tenui, vel fuscâ vel dilutè fuscâ, maculatâ; spirâ turritâ; suturis irregulariter impressis; anfractibus septenis, carinatis, ad peripheriam compresso-tuberculatis; aperturâ parvâ, rhomboideâ, intûs maculatâ; labro crenulato, sinuoso; columellâ incurvâ et valdè contortâ.

Shell tuberculate, plicate, transversely striate below, turreted, thin, brown or pale brown, maculate; spire turreted; sutures irregularly impressed; whorls seven, carinate, with compressed tubercles on the periphery; aperture small, rhomboidal, spotted within; outer lip crenulate, sinuous; columella bent in and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 271.

*Hab.*—Lake Monroe, Florida, W. Canby; and Etowah and Tennessee Rivers, Georgia, J. Postell.

My cabinet and cabinets of Mr. Postell, Mr. Anthony and Dr. Hartman.

Diam. .35,

Length .76 inch.

*Remarks.*—Several bleached specimens were collected by Mr. Canby, of Wilmington, Delaware, from Enterprise, on Lake Monroe. Mr. Postell sent me two perfect specimens from Etowah River, Georgia, and a bleached one from the Tennessee River. All these specimens are without variation. There are usually five revolving striæ below, and two above, that round the periphery, which make compressed tubercles where they are crossed. These folds are bright brown,—nearly red on their left side,—and give a maculate appearance to the whole shell. These maculations are visible on the inside. The compressed, sharp tubercles almost constitute spines, and, on first looking at this shell, one is reminded of *Melania spinulosa*, Lam., but it cannot be confounded with that species. In outline and in most of its characters it is allied to *Hallenbeckii*, herein described, but it is much smaller,

and differs in being maculate instead of banded. The aperture is about one-third the length of the shell. I dedicate this to my friend Mr. Canby, who kindly brought me some specimens.

GONIOBASIS COUPERII. Pl. 38, fig. 205.

Testâ tuberculatâ, plicatâ, infernè et supernè striatâ, turritâ, tenui, tenebroso-fuscâ, ad basim vittatâ; spirâ turritâ; suturis valdè impressis; anfractibus septenis, subcarinatis, ad peripheriam et suprâ compresso-tuberculatis; aperturâ parvissimâ, subrhomboideâ, intùs tenebrôsâ et uno-vittatâ; labro crenulato, valdè sinuoso; columellâ incurvâ, contortâ et purpurescente.

Shell tuberculate, plicate, striate above and below, turreted, thin, dark brown, banded at the base; spire turreted; sutures very much impressed; whorls seven, subcarinate, with compressed tubercles on and above the periphery; aperture very small, subrhomboidal, dark and single-banded within; outer lip crenulate, very sinuous; columella bent in, twisted and purple.

Proc. Acad. Nat. Sci., 1862, p. 271.

*Hab.*—Etowah River, Mr. Couper, by J. Postell.

My cabinet and cabinet of Mr. Postell.

Diam. .27,

Length .72 inch.

*Remarks.*—This ornamented little species was sent by Mr. Postell with the *Canbyi*, which he found also in Etowah River. They are closely allied, but *Couperii* is slimmer, has more striæ above the periphery, which are all cut by the folds, thus filling the spire with small, compressed tubercles. It differs also in being much darker, in not being maculate and in having a broad band near the base which is well marked inside. Below the periphery there are six well-defined, raised revolving striæ. The aperture is not quite one-third the length of the shell. Mr. Postell informs me that this species, as well as *Canbyi* and *Downieana*, from Etowah River, were brought some years since by Mr. Couper, son of James Hamilton Couper, Esq., of Hopeton, near Darien, and I have great pleasure in naming this species after him.

GONIOBASIS DOWNIEANA. Pl. 38, fig. 206.

Testâ tuberculatâ, subturritâ, supernè clathratâ et subcarinatâ, infernè transversè striatâ, tenui, dilutè fuscâ; spirâ conoideâ, clathratâ; suturis irregulariter impressis; anfractibus septenis, subcarinatis, ad peripheriam et suprâ compresso-tuberculatis; aperturâ submagnâ, ovato-rhomboidêâ, intùs albidâ; labro crenulato, sinuoso; columellâ incurvâ et contortâ.

Shell tuberculate, subturreted, clathrate and subcarinate above, transversely striate below, thin, pale brown; spire conical, clathrate; sutures irregularly impressed; whorls seven, subcarinate; compressed tuberculate on and above the periphery; aperture rather large, ovately rhomboidal, whitish within; outer lip crenulate, sinuous; columella bent in and twisted.

Proc. Acad. Nat. Sci., 1862, p. 272.

*Hab.*—Etowah River, J. Postell.

My cabinet and cabinet of Mr. Postell.

Diam. .33,

Length .71 inch.

*Remarks.*—Two specimens of this beautiful species only are before me, neither of them being entirely perfect. These two are without bands, but one has in the interior slight lines of color, which indicate that other individuals may be well banded. The striæ below the periphery are six, and they are thick enough to cause corresponding white lines in the interior. The three lines above the periphery are cut by close folds on ribs, and these make the upper parts beautifully clathrate. This species is closely allied to *Canbyi*, herein described, but it is shorter and wider, and the tubercles are more numerous and smaller, having about twenty on the periphery, while *Canbyi* has about thirteen. These three ornamented little species,—*Canbyi*, *Couperii* and *Downiana*,—form a distinct group among American species, which one would hardly expect to find existing here. The aperture is rather more than one-third the length of the shell. I name this species after T. C. Downie, Esq., civil engineer, who has done much to develop the natural history of Georgia.

GONIOBASIS TRYONIANA. Pl. 38, fig. 207.

Testâ granulosâ vel striatâ, subfusiformi, luteo-fuscâ vel tenebroso-fuscâ, crassâ, robustâ, vittatâ, rarè evittatâ, spirâ obtusè conoideâ; suturis irregulariter impressis; anfractibus instar senis, ultimo pergrandi; aperturâ pergrandi, ovato-rhomboidêâ, intus valdè vittatâ; labro subcrenulato, vix sinuoso; columellâ parum incurvâ et vix contortâ.

Shell granulose or striate, subfusiform, yellowish brown or dark brown, thick, robust, banded, rarely not banded; spire obtusely conical; sutures irregularly impressed; whorls about six, the last very large; aperture very large, ovately rhomboidal, much banded within; outer lip subcrenulate, scarcely sinuous; columella slightly bent in and scarcely twisted.

*Operculum* ovate, rather thick, dark brown, with the polar point near the left margin, above the base.

Proc. Acad. Nat. Sci., 1862, p. 272.

*Hab.*—Oostenaula, near Rome, Bishop Elliott; Etowah River, Georgia, J. Postell; and Ocoee River and Tennessee River, Rev. G. White.

My cabinet and cabinets of Bishop Elliott, Mr. Postell, Mr. White, Mr. G. W. Tryon, Jr., and Dr. Hartman.

Diam. .52,

Length 1.01 inch.

*Remarks.*—I have a number of specimens from the above various habitats, and they vary very much. Some are more obtuse than others, and some are tuberculate, while others are only transversely striate, close striæ often covering the whole surface. Usually the bands do not show on the outside, often giving the surface a

clouded appearance, while in the interior, usually, the bands are well marked and sometimes number as many as eight, but sometimes the aperture is entirely white; rarely the whole is purple inside, in which case the exterior is very dark brown. The base of the columella is usually yellowish outside. It is somewhat allied to *Melania* (*Goniobasis*) *Coosuensis* (nobis), but that species is more constricted and has a narrow aperture. The aperture is nearly one-half the length of the shell. I name this species after Mr. G. W. Tryon, Jr., who has done much to promote the objects of the study of malacology.

## GONIOBASIS POSTELLII. Pl. 38, fig. 208.

Testâ granulatâ, attenuatâ, subtenui, luteo-olivâ, infernè transversè striatâ; spirâ elevatâ; suturis irregulariter impressis; anfractibus subplanulatis, instar octonis; aperturâ parvâ, ellipticâ, intus vel albidâ vel vittatâ; labro acuto; columellâ tortâ.

Shell granulate, attenuate, rather thin, yellowish-olive, transversely striate below; spire raised; sutures irregularly impressed; whorls rather flattened, about eight; aperture small, elliptical, white or banded within; outer lip sharp; columella twisted.

*Melania Postellii*. Proc. Acad. Nat. Sci. July 6, 1858.

*Hab.*—Altamaha River, Georgia, James Postell, Esq.

My cabinet and cabinet of Mr. Postell.

Diam. .36,

Length 1.06 inch.

*Remarks.*—Some dozen specimens were received from Mr. Postell, which were all more or less covered with a black deposit of oxide of iron, but underneath the epidermis was quite perfect, and of a light horn-color. Most of the specimens have four or five brown bands, but others are entirely without them, while others, again, are altogether deep purple inside. It has a very close resemblance to *Melania* (*Goniobasis*) *caliginosa* (nobis), but that species is cancellate, the cancellation not amounting to granulations as in *Postellii*. It is also near to *catenaria*, Say, from South Carolina, but that shell is quite cancellate. I name this after James Postell, Esq., of St. Simon's Island, to whom I owe the acquisition of many fine *mollusca*, from Georgia. Fine specimens were subsequently sent to me by Dr. Wilson, of St. Simon's Island, procured in Lewis' Creek.

## GONIOBASIS GRANATA. Pl. 38, fig. 209.

Testâ granulosâ, infernè striatâ, fusiformi, vittatâ, subcrassâ, fulgidâ, inflatâ, olivacâ vel rubiginosâ; spirâ depressâ; suturis irregulariter impressis; anfractibus instar quinis, planiusculis, ultimo pergrandi; aperturâ grandi, ovato-rhomboidê, intus valdè vittatâ; labro parum crenulato, vix sinuoso; columellâ incurvâ et contortâ.

Shell granulose, striate below, fusiform, banded, rather thick, shining, inflated, olivaceous or reddish; spire depressed; sutures irregularly impressed; whorls about five, flattish, the last one very large; aperture large, ovately rhomboidal, much

banded within; outer lip slightly crenulate, scarcely sinuous; columella bent in and twisted.

*Operculum* ovate, rather thin, dark brown, with the polar point near to the left margin above the base.

Proc. Acad. Nat. Sci., 1862, p. 272.

*Hab.*—Etowah River, near Canton Georgia, Bishop Elliott and Rev. G. White.

My cabinet and cabinets of Bishop Elliott, Mr. White, and Dr. Hartman.

Diam. .36,

Length .70 inch.

*Remarks.*—A number of specimens were sent to me by Bishop Elliott and the Rev. Mr. White; some are much more granulate than others, which are transversely striate with rugose granulations. When perfectly granulate there are three or four rows of beautiful small nodes surrounding the whorls. There are usually seven bands well marked inside, but obscure on the exterior. A single specimen is entirely brownish purple inside. It is rarely without color; usually there is a small yellowish spot at the base of the columella outside. Those sent by Mr. White are all olive-green and without an iron deposit. Those from Bishop Elliott were all covered with the black oxide of iron, which on being removed exhibit a rubiginose color, and do not show much color in the bands. In outline it is near to *Melania (Goniobasis) bellula* (nobis), but is more inflated and is striate and granose. The aperture is about one-half the length of the shell.

GONIOBASIS STEWARDSONIANA. Pl .38, fig. 210.

Testâ granulatâ, transversè striatâ, subfusiformi, crassâ, fulgidâ, inflatâ, viridi vel fuscâ, evittatâ; spirâ per-obtusâ; suturis impressis; anfractibus convexiuseulis; aperturâ pergrandi, ovato-rhomboidêâ, intus albâ; labro acuto, subsinuoso; columellâ incurvâ, supernè et infernè incrassatâ et contortâ.

Shell granulate, transversely striate, subfusiform, thick, shining, inflated, green or brown, without bands; spire very obtuse; sutures impressed; whorls slightly convex; aperture very large, ovately rhomboidal, white within; outer lip sharp, slightly sinuous; columella bent in, thickened above and below and twisted.

Proc. Acad. Nat. Sci. 1862, p. 272.

*Hab.*—Knoxville, Kentucky, B. W. Budd, M. D.

My cabinet.

Diam. .42,

Length .70 inch.

*Remarks.*—Two specimens, one perfect, the other with little more than the body whorl, were given to me long since by Dr. Budd, to whom I am indebted for many fresh water *mollusca* of our Western and South-western States, one of which, properly belonging to this genus, I called *Melania Buddii*. Of the two specimens before me the younger is almost entirely perfect, and presents a fine, smooth, dark-green epidermis with transverse striæ, which on the upper part of the whorls are broken up into

granulations. These striæ are raised and rounded, and are darker than the ground. The old specimen is of a rusty color, having been covered with oxide of iron. The aperture is more than half the length of the shell. There is some resemblance of this shell to *Melania* (*Goniobasis*) *Hydei*, Con., but that is conical, having a high granular spire.

I name this after my friend Thomas Stewardson, M. D., to whom I am indebted for many fine specimens of our Southern mollusca.

GONIOBASIS CADUS. Pl. 38. fig. 211.

Testâ cancellatâ, fusiformi, subcrassâ, inflatâ, flavescente, evittatâ; spirâ perobtusâ; suturis irregulariter impressis; anfractibus quinis, convexiusculis; supernè cancellatis; aperturâ pergrandi. ovato-rhomboidêâ, intûs albâ; labro acuto, parum sinuoso; columellâ ineurvâ, incrassatâ et contortâ.

Shell cancellate, subfusiform, somewhat thick, inflated, yellowish, without bands; spire very obtuse; sutures irregularly impressed; whorls five, slightly convex, cancellate above; aperture very large, ovately rhomboidal, white within; outer lip sharp, slightly sinuous; columella bent in, thickened and twisted.

Proc. Acad. Nat. Sci., 1862, p. 272.

*Hab.*—Georgia, Major J. Le Conte.

My cabinet.

Diam. .33,

Length .63 inch.

*Remarks.*—A single specimen has been in my possession for many years. The description was delayed in the hope of other specimens being found. It was a single one among many species, brought by our late lamented Vice-President from Georgia, which he placed in my hands. This species reminds one of *Melania* (*Goniobasis*) *Deshaysiana* (nobis), but it is entirely different in the outline and number of its whorls, being a very short shell with a very different size of aperture. The aperture is more than half the length of the shell.

Genus IO.

When I proposed, in 1831, to form the new genus *Io* for Mr. Say's *Fusus fluvialtilis*, there were no other allied species known to naturalists. I then proposed also to change the specific name to *fusiformis*, as being more appropriate, and I gave a figure under this name. At that time the canons of nomenclature were not so well understood nor so strict as they have since been; and it is only justice to Mr. Say to relinquish my specific name and replace his. Subsequently, in 1834, I proposed a new species under the name of *Io spinosa*, (Trans. Am. Phil. Soc. vol. v. pl. 19, fig. 79, Obs. vol. i. p. 224). More recently, Mr. Anthony, in the Proceedings of the Academy, (1860,) proposed four new species; three of which I think belong to the two previously established species.

Mr. Lovell Reeve, in his beautiful "Conchologia Iconica," has recently issued among his monographs one of the genus *Io* with numerous plates and full descriptions. In this he has introduced a number of species, most of which I think more appropriately belong to Prof. Haldeman's genus *Lithasia*—the species of which form a very excellent group, which he separated from *Melania* and *Anculosa*—but which Mr. Reeve does not seem to recognise. Of the true *Io* I also think he has considered several varieties as species.

*IO* NODOSA. Pl. 39, fig. 212.

Testâ tuberculatâ, elevato-conicâ, virido-corneâ, vittatâ; spirâ regulariter conicâ; suturis valdè impressis; anfractibus instar denis, planulatis, medio tuberculatis, infrâ striatis; aperturâ parviusculâ, rhomboideâ, intûs vittatâ; labro acuto et sigmoideo; columellâ albâ et valdè contortâ; canale breviusculâ.

Shell tuberculate, raised, conical, greenish horn-color, banded; spire irregularly conical; sutures very much impressed; whorls about ten, flattened, tuberculate on the middle, striate below; aperture rather small, rhomboidal, banded within; outer lip sharp and sigmoid; columella white and very much twisted; canal rather short.

*Operculum* pyriform, spiral, dark chestnut-brown, with the polar point near to the basal margin.

Proc. Acad. Nat. Sci., 1861, p. 393.

*Hab.*—Tennessee River, Alabama?\* Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .57,

Length 1.58 inch.

*Remarks.*—This is one of those species of *Melanidæ* which we have considered to belong to the group, with a regular channel at the base, like the genus *Fusus*, but which really belongs to the genus *Io*, having other characters differing from *Melania*. It is nearly allied to the species which I described as *Melania nobilis*, † in the Trans. Am. Phil. Soc., vol. x. pl. 9, fig. 48, from a single imperfect specimen. It is a smaller species, and is not so fusiform, having a shorter channel, which is not quite so much twisted, and the nodules are not so large. The aperture is more than one-third the length of the shell.

*IO* ROBUSTA. Pl. 39, fig. 213.

Testâ canaliculatâ, parum tuberculatâ, elevato-conicâ, pallido-corneâ, infrâ obsolète vittatâ; spirâ regulariter conicâ; suturis valdè impressis; anfractibus instar denis, apud apicem planulatis, infrâ canaliculatâ; aperturâ parviusculâ, rhomboideâ, intûs vittatâ; labro acuto et sigmoideo; columellâ pallido salmoneâ; canale breviusculâ.

\* Dr. Spillman simply gave Tennessee River as the habitat of these species, but did not mention what part. It is probably from Alabama.

† In transferring this to the genus *Io*, I think it may properly be considered the type of a group of the genus.



Shell canaliculate, slightly tuberculate, raised, conical, pale horn-color, obscurely banded below; spire regularly conical; sutures very much impressed; whorls about ten, flattened about the apex, channelled below; aperture rather small, rhomboidal, banded within; outer lip sharp and sigmoid; columella pale salmon color; channel rather short.

*Operculum* ovately angular, spiral, very dark brown, with the polar point near to the basal margin.

Proc. Acad. Nat. Sci., 1861, p. 393.

*Hab.*—Tennessee River, Alabama? Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .76,

Length 1.49 inch.

*Remarks.*—There are two specimens before me. Both have tubercles below the sulcate channel, but one has them much better developed than the other. The aperture within is pale salmon in both specimens, but this may not be constant. It is rather shorter in the channel than *nodosa*, herein described, and the spire is also shorter. The aperture is more than one-third the length of the shell.

IO VARIABILIS. Pl. 39, fig. 214.

Testâ lævi, elevato-conoideâ, subfusiformi, vel vittatâ vel intensè purpureâ vel virente; spirâ regulariter conoideâ; suturis leviter impressis; anfractibus iustar novenis, planulatis, in medio angulatis; aperturâ elongato-rhomboidêâ; labro acuto et sinuoso: columellâ vel albidâ vel purpureâ et valdè contortâ; canale attenuato-constrictâ.

Shell smooth, raised, conical, subfusiform, banded, deep purple or greenish; spire regularly conical; sutures slightly impressed; whorls about nine, flattened, angular in the middle; aperture elongately rhomboidal; outer lip sharp and sinuous; columella white or purple and very much twisted; canal long and narrow.

Proc. Acad. Nat. Sci., 1861, p. 393.

*Hab.*—Tennessee River, Alabama? Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .40,

Length .88 inch.

*Remarks.*—A number were received from Dr. Spillman, but they are generally young, and the older specimens were much injured in the delicate fuse and outer lip. It is a small, thin species, with a well developed nearly straight channel. It seems to be a very variable species, some individuals being of intense purple, nearly black, while others are yellowish, with numerous bands; others again are greenish, without bands. Some are carinate towards the apex, while others are free from carination. There is a disposition in several to be tuberculate along the angle on the middle of the lower whorl. Generally there is a light line along the upper part of the whorls. The aperture is nearly one-half the length of the shell.

## IO SPILLMANII. Pl. 39, fig. 215.

Testâ lævi, attenuato-conicâ, pallido-cornicâ; spirâ regulariter conicâ, supernè striatâ; suturis leviter impressis; anfractibus instar denis, planulatis, in medio obtusè angulatis; aperturâ parvâ, rhomboideâ; labro acuto et sinuoso; columellâ albâ et valdè contortâ; canale curtâ et subeffusâ.

Shell smooth, attenuately conical, pale horn-color; spire regularly conical, striate above; sutures slightly impressed; whorls about ten, flattened, obtusely angular in the middle; aperture small, rhomboidal; outer lip sharp and sinuous; columella white and very much twisted; canal short and subeffuse.

Proc. Acad. Nat. Sci., 1861, p. 394.

*Hab.*—Tennessee River, Alabama? Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .46,

Length 1.25 inch.

*Remarks.*—This species is nearly allied to *modesta*, herein described, but may be distinguished by its longer and more attenuate spire, the upper whorls being covered with regular close transverse striæ. The channel is also rather longer and more twisted. One only of four specimens received is full grown. This has, above the angle of the last whorl, a few undefined tubercles. Below this angle there are five or six well defined transverse striæ. None of the specimens have bands. Should adults generally be found with tubercles, then this species should be placed in the tuberculate group and not in the smooth one, where I have now placed it in the above description. The aperture is nearly one-third the length of the shell. I have great pleasure in dedicating this species to Dr. Spillman, who has done so much for the natural history of his own and other Southern States.

## IO MODESTA. Pl. 39, fig. 216.

Testâ lævi, conicâ, virido-cornicâ; spirâ regulariter conicâ; suturis impressis; anfractibus novenis, planulatis, in medio angulatis; aperturâ parvâ, regulariter rhomboideâ; labro acuto et sinuoso; columellâ albâ et valdè contortâ; canale curtâ et effusâ.

Shell smooth, conical, greenish horn-color; spire regularly conical; sutures impressed; whorls nine, flattened, angular in the middle; aperture small, regularly rhomboidal; outer lip sharp and sinuous; columella white and very much twisted; canal short and effuse.

Proc. Acad. Nat. Sci., 1861, p. 394.

*Hab.*—Tennessee River, Alabama? Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .39,

Length .88 inch.

*Remarks.*—I have about a dozen of various ages before me. There is no variation in them, either in color or form, but some are slightly carinate towards the apex. None have bands. The channel is short and the outer lip flattened out, so that this species closely impinges on the auger-mouthed *Melanidæ*. None before me have the

least appearance of colored bands. It is allied to *Spillmanii*, herein described, but is a shorter shell and not so attenuate. The aperture is more than one-third the length of the shell.

IO GRACILIS. Pl. 39, fig. 217.

Testâ lævi, conicâ, pallido-purpureâ; spirâ regulariter conicâ; suturis regulariter impressis; anfractibus instar novenis, planulatis, in medio angulatis; aperturâ parviuseulâ, rhomboideâ; labro acuto et sinuoso; columellâ pallido-purpureâ, valdè contortâ et deflectâ; canale curtâ et latè effusâ.

Shell smooth, conical, pale purple; spire regularly conical; sutures regularly impressed; whorls about nine, flattened, angular in the middle; aperture rather small, rhomboidal; outer lip acute and sinuous; columella pale purple, very much twisted and bent out; canal short and widely effuse.

Proc. Acad. Nat. Sci., 1861, p. 394.

*Hab.*—Coosa River, Alabama, Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .36,

Length .90 inch.

*Remarks.*—I have two adults before me. They are precisely alike, except that one has an obscure band visible in the inside. It is a graceful, symmetrical species, with a slight purplish tint, which is stronger at the base than at the apex. It is allied to *Spillmanii* on one side and to *viridula* on the other, both herein described. The epidermis is rather more shining than usual, and the channel is short and wide. The upper part of the whorls, below the line of the suture, is lighter. The aperture is about one-third the length of the shell.

IO VIRIDULA. Pl. 39, fig. 218.

Testâ lævi, cylindrico conoidâ, virente; spirâ subelevatâ; suturis parùm impressis; anfractibus instar novenis, planulatis, in medio obtusè angulatis; aperturâ parviuseulâ, rhomboideâ; labro acuto, sinuoso; columellâ ad basim purpureâ, parùm contortâ; canale curtâ et dilatâtâ.

Shell smooth, cylindrico-conoidal, greenish; spire somewhat raised; suture slightly impressed; whorls about nine, flattened, obtusely angular in the middle; aperture rather small, rhomboidal; outer lip sharp, sinuous; columella purple at the base, slightly twisted; canal short and dilate.

Proc. Acad. Nat. Sci., 1861, p. 394.

*Hab.*—Coosa River, Alabama, Wm. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .40,

Length .98 inch.

*Remarks.*—There are three adult specimens before me. Neither have a perfect spire, but the upper whorls show slight carination. There are a few obscure transverse striæ below the angle of the last whorl. The general color is of a faded dark olive green. Along the sutures the color is light. Within the aperture the color is dull purple in two specimens; in the third, there are four obscure, broad

bands. The aperture is a little more than one-fourth the length of the shell. This species has so short a channel and so dilated an outer lip, that it is little removed from the group of *Melanidæ*, which has the auger-shaped aperture, and which I have called *Trypanostoma*.

Genus TRYPANOSTOMA.

TRYPANOSTOMA DIGNUM. Pl. 39, fig. 219.

Testâ parum nodosâ, subfusiformi, suberassâ, melleâ, unifasciatâ; spirâ elevatâ, regulariter conicâ; suturis impressis; anfractibus instar octonis, planulatis, ultimo subgrandi; aperturâ ovato-rhombicâ, intus albidâ vel salmoniâ, uno-vittatâ; labro acuto, sinuoso; columellâ inflectâ, contortâ, ad basin obtusè angulatâ.

Shell slightly noduled, subfusiform, somewhat thick, honey-yellow, single-banded; spire raised, regularly conical; sutures impressed; whorls about eight, flattened, the last rather large; aperture ovately rhombic, salmon or white within, single-banded within; outer lip acute, sinuous; columella bent in, twisted, obtusely angular at the base.

Proc. Acad. Nat. Sci., 1862, p. 273.

*Hab.*—Yellowleaf Creek, Shelby County, Alabama, E. R. Showalter, M. D.

My cabinet and cabinet of Dr. Showalter.

Diam. .52,

Length 1.06 inch.

*Remarks.*—I have two specimens of this beautiful species before me. The smaller has a well-defined row of small tubercles on the middle of the whorls. The larger has an ill-defined, obscure row, which is partly made up by a raised line. Below this is a well-marked capillary, brown band, which is distinct outside and in. The clear, bright, smooth epidermis is of a honey-yellow, inclining to brown. In outline it is near to *Melania* (*Goniobasis*) *Vanuxemiana*, (nobis), but it cannot be confounded with that species. The aperture is more than one-third the length of the shell.

TRYPANOSTOMA LUTEUM. Pl. 39, fig. 220.

Testâ lævi, obtuso-conicâ, suberassâ, stramineâ, evittatâ, mucronatâ; spirâ obtuso-conicâ; suturis impressis; anfractibus octonis, convexiusculis; aperturâ parviuseulâ, rhombicâ, intus dilutè stramineâ; labro acuto, sinuoso, ad marginem incrassato; columellâ inflectâ, infernè incrassatâ et contortâ.

Shell smooth, obtusely conical, rather thick, straw color, without bands, sharp-pointed; spire obtusely conical; sutures impressed; whorls eight, somewhat convex; aperture rather small, rhombic, pale straw color within; outer lip sharp, sinuous, thickened near the margin; columella bent in, thickened and twisted below.

Proc. Acad. Nat. Sci., 1862, p. 273.

*Hab.*—South Carolina? Prof. L. Vanuxem.

My cabinet.

Diam. .34,

Length .75 inch.

*Remarks.*—Two specimens of this pretty little species were found among many shells long since given to me by my friend, the late Prof. Vanuxem. It is allied to *Vanuxemii* (nobis), but may at once be distinguished by being without bands, and being a larger and yellow species. The aperture is rather more than one-third the length of the shell.

## TRYPANOSTOMA CAROLINENSE. Pl. 39, fig. 221.

Testâ lævi, conoideâ, subcrassâ, corneâ; spirâ obtuso-conicâ; suturis impressis; anfractibus septenis, convexiusculis; aperturâ parviusculâ, rhomboideâ, intûs albidâ vel fuscescente; labro acuto, sinuoso; columellâ incurvâ inerassatâ et contortâ.

Shell smooth, conical, rather thick, horn-color; spire obtusely conical; sutures impressed; whorls seven, slightly convex; aperture rather small, rhomboidal, whitish or brownish within; outer lip sharp, sinuous; columella bent in, thickened and twisted.

Proc. Acad. Nat. Sci., 1862, p. 273.

*Hab.*—South Carolina, Prof. L. Vanuxem.

My cabinet.

Diam. .34,

Length .76 inch.

*Remarks.*—Among the mollusca brought long since by my friend, the late Prof. Vanuxem, were about a dozen of this little species. The district of the State was not given with the habitat. In some of the specimens there is a disposition to put on a purplish mark on the inside of the base of the columella. In most of the specimens there is a pale light line immediately below the suture. This species is allied to *simplex*, herein described, but may be distinguished by its being more slender, being a darker horn-color, and in having a more elongated aperture. The aperture is about one-third the length of the shell.

## TRYPANOSTOMA HENRYANUM. Pl. 39, fig. 222.

Testâ carinatâ, attenuatâ, mucronatâ, tenui, diaphanâ, pallido-corneâ, evittatâ; spirâ regulariter attenuato-conicâ; suturis regulariter impressis; anfractibus denis, planulatis, ultimo medio regulariter carinatis et striatis; aperturâ parvâ, subrhomboideâ, intûs albidâ; labro valdè acuto, sinuoso; columellâ incurvâ et valdè contortâ.

Shell carinate, attenuate, sharp-pointed, thin, semitransparent, pale horn-color, without bands; spire regularly attenuately conical; sutures regularly impressed; whorls ten, flattened, the last one regularly carinate and striate in the middle; aperture small, subrhomboidal, whitish within; outer lip very sharp and sinuous; columella bent in and very much twisted.

Proc. Acad. Nat. Sci., 1862, p. 272.

*Hab.*—Tennessee? Smithsonian Institution.

My cabinet and cabinet of Smithsonian Institution.

Diam. .29,

Length .80 inch.

*Remarks.*—Among the *Melanidæ* sent to me by Prof. Henry, Secretary of the Smithsonian Institution, were a few of this species, which I at first regarded as a variety of *Melania (Trypanostoma) uncialis*, Hald., but it is certainly a distinct species. In the spire it is very much the same, but the color is paler, and in the form of the aperture it is quite different,—*uncialis* having a retrose channel at the base, while our species curves towards the front and has a more delicate columella, and is altogether more fragile. All the specimens before me have six revolving striæ on the lower whorl, below the periphery. The aperture is not quite one-third the length of the shell. I have sincere pleasure in dedicating this species to my friend, Prof. Joseph Henry, Secretary of the Smithsonian Institution, who liberally has placed the fresh-water *mollusca* of that admirable Institution under my examination.

TRYPANOSTOMA LATIVITTATUM. Pl. 39, fig. 223.

Testâ carinatâ, subattenuatâ, subtenui, fulgidâ, tenebrosâ, latè vittatâ; spirâ conoideâ; suturis linearibus; anfractibus instar septenis, supernè planulatis, ad basim luteis; aperturâ parvâ, rhomboideâ, intùs lativittatâ; labro acuto, sinuoso; columellâ incurvâ, infernè incrassatâ.

Shell carinate, subattenuate, rather thin, shining, dark, broadly banded; spire conical; sutures linear; whorls about seven, flattened above, yellow at the base; aperture small, subrhomboidal, broadly banded within; outer lip sharp, sinuous; columella bent in, thickened below.

Proc. Acad. Nat. Sci., 1862, p. 273.

*Hab.*—Chikasaha River, Alabama, W. Spillman, M. D.

My cabinet and cabinet of Dr. Spillman.

Diam. .26,

Length .62 inch.

*Remarks.*—This is a small, gracefully-formed species, with a very broad, intensely-brown band around the middle of the whorl. There is a second narrow band immediately under the suture. The angle forming the carina is continued, is well defined on all the whorls, and immediately below it is a hair-like elevated line parallel to it. The area at the base of the columella is of a fine yellow, and contrasts sharply with the dark-brown band above. It is allied to *Chikasahaensis* (nobis), but differs in being more gracefully slender, having different bands and less impressed sutures. The aperture is about one-third the length of the shell.

TRYPANOSTOMA STRICTUM. Pl. 3, fig. 224.

Testâ carinatâ, subattenuatâ, tenui, diaphanâ, pallido-corneâ, uno-vittatâ; spirâ regulariter conicâ; suturis linearibus; anfractibus instar senis, supernè planulatis; aperturâ parviusculâ, rhomboideâ, intùs albidâ et uno-vittatâ; labro acuto, parum sinuoso; columellâ parum incurvâ et contortâ.

Shell carinate, rather attenuate, thin, semi-transparent, pale horn-color. single-

banded; spire regularly conical; sutures linear; whorls about six, flattened above; aperture rather small, rhomboidal, whitish and single-banded within; outer lip sharp, slightly sinuous; columella slightly bent in and twisted.

Proc. Acad. Nat. Sci. 1862, p. 272.

*Hab.*—South Carolina, Prof. L. Vanuxem.

My cabinet.

Diam. .24,

Length .60 inch.

*Remarks.*—Among the numerous mollusca brought from the South long since by my friend the late Prof. Vanuxem, I found a single specimen of this species, which is different from all others brought by him. I do not know from what part of South Carolina it came, but probably from Spartanberg District, as many of his specimens were from there. This is a small, very regularly formed species, in general outline near to *lativittatum*, herein described, but totally different in the band, that species having it broad and dark, while this is hair-like and pale. It is also more fusiform. The aperture is more than one-third the length of the shell.

TRYPANOSTOMA ROSTELLATUM. Pl. 39, fig 225.

Testâ striatâ, attenuatâ, subtenui, corneâ, evittatâ; spirâ elevatâ; suturis valdè impressis; anfractibus octonis, convexiuseulis; aperturâ parvâ, rhomboideâ, intus albidâ; labro acuto, valdè sinuoso; columellâ incurvâ et valdè contortâ.

Shell striate, attenuate, rather thin, horn-color, without bands; spire raised; sutures very much impressed; whorls eight, slightly convex; aperture small, rhomboidal, whitish within; outer lip very sinuous; columella bent in and very much twisted.

*Operculum* ovate, dark-brown, with the polar point near the base on the left.

Proc. Acad. Nat. Sci., 1862, p. 272.

*Hab.*—Florence, Alabama, Rev. G. White.

My cabinet and cabinets of Mr. White and Dr. Hartman.

Diam. .30,

Length .88 inch.

*Remarks.*—Quite a number of this species was among the shells sent to me by Mr. White, collected by him in the northern part of Alabama some years since. It was supposed to be a variety of *Melania (Goniobasis) proxima*, Say, but the form of the aperture is quite different, having an expanded outer lip. It is also larger, some specimens being nearly an inch long, and it has not a carina, but usually three striae, the middle one of which rises almost to a carina. In some specimens there is only a single stria, sometimes two, ordinarily three, and rarely four. Usually the upper stria is continued on the lower whorl, extending to the aperture, but rarely any of the others. The aperture is about two-sevenths the length of the shell. It is allied to *Whitei*, herein described, but is a smaller species and differs in color, striae and in the aperture.

## Genus LITHASIA.

## LITHASIA VITTATA. Pl. 39, fig. 226.

Testâ lævi, cylindraceâ, subtenui, tenebroso-corneâ, quadrivittatâ; spirâ brevi, decollatâ; suturis irregulariter impressis; anfractibus planulatis, ultimo pergrandi; aperturâ grandi, subrhomboideâ, intus albidâ et valdè vittatâ; labro acuto; columellâ incrassatâ, albâ, incurvâ.

Shell smooth, cylindrical, rather thin, dark horn-color, four-banded; spire short, decollate; sutures irregularly impressed; whorls flattened, the last very large; aperture large, rhomboidal, whitish within and much banded; outer lip acute; columella thickened, white, incurved.

*Operculum* ovate, thin, light brown, with the polar point on the inner edge near to the base.

Proc. Acad. Nat. Sci., 1862, p. 273.

*Hab.*—Coosa and Cahawba Rivers, Alabama, E. R. Showalter, M. D.

My cabinet and cabinets of Dr. Showalter and Dr. Lewis.

Diam. .40.

Length .88? inch.

*Remarks.*—This is a beautifully banded species, which is so near to *brevis* (nobis) in size and outline that I considered it at first as a strongly marked variety of that species. From examination now of about a dozen specimens before me, sent by Dr. Showalter and Dr. Lewis, I am perfectly satisfied that this is a distinct species. All the specimens I have seen have four well expressed dark brown bands, which are strongly exhibited within. All the specimens are so much worn at the apex that it is impossible to say how many whorls they naturally have. There is a great difference in the form of the apertures of the specimens before me,—some have quite an angular base, while others are rounded almost like a *Melania*. The aperture is probably two-thirds the length of the shell.

## LITHASIA DOWNIEI. Pl. 39, fig. 227.

Testâ parum nodulosâ, subcylindraceâ, castaneâ; spirâ obtusè conoideâ, subelevatâ; suturis irregulariter impressis; anfractibus septenis, planulatis, ultimo subgrandi; aperturâ subgrandi, rhomboideâ, intus vel albidâ vel vittatâ; labro acuto, sinuoso; columellâ albâ et incurvâ.

Shell sparsely nodulous, subcylindrical, chestnut colored; spire obtusely conoidal, somewhat raised; sutures irregularly impressed; whorls seven, flattened, the last rather large; aperture rather large, rhomboidal, white or banded within; outer lip sharp, sinuous; columella white and incurved.

Proc. Acad. Nat. Sci., 1862, p. 273.

*Hab.*—Cumberland River, Major T. C. Downie.

My cabinet and cabinet of Major Downie.



Diam. .44,

Length .98 inch.

*Remarks.*—This is an unusual form of *Lithasia*, and cannot be confounded with any known species. The spire is exerted like most of the *Melanidæ*, but the aperture has all the characteristics of the true *Lithasiæ*. Its most remarkable character is the formation of the few low, elongate tubercles which it possesses. These are formed by an enlargement on the middle of the edge of the outer lip at each stage of growth,—a character I have not observed in any other species of *Melanidæ*. I suspect that that this species will generally be found to be banded. One of the two specimens before me has six well-defined bands, which are indistinct on the outside, but are well marked inside. The other has only one band, and this is visible only on the upper whorls,—the aperture being whitish, with a brown, indistinct band at the base. The upper callus is well marked, and the channel below is well defined. The aperture is more than one-third the length of the shell. I have great pleasure in naming this fine species after Major T. C. Downie, to whom I owe the acquisition of many new and rare molluses.

## Genus STREPHOBASIS.

## STREPHOBASIS CARINATA. Pl. 39, fig. 228.

Testâ carinatâ, subfusiformi, inflatâ, subtenui, virente, quadrivittatâ; spirâ obtusâ; suturis valdè impressis; anfractibus senis, planulatis, ad apicem carinatis, ultimo inflato; aperturâ submagnâ, rhomboideâ, intus albidâ et vittatâ; labro acuto, parum sinuoso; columellâ incrassatâ, retrorsâ et valdè contortâ.

Shell carinate, subfusiform, inflated, rather thin, greenish, four-banded; spire obtuse; sutures very much impressed; whorls six, flattened, carinate at the apex, the last one inflated; aperture rather large, rhomboidal, whitish and banded within; outer lip sharp, somewhat sinuous; columella thickened, bent back and much twisted.

Proc. Acad. Nat. Sci., 1862, p. 273.

*Hab.*—Tennessee River, W. Spillman, M. D.

My cabinet and cabinets of Dr. Spillman.

Diam. .20,

Length .37 inch.

*Remarks.*—A single specimen, no doubt young and somewhat fractured on the outer lip, is the only one received among the shells from Dr. Spillman. The spire is perfect, and all the whorls but the lowest one are carinate. It is, perhaps, nearest to *S. Clarkii* (nobis), but may be at once distinguished by the inflated form, the size and the bands. The aperture is about one-half the length of the shell.

## STREPHOBASIS OLIVARIA. Pl. 39, fig. 229.

Testâ levi, ellipticâ, crassâ, vittatâ, tenebroso-olivâ; spirâ obtuso-conicâ; suturis valdè impressis; anfractibus instar septenis, convexis, ultimo pergrandi; aperturâ subgrandi, rhomboideâ, intus albâ et vittatâ; labro acuto, parum sinuoso; columellâ infernè incrassatâ et retrorsum contortâ.

Shell smooth, elliptical, thick, banded, dark olive; spire obtusely conical; sutures very much impressed; whorls about seven, convex, the last one large; aperture large, rhomboidal, white within and banded; outer lip acute, slightly sinuous; columella thickened below and twisted backwards.

*Operculum* ovate, very dark brown, with the polar point near the basal margin.

Proc. Acad. Nat. Sci., 1862, p. 273.

*Hab.*—Knoxville, Tennessee, J. Clark.

My cabinet.

Diam. .42,

Length .99 inch.

*Remarks.*—Some twenty specimens are before me, all having very much the same size, form and general appearance. Generally there are two broad, well-characterized bands, strongly marked on the inside and observable on the outside. Two of the specimens have no bands, one has a single band, two have four bands and three are purple inside. This species is nearest to *solida*, herein described, but it is more elliptical, less ponderous and of quite a different color,—that species being light horn-color. The aperture is about four-tenths the length of the shell.

ART. VII.—*On the Pedipalpi of North America.*\*

By HORATIO C. WOOD, JR., M. D.

## Ord. PEDIPALPI.

Respiratio pulmonaria. Maxillæ maximæ. Maxillarum palpi maximi a "manu" terminati.

Among the Pedipalpi the cephalothorax is always covered with a dorsal shield entirely separate from the abdominal scuta. In the Scorpionidæ the abdomen is continuous with the cephalothorax, whilst in the Thelyphonidæ and Phrynidæ they are united by a pedicle. In the first family the abdomen is prolonged posteriorly into a sting-bearing appendage or tail. In the second there exists merely a filiform prolongation, which in the third, still further degenerated into a mere button. The Scorpionidæ have the foremost feet well developed as such. In the Thelyphonidæ they are very slender and strikingly elongate. Whilst in the Phrynidæ they are excessively long, filiform, and multiarticulate, indeed, almost moniliform. The Scorpionidæ are provided with the so-called "combs," which are wanting in the other families. These are situated just behind the legs, one on each side of the genital opening. Their function is not exactly known—but is probably connected with the sexual act.

The most anterior of the organs connected with the mouth, in the Pedipalpi are the mandibles, the "antennes pinces" of Emile Blanchard. Their analogy and homology with the mandibles of Coleoptera are very obvious. In the Scorpionidæ they are formed of two corneous joints. Of these the posterior is very small; but the anterior is much larger and armed with both a moveable and fixed finger. The former is so articulated as to have its motion in a horizontal plane, and has its inner surface generally deeply grooved with denticulate margins. This channel receives into itself the dentate edge of the fixed finger. Among the Thelyphonidæ and Phrynidæ the first joint is wanting. The second is large and somewhat cuneate. Its lower edge as well as the fingers are generally hidden by very thick crests of long silky hairs. The movement of the upper finger is in a vertical plane. Their whole appearance re

\*This paper is founded, almost entirely, on specimens belonging to the Smithsonian Institution. For the privilege of investigating them, we would offer our thanks to Profs. Henry and Baird. For the same reasons as before influenced us, we do not consider Mexico as included in our scope.

sembles that of the cheliceres of a mygale. The "foot jaws" are situated just posterior to these. Their aspect in each of the three families is somewhat characteristic. In the Scorpionidæ they are generally without spines and are provided with a conspicuous "hand" or swollen terminal joint. In the Thelyphonidæ they are very massive, generally rather short and armed with a moderate number of often very large and robust spines. In the Phrynidæ, they are slender, more or less elongate, and mostly provided with numerous long, acute spines. They appear to us to be the analogues of the maxillæ and maxillary palpi of Coleoptera. Their first joint in the Scorpionidæ is very moveable, and doubtless fulfils the functions of maxillæ. In the Thelyphonidæ, it is fixed, but serves as a "*piece de resistance*" to the mandibles. In the Phrynidæ its motion is not at all restricted, and on the inner side there is a well marked lobe. The remainder of the foot jaws, appear to represent the maxillary palpi. They are composed of the same number of articulations as is common among beetles. If these "foot jaws" are the maxillæ with their palpi, we ought to find some trace of the ligula, which in Coleoptera is generally placed between or a little posterior to the maxillæ. Now in the Scorpionidæ and Thelyphonidæ, this exists as a hairy, membranous, conical, body, placed between the basal joints of the maxillæ. The labium is not distinguishable. The labial palpi are almost entirely atrophied. But in the Scorpionidæ along the inner side of the first maxillary joint is a hairy membranous portion, which appears to represent that organ. It is also traceable in the Thelyphonidæ, but is lost in the Phrynidæ. In some of the Staphylinidæ the labial palpi degenerate into mere filamentous appendages. It is therefore not surprising to see them so degraded among the Pedipalpes.

In the Phrynidæ posterior to the maxillæ is a corneous styloid process—we think that this represents the ligula, although apparently articulated to the sternum. For the mentum is probably in this family coalesced with, and forming the anterior portion of the sternum. In the Scorpionidæ two large processes spring from the base of the anterior pair of feet. These form the posterior boundary of the mouth and *seem* to be the mentum. Two similar plates arise from the second pair of feet, these we take to be analogous with the gula. In the Thelyphonidæ these are all consolidated into a single plate.

It will be perceived that here there are represented all the more important cephalic organs of the Coleoptera, excepting the antennæ. Now is it not possible, that the first pair of legs are misplaced and altered antennæ? The excessively elongate and filamentous legs of the Phrynidæ can be of no use as organs of progression, and must apparently fulfil the functions of antennæ, from which they do not differ in form. And even those of the Thelyphonidæ, seem scarcely fit for progress. In both of these families, this first pair of legs articulates on a different plane from the others, and entirely in front of the posternum.

## Fam. I. SCORPIONIDÆ.

Dens mandibularis horizonti in libella movens. Pedum par anticum haud elongatum, sed alteris simile. Abdominis appendix caudalis et crassis et longa.

The natural arrangement of this family is still enveloped in obscurity. De Geer in his *Memoires pour L' Hist. des Insectes* vol. vii. p. 337, divides them into "Des Scorpions de la premiere familie ou de ceux à six yeux" and "Des Scorpions de la seconde familié, ou de ceux à huit yeux." Linnæus recognized but one genus. Dr. Leach, in 1815, (*Linn. Trans.* vol. xi. p. 391,) founded a second, depending on the ocelli for his characters. Since then the list has been swelled by several authors, mostly, by the extension and development of these characters. In *Apteres*, vol. iii. 1844, (*Suites a Buffon*), M. Gervais acknowledged but one genus and various sub-genera. While Koch. (*Arachnid. Syst.*) in 1850, elevated the Scorpionidæ to the rank of an order, designating many of the *sub-genera* of Gervais, (genera of other authors,) as *families*, and indicating numerous new genera.

In 1861, Prof. Peters, (*Monatsberichte*, p. 508,) published an entirely new classification, basing it on hitherto unused characters. Whatever emanates from such authority, should be received with great deference. With our present supply of foreign specimens, we do not feel entitled to condemn it absolutely. But if we adopt it, we would necessarily propose several new sub-families and genera. This we certainly are not prepared to do, and have in this paper retained the number of ocelli as the genuine criterion.

*Synopsis of the Scorpionidæ of North America.*

## Gen. I. SCORPIUS, Oculi 6.

S. ALLENII.

## Gen. II. BUTHUS, Oculi 8.

\* *Lateral eyes arranged in a straight series. Tail armed with a basal spine to the sting.*

B. BIACULIATUS.—Color cinnamon and nearly uniform. Abdomen very strongly granulate and tuberculate. Length  $3\frac{1}{2}$  inches.

B. CAROLINIANUS.—Color fulvous, striped very dark brown. Cephalothorax maculate. Abdomen but moderately granulate and tuberculate. Length  $2\frac{1}{4}$  inches.

B. CALIFORNICUS.—Color nearly the same as in the last; cephalothorax immaculate. Abdomen strongly granulate. Length 2 inches.

\*\* *Lateral eyes arranged in a slightly curved series. Tail with a basal spine to sting.*

B. LESEUERII.—Hands very much swollen.

\*\*\* *Eyes in a straight or nearly straight series. Sting without the basal spine.*

B. EXILICAUDA.

\* \* \* \* *Lateral eyes arranged in a curved series. Sting without the basal spine.*

B. HIRSUTUS.—Body and tail very hairy. Cephalothorax with the anterior margin convex and not emarginate. Length  $4\frac{1}{4}$  inches.

B. EMARGINATICEPS.—Body and tail very hairy. Cephalothorax with the anterior margin broadly and very deeply emarginate. Length  $4\frac{1}{4}$  inches.

B. EUSTHENURA.—Body and tail moderately hairy. Hands very small and slender. Last caudal segment rather large and robust. Sting very short and robust, strongly curved.

B. BOREUS.—Body and tail scarcely at all pilose. Hand tumid. Superior crests of anterior caudal segments not terminating in a spine. Last article quite large and robust. Sting rather short and robust, but very slightly curved. Length 3 inches.

B. PUNCTIPALPI.—Hand tumid. Superior crests of anterior caudal segments terminating in a spine. Last article small and slender. Sting very long and slender, strongly curved.

B. SPINIGERUS.—Hand small, scarcely at all tumid. Superior crest of anterior caudal segments terminating in a spine. Last article large and robust. Sting short, robust, and rather strongly curved. Length  $2\frac{1}{2}$  inches.

#### Gen. III. CENTRURUS, Oculi 10.

C. PHAIODACTYLUS, Hand very much swollen.

*Species unknown to us.*

S. PUNCTATUS, De Geer.

S. MACULATUS, De Geer.

S. TESTACEUS, De Geer.

S. AUSTRALIS, De Geer.

VÆJOVIS CAROLINUS, Koch.

#### Gen. I. SCORPIO.

Oculi 6. Oculi laterales utrinque 2.

*Scorpio*, De Geer, Mem. des Insect., vol. vii. p. 337. Haud *Scorpio*, Linnæus.

*Scorpius*, Ehrenberg, Symbolæ Physiæ.

"Fam. I. *Scorpionides*." Koch Arachnideu, Syst., p. 36.

S. ALLENI.—S. saturate bruneo-castaneus, lævis, venuste politus; cephalothorace antico distincte emarginato; palpis modicis; manibus magnis, subquadrangulatis, latis, vix crenatis, sparse punctatis; digitis robustis, modice brevibus, fere rude punctatis, curvatis; oculis lateralibus fere æqualibus; cauda breve, valde crenulata; spiculo brevissimo, subuncinato, sine spinulo basali; pectinis dentibus fere 7.

*S. Alleni*, Wood, Proc. Acad. Nat. Sci. April, 1863.

The dorsum is beautifully polished, and not at all tuberculate. The palpi are of

medium size. The second joint has all of its borders, except the postero-inferior, crenulate. The third has only its supero-anterior crenate. Its anterior face is complanate; its posterior convex. The hands are rather thin, somewhat cordate, subquadrangular, and faintly marked with divisions between eight facets. The anterior border is thin and convex. The fingers are very robust, almost rudely punctate, rather short, and ornamented with a few long hairs. Their opposing margins are minutely denticulate. The tail is short; in the female not so long as the body. The first joint is broader than long. It has both the superior and the supero-lateral crests crenulate. The third and fourth have the infero-lateral also distinctly crenate. The inferior crests are crenulate on the fourth. The penultimate joint is elongate; its lower surface is tuberculate; its single median inferior and infero-lateral crests strongly dentate; the terminal joint is elongate; its superior surface is complanate and triangular; its inferior convex, and marked with a dark median stripe. The sternal plate is pentangular. It affords me great pleasure to dedicate this species to my friend and co-laborer, Dr. H. Allen, U. S. A.

Length of body, ♂ 6 lines, ♀ 9 lines: of tail, ♂ 8 lines, ♀ 8 lines.

*Hab.*—Lower California. Smithsonian Museum. J. Xantus de Vesey.

## Gen. II. BUTHUS, Leach.

Oeuli 8. Oeuli laterales utrinque 3 in serie recta vel curvata dispositi.

*Scorpio*, Linn. Syst. Nat. Ed. 12, p. 1037. (Haud. *Scorpius*, Ehrenberg.)

*Buthus*, Leach, Linn. Trans. xi., p. 391.

Gen. "*Buthus*, Leach." Sub-gen. *Heterometrus*, *Isometrus*. Hemprich et Erhenberg, Symbolæ Physicæ, Animal, Evertibrat. Scorpiones.

Fam. *Buthides*. Gen. "*Buthus*, Leach.," *Opisthophthalmus*, *Brotheus*, *Telegonus*, *Ischnurus*, Koch Uebersicht des Arachniden System, p. 36, 37.

Gen. *Scorpius*, (partim.) Sub. gen. *Atrcus*, *Buthus*, *Telegonus*, *Gervais*, Apteres iii. p. 52, 57, 59.

The study of the species of the United States, might lead one to consider this group as consisting of two distinct genera. These would correspond in a great degree with the *Buthus* and *Telegonus* of some authors. But *S. squama*, Gervais, a native of Van Dieman's Land, and *B. lesueurii* seem to unite them together.

S. BIACULEATUS.—B. saturate cinnamomeus, pedibus dilute cinnamomeis: oculis lateralibus in serie recta dispositis; cephalothorace antico late sed haud profunde emarginato, abdomineque tuberculatis, valde asperatis; illo medio valde carinato; palpis modice gracilibus, leviter pilosis, marginibus valde crenulatis, superficie antica tuberculata; manibus brevibus, nonnihil tumidis; digitis valde elongatis, robustis; pedibus compressis, granulatis, marginibus crenulatis; cauda elongata, modice gracile, marginibus valde crenulatis, interdum denticulatis; spiculo spinulo basali armato; pectinis dentibus 20-32.

*Scorpio biaculeatus* Latreille Coll. de Museum (sine description.)

*Androctonus biaculeatus*, Lucas. Hist. des Canaires par Webb et Barthelot Arach. p. 45 (according to Gervais.)

*Scorpio (Atreus) biaculeatus*, Gervais, Apteres, vol. iii. p. 54. vol. iv. pl. 23, f. 3. Exp. de l'Amerique du Sud. par M. Castelneau. Sept. part. (Myriap. et Scorp.) p. 43, pl. ii. fig. 4.

*Scorpio (Atreus) Edwardsii*, Gervais, Archiv. Mus. vol. iv. p. 216, pl. xi. fig. 13--15. Apteres, vol. iii. p. 53. Exp. dans l'Ameriq. du Sud. part. Sept. (Myriap. et Scorp.) p. 41, pl. i. fig. 1.

*Scorpio (Atreus) De Geerii*, Gervais, Archiv. Mus. vol. iv. p. 217, pl. xi. fig. 16--17. Apteres, vol. iii. p. 54. Exp. dans l'Ameriq. de Sud. part. Sept. (Myriap. et Scorp.) p.

*Scorpio (Atreus) obscurus*, Gervais, Archiv. Mus. vol. iv. p. 219, pl. xii. fig. 26. Apteres, vol. iii. p. 55.

The cephalothorax is shallowly emarginate in front. The median furrow is very deep in its posterior portion. The anterior margin is very rough and tuberculate. The median eyes are placed near to the junction of the anterior and middle third, and are surmounted by a strongly marked curved crest or brow. This extending some distance in front, becomes crenulate. The surface is very much roughened, by tubercles disposed in rows. The maxillary palpi are rather slender, with their margins strongly crenulate, or more rarely denticulate; on their anterior face are numerous spinous tubercles. The third joint has on its upper surface a very distinct, crenate ridge. But as is the case with the margins of this articulation also, the crenations are often feeble. The hand is irregularly sub-parallelopipedal with its anterior face very convex. Its postero-inferior, superior and antero-superior margins are provided with well-marked but not crenulate raised lines. The fingers are very long, but at the same time rather robust. Their opposing margins are armed with a series of central, obliquely longitudinal, imbricated rows of small teeth. On either side of these, larger ones are arranged similarly but irregularly. The abdominal scuta have their anterior surfaces minutely granulate. Their posterior roughened by numerous tubercles, which are arranged in curved series, presenting their concavities forward. The mesial keel is often crenulate. The posterior margins are provided with sub-spinous tubercles. The last true abdominal scutum presents superiorly a pair of strongly pronounced, nearly straight crenulate ridges. These, although convergent posteriorly, are generally not connected by any cross lines. In some specimens, however, reaching to the posterior margin, they are thus joined together. But near their proximal end a transverse row of crenations connects them with a more external ridge similar with and nearly parallel to themselves. The tail in the male is long and slender. In the female, both shorter and more robust. The median lateral crests exist only on the first joint. The four anterior joints have the superior, supero-lateral, the infero-lateral, and the inferior crests well developed. The inferior ridges of the fourth segment are often not crenulate. The penultimate articulation in the male is very often subcylindrical and without a crest. We have examined the young of this species from those a few lines in length to the adult. They are first of a dark purple color with a light median stripe. But they soon acquire the peculiar specific charac-



ters. They are perfectly distinct from "*Buthus vitatus*, Say," of Girard. The foregoing description is taken from Florida specimens. Those from more southern climes have the tails shorter and more massive. Their crests are more strongly pronounced and denticulate, and even serrate, and the penultimate joint shorter and less cylindrical in the male. Even in that sex it is indeed often irregularly parallelipedal, with well-marked crenulate or denticulate ridges. The last joint and sting are longer in the tropical specimens. The palpi are somewhat more hairy and more denticulate. But we have traced the gradations through all shades, from one extreme to the other. Mr. Gervais, in separating his species, seems to have relied to some extent on the number of teeth to the comb. But an extended examination has convinced us that, here, at least, this character is entirely unreliable. The geographical range is very extensive. We have seen numerous specimens from Florida, Cuba and Panama. Gervais describes it as coming from Guiana. His *S. De Geerii*, he states to be an inhabitant of Chili, Carthagenia and Santa Fe de Bogota. *S. Edwardsii* of the two latter places. *S. obscurus*, of Columbia and Guiana. So it is likely that the species is common to most of the countries of tropical America. If it is identical with *Androctonus biaculeatus* of Lucas, as seems plausible, it is also an inhabitant of the Canary Islands. The facility of its carriage from one port to another, in cargoes of lumber, &c., may, in part, account for its wide distribution.

Length of body. ♂ unc.  $1\frac{1}{2}$  ♀  $1\frac{3}{8}$  of tail ♂ unc.  $2\frac{1}{4}$  ♀ 2.

B. CAROLINIANUS.—*B. fulvus*, vitiis duabus, dorsalibus, fuscis, latis, interruptis, antice coalescentibus; cephalothorace late sed haud profunde emarginato, medio canaliculato; oculis lateralibus in serie recta positis; palpis gracilibus, superficie antica spinulis paucibus asperata, cristis leviter crenulatis; manibus vix tumidis, brevibus; digitis valde clougatis, gracilibus, curvatis; abdomine medio carinato, cauda gracile, infra vitata, minute crenulata; spiculo spinulo parvissimo instructo; pectinis dentibus 21-25; lateribus nigro-fusco.

*Scorpio carolinianus*, Palisot de Beauvois, Insect Recu. en Afrique et en Ameriq. p. 190, pl. v. fig. 3, 1805.

*Buthus vitatus*, Say, Journ. Acad. Nat. Sci. I. series, vol. ii. p. 61, haud *B. vitatus*, Guèriou, Voy. du Coquille, vol. ii. part. ii. p. 50.

?? *Scorpio Americanus*, De Gerr, Mem. vol. vii. p. 135, pl. 41, figs. 9-10.

*Scorpio (Atreus) vitatus*. "*Buthus vitatus*, Say," Girard, Marey's Report, p. 269, partim.

The cephalothorax is slightly emarginate in front. The anterior angles are rounded. The two dark stripes are so dilated and coalesced before the median eyes, as to form a well-marked triangle, with its apex directed posteriorly. The surface is very rough, uneven, and marked with lateral, oblique furrows. The lateral ocelli are of equal size, and arranged upon two converging straight lines. The median are placed a little in front of the middle of the cephalothorax. The mandibles, being light-yellow, are quite prominent. The maxillary palpi in the females scarcely equal, but in the males a little exceed the body in length. Their crests are very feebly crenulate.

The proximal end of the third joints is somewhat tumid, and has on its anterior face several tuberculoid spinules. The hands are but little larger than the preceding articulation. Their faintly pronounced crests are not crenulate. The movable finger is somewhat longer than the fixed. The opposing surfaces are armed, with both imbricated, obliquely longitudinal series of very minute tuberculoid teeth, and also a row of larger ones on either side. The sides of the body are generally fuscous, but in some specimens, perhaps from the action of alcohol, they are of a much lighter tint. The legs are light yellow, strongly compressed, more or less tuberculate, and provided with crenulate lines. The tail in both sexes is much longer than the body. The superior surface is broadly furrowed, but the penultimate segment, especially in the male, often has the upper surface rounded, and the furrow obsolete. The four anterior caudal joints are protected on each side by superior, supero-lateral, infero-lateral, and inferior minutely crenulate crests. The first has in addition to these a median lateral. The penultimate segment is much longer than either of the others, and has two supero and infero-lateral, with a single median inferior ridge. But in addition to these, it often has the rudiments of the median lateral and lateral inferior. The number of teeth composing the comb varies in the normal adult from 21-25. Beauvois originally described it as possessing only eighteen. We have seen one or two with that number, but think they are redeveloped appendages. Mr. Girard considered this species as the young of *S. biaculeatus*. Although this at the first glance appears somewhat plausible, yet the examination of a large suite of specimens has convinced us that he is mistaken. We have seen a number of immature individuals of *S. biaculeatus* all of which possessed the essential characters of the adult. The geographical range of this species is very great. From the Southern Atlantic States, it extends through Texas along that curious well-known belt of almost tropical animal life into Southern Kansas, and perhaps still farther north.

Length of body ♂  $\frac{3}{4}$  unc. ♀ unc. 1 tail ♂ unc.  $1\frac{3}{8}$  ♀ unc.  $1\frac{1}{4}$ .

B. CALIFORNICUS.—B. dilute olivaceo-fulvus, fusco vitatus; cephalothorace antico late sed haud profunde emarginato, medio valde canaliculato; oculis lateralibus in serie recta positis; palpis modice gracilibus, marginibus distincte crenulatis; manibus modice tumidis; digitis nonnihil elongatis et curvatis; abdomine medio valde carinato, tuberculis parvis valde asperato; pedibus flavis, compressis, proximis lineis elevatis vel crenulatis vel denticulatis impressis, ultimis pilosis; pectinis dentibus 21; cauda nonnihil elongata, leviter crenulata; spiculo spinulo basali parvissimo armato.

*Scorpio (Atreus) californicus*, Girard, Marey's Report.

In our single specimen the cephalothorax is yellow and immaculate, with the exception of the eye spot. It is, however, bordered with black. Anteriorly it is slightly emarginate. The surface is very rough, with the lateral grooves indistinct, but is furnished posteriorly with a curved series of tubercles on each side. Each abdominal scutum, save the last, has a well-marked curved series of tubercles on each side. The

last is three-sided, and is protected by six denticulate lines, so placed as to form triangles with one another, as in *B. carolinianus*. The median keel is more or less crenulate. The first four joints of the tail are furnished with the usual superior, supero and infero-lateral and inferior crests. They are minutely serrulate. The first joint has a well-marked median lateral raised line; the second the rudiments of it. The fifth articulation is the longest, and has the ridges obsolete. The last joint is small, and is furnished with a rudimentary spine at the base of the sting. The palpi are rather slender, but their crests are strongly pronounced and crenulate. Their inner surface is furnished with small, thick, tuberculoid spines. The hands are rather small, with several obsolete crests. The fingers are nearly twice as long. Their opposing margins are armed with median, oblique, imbricated rows of minute teeth, with a series of larger ones on either side. This species is very closely allied to the preceding, and very possibly may prove identical with it. We have seen only the type of Mr. Girard's description. It appears to differ from *B. carolinianus*, in the greater roughness of the body, in the more strongly marked denticulate crests of the tail, in the maxillary palpi having their inner surface more spinous, and their ridges more crenulate, and finally in the color.

*Hab.*—California.

*B. LESUEURII.*—*B. brunneus*; cephalothorace antico distincte emarginato, medio valde canaliculato, utrinque postice sulco curvato; oculis lateralibus in seriè fere recta dispositis; palpis gracilibus, tuberculatis, sed vix carinatis et cauda manibusque et venuste politis et aurantiis et leviter pilosis; illis valdissime tumidis, subcordiformibus, enormiter areolatis; digitis brevibus, robustis, nigro-fuscis, curvatis, marginibus opponentibus indistincte denticulatis; abdomine minutissime granulato, haud carinato; pedibus flavis, compressis; cauda breve, crasse; cristis valde crenulatis, interdum denticulatis; articulo ultimo magno, spiculo parvo sed spinulo basali armato; pectinis dentibus 8.

*B. lesueurii*, Gervais, Archiv. Mus. vol. iii. p. 226, pl. xi. fig. 27--29. Apter. vol. iii. p. 61, 62.

The cephalothorax of this elegant scorpion has its surface polished, but very minutely granulate. The median furrow is very strongly pronounced. Posteriorly, on each side, there is a sulcus so curved that the inner portion of it is longitudinal, but the outer transverse. The crests of the palpi are not all well marked. The hands are furnished with but one raised line. This placed on their posterior border, although well pronounced, is not at all crenulate. The caudal joints are both broad and very short. Their superior surface is deeply sulcate. A more or less forcibly crenulate or denticulate median lateral crest exists on the first three; sometimes feebly pronounced on the third; rudiments only on the fourth and fifth. The first four joints are all provided with superior, supero and infero-lateral and inferior crests. The supero-lateral commences by a broad, thin, but not denticulate articular process. The penultimate segment has supero and infero-lateral ridges as in the others. It has.

however, no superior, and but a single median inferior crest. Its distal extremity is furnished on its lower aspect with two curved series of denticles. One of these is semi-elliptical; the other semi-circular. The last joint is large. Its superior surface is triangular, flat, or even depressed, and provided with well developed articular processes. Its inferior aspect is somewhat tuberculate, and is furnished with two obsolete grooves, and a row of denticles around its proximal extremity.

Length of body ♂  $\frac{5}{8}$  unc. ♀  $\frac{3}{4}$  tail ♂  $\frac{3}{4}$  ♀  $\frac{5}{8}$  unc.

The only specimens that we have seen were collected in Cuba, by Mr. Wright, and presented by him to the Academy. It is possible that this species is not a native of the United States. As our description is drawn up from a foreign specimen, we append the original one of M. Gervais.

“*Scorpion de Lesueur (S. Lesueurii).*”

“Troisième paire d’yeux latéraux sur la même ligne que les autres, plus petite; céphalothorax échancré en avant, lissé, ainsi que l’abdomen et le reste du corps sauf les carènes caudales; anneaux de la queue épais et courts; une carène médio latérale sur les premier, deuxième et troisième et en rudiment sur la quatrième; une seule latéro-supère au cinquième; vésicule plus grand que l’aiguillon, aplatie en dessus, rugueuse en dessous; aiguillon subitement courbé; une épine obtusé à sa base; 8 dents au peignes; main cordiforme à doigts courts, l’immobile le plus court; couleur fauve testacé en dessus et sous la queue; dessous de l’abdomen et pieds blonds; quelques poils au palpes, aux pieds et à la queue. Long. totale 0.050.”

BUTHUS EXILICAUDA.—B. dilute aurantiaco-brunneus, interdum obscure maculatus; dorso tuberculis parvis asperato; cephalothorace antico late sed haud profunde emarginato; palpis nonnihil gracilibus, subelongatis; manibus parvissimis; digitis valde elongatis, gracilibus, curvatis; cauda gracile, nonnihil subelongata; spiculo modice longo, valde curvato, sine spinulo basali; pectinis dentibus fere 18.

*B. exilicauda*, Wood. Proc. Acad. Nat. Sci., April, 1863.

The cephalothorax is medianally canaliculate, and anteriorly broadly but very shallowly emarginate. The lateral eyes are arranged in a straight or nearly straight series. The palpi have their surface quite rough, and are somewhat elongate and slender. The second article has four minutely crenulated crests, besides minute tubercles on its anterior face. The third has five ridges, besides larger tubercles on its front surface. The anterior aspect of the hand is very convex. The posterior border is ornamented by an obsoletely crenulate ridge. The opposing margins of the fingers are armed with obliquely longitudinal imbricated rows of minute teeth, with a series of distant larger ones on either side. The caudal surface is rough. The first joint has very minutely denticulate superior, supero-, median-, infero-lateral, and inferior ridges. The next three articles have the same crests, except the median lateral. There are generally no distinct ridges on the penultimate segment. The last joint is short, and very narrow, but quite thick. Its superior aspect is not complanate; its inferior is strongly convex. The lower surface of the tail is generally marked

with a median longitudinal stripe. The sternal plate is triangular, with its apex truncate.

Length of body, ♂ 7 lines, ♀ 8 lines: of tail, ♂ 13 lines, ♀ 12 lines.

*Hab.*—Lower California. Museum of Smithsonian Institution.

*B. HIRSUTUS.*—*B. brunneus*: palpis, pedibus caudaque dilute aurantiacis, longe pilosis; cephalothorace lato, margine antico non solum haud emarginato sed etiam convexo; oculis lateralibus in serie valde curvata dispositis; palpis crassibus, marginibus nonnihil crenulatis; manibus modice tumidis, obsolete septemPLICATIS, marginibus posticis anticisque tuberculatis; digitis valde elongatis robustis, curvatis, obsolete plicatis; pectinis dentibus 25—30; abdomine nonnihil læve, haud carinato; spiculo sine spinulo basali. (Pl. 40, fig. 1, 1a, 1b, 1c.)

*B. hirsutus*, Wood. Proc. Acad. Nat. Sci., April, 1863.

The common tint of the dorsum is a very dark reddish-brown, but it varies greatly, in some specimens being as light as the legs, in others even olive. In the typical pattern, whilst the penultimate caudal segment is of the same reddish-brown as the body, the terminal is very light. The cephalothorax is broad, and has its surface minutely granulate. The median furrow is strongly pronounced, and is intersected by three transverse ones. The most anterior of these crosses it at the position of the median ocelli; the most posterior just in front of the hinder margin. Rarely these are somewhat obsolete, and sometimes they are slightly oblique. The opposing edges of the fingers are armed with obliquely longitudinal imbricated rows of small teeth, with a series of larger distant ones on each side. The surfaces of the abdominal scuta are quite smooth, but their posterior borders are tuberculate. Anteriorly they are impressed with two crescentic linear furrows. The legs are compressed and hairy; their edges are more or less crenulate. The tail is long, massive, rough and very hairy. At the proximal end of each of the first four joints, there is a pair of broad, thin, minutely denticulate articular processes. On the distal extremity of the fourth there is a nondenticulate pair. The superior, supero and median lateral crests of the first four articles are strongly but irregularly crenate. The median is evanescent, on each, anteriorly. The inferior and infero-lateral ridges are smooth on the two anterior joints, on the third they are slightly, on the fourth distinctly crenate. The supero and median lateral crests of the penultimate segment are strongly crenate; the infero lateral and median inferior strongly denticulate. The last joint is short, swollen and very hairy. Its articular processes are large, but not dentate. Its superior surface is triangular, smooth and complanate, or even depressed; its inferior is tuberculate, and traversed by two grooves on each side.

Length of body,  $1\frac{5}{8}$  inches: of tail,  $2\frac{5}{8}$  inches.

*Hab.*—California. J. Xantus de Vesey. Smithsonian Museum.

*B. EMARGINATICEPS.*—*B. olivaceo-fulvus*; palpis, pedibus caudaque longe pilosis; cephalothorace antice lato et profundissime emarginato. sed alibi. *B. hirsuti* illo simillimo; palpis crassibus; margini-

bus nonnihil crenulatis; manibus modice tumidis, obsolete septuplicatis, marginibus anticis posticisque tuberculatis; pectinus dentibus 30; abdomine nonnihil leve, medio haud carinato; spiculo sine spinulo basali. (Pl. 40, fig. 4.)

*B. emarginaticeps*, Wood. Proc. Acad. Nat. Sci., April, 1863.

The color of our single specimen is an olive yellow tint, with a very dark crescentic blotch at the position of the median eyes. But in this pattern it does not differ from some individuals of the preceding species. The cephalothorax differs from that of *B. hirsutus* only in one character: In its anterior border is a very large emargination, which reaches about one-third of the distance to the median eyes. The abdomen is precisely like the preceding species. The tail is perhaps a little less massive. But it also so closely resembles that of *B. hirsutus* the description of one will answer for the other.

Length of body,  $1\frac{5}{8}$  inches; of tail,  $2\frac{5}{8}$  inches.

*Hab.*—Lower California. J. Xantus de Vesey. Smithsonian Museum.

*B. EUSTHENURA.*—*B. aurantiae*o brunneus; dorso tuberculis minimis asperato; cephalothorace haud emarginato, medio canaliculato; oculis lateralibus utrinque in serie curvata dispositis; palpis gracilibus longis, longe sparse pilosis; manibus parvis, haud tumidis, subcylindraceis; cauda modice longa, percrassa; spiculo brevissimo, valde curvato, sine spinulo basali: pectinis dentibus fere 17.

*B. eusthenura*, Wood. Proc. Acad. Nat. Sci., April, 1863.

The surface of the cephalothorax is rough and uneven. The hands are very small and smooth, with some traces of the eight facets so distinct in *B. punctipalpi*. The fingers are about as long as the hand, rather slender, with their opposing margins armed with a row of very sharp, minute teeth, and much larger ones placed at intervals on one side of their distal portion. The legs are somewhat compressed; very long and slender. The tail, when compared with the body, is very heavy. On the first four joints the superior and supero-lateral crests are alone serrulate. The superior terminates in a spine, feebly produced on the fourth article. The inferior and infero-lateral crests are distinct, but not crenulate. The penultimate segment has well-marked but not crenate, supero and infero-lateral ridges, besides a single median inferior and median lateral on their proximal portion. The terminal joint resembles that of *B. punctipalpi*, but is much larger and thicker, and not so prolonged posteriorly. Sternal plate pentangular.

Length of body, ♂ 7 lines: of tail, ♂ 13 lines.

*Hab.*—Cape St. Lucas. J. Xantus de Vesey. Smithsonian Museum.

*B. BOREUS.*—*B. fulvus*; cephalothorace antico haud emarginato; oculis lateralibus in serie curvata positus; palpis modice gracilibus, marginibus valde crenulatis; manibus tumidis, brevibus, lineis elevatis crenulatis 8; digitis nonnihil elongatis, curvatis; abdomine medio nonnihil carinata, fere leve; cauda nonnihil brevis, denticulata, spiculo sine spinulo basali; pectinis dentibus 18; lateribus dilute flavis.

*Scorpio (Telegonus) boreus*, Girard, Marcy's Report, p. 257, pl. 17, fig. 5—7 [partim.]

The surface of the cephalothorax is much less granular and with a less strongly pronounced median keel than in *B. carolinianus*. The median eyes are anterior to its middle. The lateral ocelli are arranged in the form of arcs, with their convexity looking forwards and outwards. Overhanging them is a pair of tumid swellings. The proximal three joints of the palpi are irregularly parallelopipedal, with their angles well marked and denticulate. The proximal portion of the inner surface of the third has several small tuberculoid spines similar to but larger than those of *B. carolinianus*. The hand is considerably larger than in that species. It is marked with eight raised, faintly crenulate lines, which separate as many facets. The fingers are somewhat elongate and rather stout. Their opposing margins have a wavy outline, and are armed with a continuous series of minute teeth, with larger ones anterior to them. The anterior joints of the tail are very short. The furrow on the superior surface is deeply excavated. The first four articulations are furnished each with two denticulate or strongly crenulate superior and supero-lateral crests. The median lateral exists only in a well marked degree on the first; it also is denticulate. Each of the four has two infero-lateral and two inferior ridges. These are often illy pronounced and not crenulate. The penultimate articulation has two superior and infero-lateral and a single median inferior raised line. Sometimes the rudiments of the supero-lateral also exist. The sting is long and slender. The legs are strongly compressed and pilose. The sternal plate is pentangular. The specimen referred to by Mr. Girard as coming from Eagle Pass we have examined, and do not think identical with this species.

*Hab.*—Utah. Smithsonian Museum.

*B. PUNCTIPALPI.*—*B. aurantiaco-brunneus*; dorso tuberculis minimis asperato; cephalothorace medio canaliculato, antico nonnihil emarginato; palpis dense minutissime punctatis, nonnihil robustis; manibus magnis, tumidis, octo faciebus indistincte instructis; cauda modice longa et crasse; articulo penultimo longo; ultimo parvo, supra complanato; spiculo gracilimo, valde elongato, gradatim curvato, sine spinulo basali; pectinis dentibus fere 20.

*B. punctipalpi*, Wood. Proc. Acad. Nat. Sci., April, 1863.

All of our specimens are immaculate; some of them shade off in color towards an olive. The lateral eyes, three in number, are generally arranged in a slightly, but occasionally in a strongly curved line. The cephalothorax, and, indeed, the whole dorsum is roughened by very numerous minute tubercles. The scuta are more or less distinctly medianly keeled. The joints of the palpi are irregularly parallelopipedal, with their margins mostly well defined and crenulate. The second joint has on its anterior face one or two crenate ridges; its posterior margin is

rounded off. The hands are large, and have only their superior and inferior edges distinctly crenate. The fingers are robust and moderately long, with their opposing margins armed with a single row of teeth, with larger ones at regular intervals on one side of their distal portion. The feet are compressed. The tail is rather robust. The first three joints have their superior and supero-lateral ridges sharply serrate, and terminating posteriorly in a spine. In the fourth they are the same, except that the terminal spinule of the supero-lateral crest is wanting. The first four joints have infero-lateral and inferior crests, the former mostly distinctly, the latter indistinctly, (except on the posterior segment,) serrulate. The penultimate articulation is long, and armed with distinctly serrulate supero-lateral, infero-lateral crests, as well as a single median inferior; and on its anterior half, central lateral ridges. Its form is that of a parallelopipedon thinned at its two extremities. The superior surface of the last joint is triangular and complanate; the inferior is convex. The sting is very long, slender and gracefully curved. The sternal plate is pentangular.

Length of body, ♂ 10 lines, ♀ 12 lines; of tail, ♂ 16 lines, ♀ 14 lines.

*Hab.*—Cape St. Lucas, J. Xantus de Vesey. Smithsonian Museum.

B. SPINIGERUS.—*B. dilute olivaceo-fulvus, fusco vittatus; cephalothorace antico haud emarginato, medio canaliculato; oculis lateralibus in serie curvata positis; palpis modice robustis, marginibus valde crenulatis; manibus nonnihil tumidis, lineis elevatis obsoletis; digitis nonnihil elongatis, modice curvatis, marginibus opponentibus et dentatis et crenulatis; abdominibus mediis nonnihil carinatis; cauda modice brevis, robustissima, lineis elevatis denticulatis; spiculo sine spinulo basali; pectinis dentibus 20—25. Pl. 40, fig. 2, 2a, 2b.*

*B. spinigerus*, Wood. Proc. Acad. Nat. Sci., April, 1863.

The color of this species varies; generally each abdominal plate has a dark brown V or W-shaped marking, forming a continuous stripe on each side. This is obsolete on the cephalothorax. But this distinctness of pattern is often lost, and the whole body involved in an olive-brown tint. The palpi closely resembles those of *B. boreus*, but have the hand not so large, and the facets and elevated lines not so strongly pronounced. The opposing margins of the fingers resemble those of that species in their armature, but want the wavy outline. On each side of the abdominal median line are numerous small black tubercles, so arranged as to form more or less prominent ridges. There is also a series of these on the posterior border of each of the abdominal scuta. The legs and tail are of a dirty yellow color. The anterior four caudal joints are short and very robust, the breadth of the first three often equalling their length. These four joints are provided with denticulate superior and supero-lateral crests. In the anterior three these are of nearly the same length, and terminate distally in a small spine. In the fourth, the dorsal is



only two-thirds the length of the other raised line, and the joint is then scooped out to the level of the latter, which does not end in a spine. On the first four articulations the middle lateral crests are almost entirely obsolete. On the fifth they are more strongly pronounced. This joint is much more elongate than the others. Its supero-lateral crests are not so strongly denticulate as those of the others, and have no spine at their distal extremity. The infero-lateral and inferior crest exist on the first four joints as four black, occasionally somewhat obsolete, ridges, but are not crenulate. On the fifth both the inferior-lateral and the single median-inferior crests are denticulate. The sixth caudal joint is somewhat ovate, flattened above, and without ridges. On the lower surface there exists a faint mesial groove. The sting is slender and strongly curved.

Length of body ♂ ♀ one inch; of tail, ♀ one inch, two lines, ♂ one inch, four lines.

*Hab.*—Texas. Smithsonian Museum.

SCORPIO PUNCTATUS.—“Scorpio (punctatus) octonoculus, peetinibus 16-dentatis, manibus elongatis; digitis filiformibus; cauda corporis longitudine; aculeo basi mucronato.”

“Enfin le troisieme caractere de ce scorpion, c'est que le dernier nœud de la queue, qui est le support de l'aigulon, est ovale & garni d'arrêtes formées par des points élevés; mais ce qu'on lui trouve de remarquable, c'est qu'il se prolonge en devant & en dessous de l'aigillon en une espece de éminence comme une pointe avancée, garnie de chaque côte d'une petite épine & tout près de l'origine de ce nœud on voit au bord extérieur un petit tubercule arrondi.”

*Scorpio punctatus*, De Géer, Mem. des Insect., vol. vii. p. 343, pl. 41, fig. 1.

With this species we are not at all acquainted, nor does it seem likely that we ever shall be. We think it scarcely probable that any identification will be established. *S. punctatus*, Gervais, Apteres, vol. iii. p. 36, is probably different.

*S. MACULATUS*, De Geer, Mem. Insect., vol. vii. p. 346, pl. 41, fig. 9.

We are not acquainted with this species, which also is scarcely recognizable. The describer says, “C'est a Surinam & en Pensylvanie qu'on trouve les scorpions de cette espece”!!

The species has certainly become extinct in the latter locality since 1778!

*S. TESTACUS*, De Geer, Mem. Insect., vol. vii. p. 347, pl. 41, fig. 11.

*S. AUSTRALIS*, De Geer, Mem. Insect., vol. vii. p. 348, pl. 41, fig. 5.

### Gen. III. CENTRURUS.

Gen. *Scorpio* (partim) subgen. *Centrurus*, Gervais, Apteres, vol. iii. p. —.

Fam. *Centrurides*. Gen. *Centrurus*, *Vacjovis*, Koch, Uebers Arachnid. Syst., p. 38.

*C. PHAIODACTYLUS*.—*C. brunneo-fulvus*; cephalothorace sparse punctato, medio leviter canaliculato, antico et abbreviato et rotundato et nonnihil emarginato, postico transverse sulcato; manibus caudaque venuste politis et pedibus nonnihil pilosis; palpis robustis, angulis vel valde crenulatis vel denticulatis, articuli tertii superficie antica spinulo unico (interdum duobus); manibus valdissime tumidis, longis, indistincte octoplicatis; digitis latis, robustissimis, modice brevibus, curvatis, marginibus opponentibus acute denticulatis; pedibus flavis; abdomine læve; cauda breve, cristis superioribus obsolete, superficie superiore nonnihil minute granulata; articulo quarto haud carinato; articulo ultimo maximo, spiculo parvo sine spinulo basali; pectinis dentibus 7—9. Pl. 40, fig. 3, 3a, 3b.

*C. phaiodactylus*, Wood. Proc. Acad. Nat. Sci., April, 1863.

The cephalothorax is not produced as far anteriorly as is commonly the case. It is impressed with a faint transverse groove at the position of the median ocelli, and with another, more distinctly defined, on its posterior third. These channels separate three pairs of slightly pronounced elevations, which successively decrease in size from the first. The first joint of the palpi has all of its margins armed with distinct obtuse denticules, excepting only the postero-inferior, which is rounded and concave, and crenate only on its proximal third. The third article is much larger than the second, and has only its anterior margins crenate. Its posterior surface as well as that of the hand, is sparsely and irregularly punctate. The anterior aspect of the hand is minutely tuberculate. The first joint of the mandibles is very long, almost always extending as far forward as the cephalothorax, and often much beyond it. The distal portion of these organs, with the "pincers," is black. The median eyes are placed upon a single black elevation in the middle third of the cephalothorax. The first two lateral ocelli are somewhat smaller than the median; the third is much smaller; the fourth is at right angles to the third, and is still less. The three anterior joints of the tail are short and rather broad. Their superior crests are entirely, and their supero-lateral almost, obsolete; their inferior and infero-lateral are well marked and broadly crenate. All of the ridges of the fourth segment are obsolete. The penultimate joint is elongate and slender. Its lower surface is rough, and has two strongly, but obtusely denticulate, infero-lateral, and a single median inferior crest. The last segment is immensely swollen. Its distal portion is suddenly and very strongly contracted, and then inflated slightly again, so as to form a knob, as it were, on the base of the sting.

Length of body,  $1\frac{1}{4}$  inches; of tail,  $1\frac{1}{4}$  inches.

*Hab.*—Utah Territory. Smithsonian Museum. M. McCarthy, Esq.

*VAEJOVIS CAROLINUS*.—"Gelbraun, dunkelbraun gefleckt; die Taster rostfarbig mit rundrippigen Händen; der Schwanz ziemlich dick, oben und unten mit gezähnten Kielen.

"Läng des Vorder- und Hinterleibes  $4\frac{3}{4}$ "", des schwanzes  $6\frac{1}{2}$ "".

"Der Vorderleib hinten breit, im Ganzen nieder, oben etwas flach und schwielig, fast glauzlos; die Mittelfurche vom Vorderrande bis zum Hinterrande durchziehend, ziemlich tief, die zwei Kiele auf dem

Augenhügel etwas geglättet, letzter sich vorn und hinten gleichmassig ausspizzend; die Beulen am Hinterkopfe hinten etwas gerundet; die Seitenfalten geschwungen und ziemlich tief, vom Hinterwinkel der Beulen bis an die breiten Seitenumschläge ziehend; die Fläche des Vorderleibes bei guter Vergrößerung fein geriebelt. Die Angen in ganz geregelter Stellung.

“Die Ringschilde des Hinterleibes flach gewölbt, ohne Glanz, die Vorderrandsumschläge etwas glatt und mattglänzend, auf dem Rücken ein seichter Eindruck mit einem niedern Längskiele, am Hinterrande eine Reihe sehr feiner Körnchen; das Endschild von gewöhnlicher Gestalt; deutlich feinkörnig, hinten beiderseits mit zwei schiefen gezähnelten Längsrippen, den Vorderrandschlag nicht erreichend. Der Schwanz mattglänzend, von oben gesehen bis in die Hälfte des fünften Gliedes gleichbreit, und mit etwas tief ausgehöhlter Fläche, das fünfte Glied gegen die Spitze etwas schmaler, die Kiele aller fünf Glieder etwas hoch und geschärft, und alle fein gezähnt oder gekörnt, die untern des ersten und zweiten weinger deutlich als die andern; das Endglied länglich eiförmig, oben flach und etwas glänzend, unten bauchig mit sehr seichter aber ziemlich breiter Längsvertiefung und fein gekörnten Zwischenerhöhungen; der Stachel mässig lang und sanft gebogen. Die Taster von mässiger Länge, Vorder- und Hinterarm flach seitig mit sehr fein gekörnten Kielen des Hinterarms; die Hände am Ballen aufgetrieben, merklich dicker als der Vorderarm, etwas glänzend, mit niedern, abgerundeten Längsrippen in der gewöhnlichen Lage und mit ziemlich stark gebogenen dünnen Fingern. Die Unterseite und die Beine wie bei der vorhergehenden Art, mit welcher die gegenwärtige überhaupt viel Aehnlichkeit hat.”

“Der Kopf, die Ringschilde des Hinterleibes und der Schwanz gelbbraunlich, erster dunkelbraun gefleckt, auf letztem vor dem Hinterrande ein dunkelbrauner Querstreif und überdiess mit dunkelbrauner Mischung; die Kiele des Schwanzes etwas dunkler als die übrige Fläche, das Endglied des letztern rostroth, mit dunkler rostrother Spitze des Stachels. Die Taster gelbbraunlich mit dunklern Kielen an den Gliedern bis zur Hand; die Hände dunkler, aufs Rostbraune ziehend, die Finger an der Wurzel dunkler als die Handfarbe, an der Endhälfte ins Gelbe übergehend. Unterseite des Vorder- und Hinterleibes gelb, mit olivengelblichem Anstriche, die Brnstkämme hellgelb, die Beine gelb, etwas heller als die Bauchfarbe.”

“Vaterland, Nord Amerika, Carolina.”

This description is copied from Hoch's Arachniden. Bd. x. s. 7, f. 759. It probably refers to *Scorpio carolinianus*.

## Fam. II. *THELYPHONIDÆ*.

Dens mandibularis in plana verticale movens. Pedum par anticum valde elongatum, sed haud antenniforme. Abdominis appendix caudalis elongata, gracillima.

### Gen. I. *THELYPHONUS*.

Oculi 8. Oculi medii 2, in cephalothoracis fronte positi. Oculi laterales utrinque 3 in serie triangulare dispositi.

*Thelyphonus*, Latreille. Histoire Naturelle des Crust., tome vii. p. 130, 1804. Gervais, Apteres, vol. iii. p. 9.

In this genus the cephalothorax has its carapace or dorsal shield more or less irregular, minutely tuberculate or granulate, and very generally medianly canaliculate.

• Posteriorly, in the median line, there exists a depression, mostly well-marked, from which radiate obsolete grooves. Anteriorly the carapace is rapidly narrowed, but it is possessed of a vertical aspect elsewhere wanting, having a sharp edge between it and the upper surface. The median pair of eyes are situated on a tubercle. They are sensibly larger than the lateral. At the hinder end of the edge formed by the folding down of the dorsal shield, spoken of above, are the posterior or lateral eyes, arranged in the form of a triangle, three on each side. The upper surface of the abdomen is generally roughened, like the cephalothorax. The lower surface smooth. The specific characters are principally founded on the aspect and armature of the maxillary palpi. There has as yet only a single species been found in the United States.

*T. GIGANTEUS*.—*T. saturate* rubro-castaneo; cephalothorace enormiter subrude punctato; palpis crassis, maximis, rude punctatis, in femina longis, in mare longissimis; articulo secundo supra quinque spinoso, infra bispinoso; tertio et supra et infra unispinoso; quarto supra spina maxima longissimaque, spinæ marginibus antico et postico denticulato; quinto extra spina maxima et crassissima, spinæ marginibus et antico et postico denticulato; digito crassissimo, infra et supra valde denticulato.

*Thelyphonus giganteus*, Lucas, Magazin de Zoologie (Guerin) 1835, cl. viii. pl. 8. Gervais, Apteres, iii. p. 12. Koch Arachniden. Bd. x. p. 21, Fab. 331, fig. 767, et Fab. 332, fig. 768.

*Thelyp. excubitor*, Girard, Marcy's Report of Explorations of Red River, p. 265, fig. xvii. 1-4.

The general color of this species is very deep reddish-chestnut. The ventral surface is much lighter than the dorsal. The sides of the abdomen of the female when distended with eggs, are of a fawn tint, spotted with black. The cephalothorax is very rough, with its surface irregularly rudely punctate, or perhaps more properly excavated. It has an interrupted mesial groove. The maxillary palpi are very massive and long. In the female they are much longer than in the male. The former sex is the *Thelyp. excubitor* of Girard. This we have proven by the dissection of a number of individuals; a figure of each sex is given by Koch. The first or immovable joint of the palpi has its anterior spine large and curved. The second has its superior surface expanded anteriorly into a broad, spine-like process. The curved margin of this is armed with five short stout spines. The third joint, superiorly, is provided with a robust spine, inferiorly with one generally fully a line in length. The legs are stout, tuberculate, and sparingly pilose. The abdomen is distantly, coarsely, and thickly minutely punctate. The larger punctations on the superior surface are often quite peculiar, appearing somewhat like the teeth of a rasp, as if they had been punched out.

*Hab.*—South Western United States, Mexico.

Fam. III. *PHRYNIDÆ*.

Deus mandibularis in plana verticale movens. Abdominis sine appendice. Pedum par anticum elongatissimum, anteaniforme.

Gen. *PHRYNUS*.

Oculi 8. Oculi laterales utrinque, 3, in serie triangulare dispositi.

The cephalothorax in this genus is very broad and more or less reniform. It is perhaps not quite so rough as in the genus *Phrynus*. The important specific characters are mostly drawn from the maxillary palpi. There is as yet no species known to exist within the United States; but we append the description of an unknown form brought from Lower California by Mr. Xantus.

*P. ASPERATIPES*.—*P. dilute aurantiacus saturate rubido-brunneo maculatus*; cephalothorace lato, reniforme, abdomineque tuberculis parvis sparsis et granulis minutis numerosis asperatis; palpis magnis, latis, nonnihil semi-cylindratis; articuli secundi superficie antica et spinulis parvis numerosis et uno vel duobus majoribus armata; articuli tertii margine superiore spinis 4, inferiore spinis 5; articuli tertio quartique superficiebus posticis tuberculis parvis spinosis in seriebus rectis dispositis armatis; illius margine superiore ultimo spinis maximis 3 et 2—3 modicis instructo; margine inferiore spinis magnis 2 et 2—3 parvis armato; articulo quinto spina maxima unica et spinulis modicis duobus instructo; femoribus tuberculis spinosis numerosis asperatis.

*P. asperatipes*, Wood. Proc. Acad. Nat. Sci., April, 1863.

The color of our single specimen is a very light orange. The cephalothorax has a median longitudinal sulcus distinct anteriorly, but evanescent posteriorly. A short distance behind the centre of the cephalothorax is a well defined transverse groove, extending nearly across one-third of its breadth. Posterior to this, and connected with it by the median sulcus (here very well marked), is a transverse furrow similar to the other, but only about one-third its length. The three sulci are of a dark-brown tint. Besides these, there are on each side of the cephalothorax four dark, but more or less obsolete grooves. At the position of the lateral eyes on each side there exists a dark-brown spot, and between them and the anterior transverse groove is a pair of similarly colored round depressions. The maxillary palpi are of a more decided orange than the body. The second joint has its anterior face armed with eight or ten very small spines or spinous tubercles, and one or two larger ones. The spines on the lower margin of the third joint are longer than those on the upper. On each, the two nearest the body are much larger and more closely approximated than the others. Between the margins are a few very small spinules. The spinous tubercles on the upper portion of the posterior surface are more numerous than those on the lower. The fourth joint is

dilated superiorly in its distal portion; where on the upper margin are placed three very long acute spines, with two or three much smaller ones. The lower margin has five spines, three of them being much smaller than the other two. The moveable finger is very long and acute. The upper surface of the abdomen has along the mesial line a double row of dark-brown spots, and on either side a series of blotches of the same color,—one on each scutum. The legs and sides of the abdomen are very rough. The under surface of the abdomen is smooth.

*Hab.*—Lower California. Smithsonian Museum. J. Xantus de Vesey.

ART. VIII.—*New Exotic Unionidæ.*

By ISAAC LEA.

Most of the species described in this paper are from South America, and nearly the whole of these were collected by Prof. J. Wyman. A few are from Asia, presented by various friends, to whom they are duly credited.

During the winter of 1858-59, R. B. Forbes, Esq., of Boston, whose name has been identified with so many works of philanthropy and public utility, organized an excursion to the La Plata, Uruguay and Rio Negro Rivers in South America; his object in part being to afford facilities for studying the natural history of the countries bordering on those waters. Prof. Wyman, who accompanied him, has most kindly placed at my disposal all the specimens of the *Unionidæ* which he had been enabled to collect in these extensive southern fresh waters. In this very interesting collection I was surprised to find so many species which had not been before observed. These are now herein described, and consist of eleven *Uniones* and four *Anodontæ*. The whole number brought of these fresh water Molluscs was twenty-three species. Those heretofore described are *Prisodon truncatus*, Schum., (*Castalia ambigua*, Lam.,) *Unio Paranensis*, Lea, *U. parallelopipedon*, Lea, *Anodonta rotunda*, Spix, *A. trapezalis*, Lam., *A. lato-marginata*, Lea, *A. tenebricosa*, Lea, *A. Blainvilliana*, Lea. In addition there were three small species of *Cyrena*, two of which I have not ascertained, the third is the *variegata* of d'Orbigny. There was also a small species of *Cyclus*.

## UNIO ÆTHIOPS. Pl. 41, fig. 285.

Testâ lævi, oblongâ, subinflatâ, ad laterè planulatâ, valdè inæquilaterali, posticè biangulatâ, anticè rotundatâ; valvulis crassiusculis, anticè erassioribus; natibus prominulis, planulatis, ad apices divaricatè undulatis; epidermide micante, nigrâ, striatâ, eradiatâ; dentibus cardinalibus parvisculis, compressis, obliquis, suberectis crenulatisque; lateralibus prælongis, crenulatis rectisque; margaritâ albâ et iridescente.

Shell smooth, oblong, somewhat inflated, flattened at the side, very inequilateral, biangular behind, rounded before; valves somewhat thick, thicker before; beaks somewhat prominent and flattened, with diverging undulation at the tips; epider-

mis shining, black, striate and without rays; cardinal teeth rather small, compressed, oblique, suberect and crenulate; lateral very long, crenulate and straight; nacre white and iridescent.

*Hab.*—Uruguay River, South America, Prof. J. Wyman.

My cabinet.

Diam. .7,

Length 1.1,

Breadth 2 inches.

Shell smooth, oblong, somewhat inflated, flattened at the side, very inequilateral, biangular behind, rounded before; substance of the shell somewhat thick, thicker before; beaks somewhat prominent and flattened, with diverging undulations at the tips; ligament rather long, thin and light-brown; umbonial slope somewhat raised and obtusely angular; posterior slope long elliptical, somewhat wrinkled, with a moderate carina; cardinal teeth rather small, compressed, oblique, suberect, crenulate and double in both valves; lateral teeth very long, crenulate and straight; anterior cicatrices rather small, well impressed, confluent with the lower, but distinct from the upper; posterior cicatrices rather large, confluent and slightly impressed; dorsal cicatrices placed nearly in the centre of the cavity of the beaks; cavity of the shell rather deep and wide; cavity of the beaks very shallow and rounded; nacre white and iridescent.

*Remarks.*—A single specimen only was received of Prof. Wyman, and this not very perfect. The beaks are very much eroded, but yet are perfect enough to show some of the undulations which still remain in the nacre, while the epidermis is removed. While it reminds one of a half-grown *parallelopipedon* (nobis), it is by no means so wide. In outline it really is closer to *Mississippiensis*, Con., but it differs in color entirely, that shell being beautifully rayed, while this apparently has no rays whatever. It is also higher in the umbonial slope, and the cardinal teeth are smaller and more compressed.

#### UNIO FUNEBRALIS. Pl. 41, fig. 286.

Testâ lævi, subrotundâ, compressissimâ, inæquilaterali, anticè et posticè rotundatâ; valvulis crassis, anticè crassioribus; natibus prominulis, compressis; epidermide nigricante, striatâ, ad apices micante, eradiatâ; dentibus cardinalibus parviusculis, subcompressis, tripartitis; lateralibus sublongis valdè curvisque; margaritâ vel albâ vel salmonis colore tinetâ.

Shell smooth, subrotund, very much compressed; inequilateral, rounded before and behind; valves thick, thicker before; beaks somewhat prominent, compressed; epidermis blackish, striate, shining at the beaks, eradiate; cardinal teeth rather small, rather compressed, tripartite; lateral teeth rather long and very much curved, nacre white or salmon color.

*Hab.*—Uruguay River, South America, Prof. J. Wyman.

My cabinet.



Diam. .8,

Length 2.6,

Breadth 2.9 inches.

Shell smooth, nearly round, very much compressed, inequilateral, rounded before and behind; substance of the shell thick, thicker before, with a very broad, thick basal margin; beaks somewhat prominent and compressed; ligament short, rather thick and dark-brown; umbonial slope scarcely raised and rounded; posterior slope compressed and raised into a carina; cardinal teeth rather small, rather compressed, divided into three lobes in the right valve and crenulate; lateral teeth rather long, very much curved, forming an arch at the plate posterior to the cardinal teeth; anterior cicatrices rather small, well impressed, confluent with the lower but distinct from the upper; posterior cicatrices rather large, confluent and very slightly impressed; dorsal cicatrices well impressed, and placed within the cavity of the beaks; cavity of the shell very shallow and wide; cavity of the beaks very shallow and subangular; nacre white or salmon color.

*Remarks.*—This is a very remarkable species, being exceedingly compressed and nearly round. Its thick, black epidermis is very uncommon, and this thickness causes it to peel off in flakes. The form of the cardinal teeth is very unusual, being treble in both valves, while the lateral tooth has the normal character of the *Unio* in being double in the left and single in the right valve. The great thickness and width of the basal margin below the palléal cicatrix is very striking. It exceeds *Paranensis* (nobis) in that respect, while it has other characters closely in relation. The rotundity is nearly the same, but it differs in the teeth, in the color of the epidermis and in being more compressed. It belongs, of course, to the group of which *Paranensis* may be considered the type. In the two specimens before me both have the beaks much eroded, and therefore the character of the tips cannot be given; but I have no doubt this will be found to have radiate undulations. One of the specimens has a white nacre, the other is slightly salmon color. The interior of the cavity, from the palléal cicatrix, in both specimens, is covered with epidermal layers, giving a greenish hue to nearly the whole surface.

## UNIO PICEUS. Pl. 41, fig. 287.

Testâ lævi, ellipticâ, subinflatâ, valdè inæquilaterali, posticè subrotundatâ, anticè obliquè rotundatâ; valvulis crassiusculis, anticè aliquantò crassioribus; natibus prominulis; epidermide micante, nigrâ, striatâ, obsoletè radiatâ vel eradiatâ; dentibus cardinalibus parviusculis, compressis, obliquis, in valvulo sinistro singulis; lateralibus sublongis subcurvisque; margaritâ cæruleâ albâ et iridescente.

Shell smooth, elliptical, somewhat inflated, very inequilateral, somewhat rounded behind and obliquely rounded before; valves somewhat thick, slightly thicker before; beaks slightly prominent; epidermis shining, black, striate and obscurely rayed, or without rays; cardinal teeth rather small, compressed, oblique, single in the left valve; lateral teeth rather long and somewhat curved; nacre bluish white and iridescent.

*Hab.*—Uruguay River, South America, Prof. J. Wyman.

My cabinet and cabinet of C. M. Wheatley.

Diam. .7,

Length 1.1,

Breadth 1.8 inch.

Shell smooth, elliptical, somewhat inflated, very inequilateral, somewhat rounded behind and obliquely rounded before; substance of the shell somewhat thick, slightly thicker before; beaks slightly prominent; ligament small and dark-brown; epidermis shining, black, striate and obscurely rayed, with rather distant marks of growth; umbonial slope somewhat raised and rounded; posterior slope compressed, elliptical, with an obscure furrow on each valve; cardinal teeth rather small, compressed, lamellar, oblique, single in the left and double in the right valve; lateral teeth rather long, somewhat thin and curved; anterior cicatrices rather small, well impressed, confluent with the lower but distinct from the upper; posterior cicatrices confluent, rather large and slightly impressed; dorsal cicatrices well impressed, and placed across the cavity of the beaks; cavity of the shell rather deep and wide; cavity of the beaks shallow and rounded; nacre bluish white and iridescent.

*Remarks.*—There were three specimens among the shells from Prof. Wyman. They all differ slightly in the ellipticity of outline. One being a little wider and the other not quite so much so as that figured. It is very near to *lugubris* (nobis) in outline and in the blackness of the epidermis, but in the nacre it differs entirely, as it does in the cardinal teeth. It is also very near in outline to *lepidus*, herein described. The single cardinal tooth in the left valve is very unusual. The blackness of the epidermis is very striking and apparently it is without rays. In looking through the valve the hue is greenish, and one of the specimens exhibits obscure rays. The beaks of all the three are eroded, and I cannot therefore describe the undulations of the tips. From indications in the exposed nacre I have no doubt that this species has diverging undulations at the tips. The transverse striæ are coarse, almost amounting to sulcations. The cardinal are nearly on the same curve with the lateral teeth.

UNIO NOCTURNUS. Pl. 42, fig. 288.

Testâ lævi, subrotundâ, subcompressâ, inæquilaterali, anticè et posticè rotundatâ; valvulis crassis, anticè crassioribus; natibus prominulis, subinflatis; epidermide nigricante, anticè rugoso-striatâ, eradiatâ; dentibus cardinalibus parviusculis, erectis, subcompressis, in utroque valvulo duplicibus; lateralibus sublongis valdè curvisque; margaritâ vel albâ vel salmonis colore tinctâ.

Shell smooth, subrotund, somewhat compressed, inequilateral, rounded before and behind; valves thick, thicker before; beaks somewhat prominent and a little inflated; epidermis blackish, roughly striate before and without rays; cardinal teeth rather small, erect, rather compressed, double in both valves; lateral teeth rather long and much curved; nacre white or salmon color.

*Hab.*—Uruguay River, South America, Prof. J. Wyman.

My cabinet.

Diam. 1·2,

Length 2·2,

Breadth 2·8 inches.

Shell smooth, subrotund, somewhat compressed, inequilateral, rounded before and behind; substance of the shell thick, thicker before; beaks somewhat prominent and a little inflated; ligament rather small and dark-brown; epidermis blackish, roughly striate before and without rays; umbonial slope slightly raised and rounded; posterior slope compressed, slightly sulcate on each valve; cardinal teeth rather small, erect, rather compressed and double in both valves; lateral teeth rather long, very much curved, and forming an arch at the plate anterior to the cardinal tooth; anterior cicatrices rather small, well impressed, confluent with the lower but distinct from the upper; posterior cicatrices rather large, confluent and very slightly impressed; dorsal cicatrices in a long row across the centre of the cavity of the beaks; cavity of the shell somewhat shallow and wide; cavity of the beaks rather shallow and obtusely angular; nacre white and salmon color.

*Remarks.*—Two specimens and a large odd valve are before me. This species is closely allied to *funeralis*, herein described, and of course belongs to the group of which *Puranensis* is the type. It differs from *funeralis* in being more inflated, in having a less palleal border, in having a darker epidermis and in the cardinal teeth being more lobed. Like it, one of the specimens is disposed to be salmon colored, and also to have much epidermal matter deposited on the inside, in anticipation of erosion. In outline it is very close to *variabilis*, (Mya) Maton, but it has a rougher and much darker epidermis, and it is not so high in the carina of the posterior slope. The superior anterior cicatrix is well impressed and separate from the great anterior adductor cicatrix,—a character usual to the South American species. Neither of the specimens have beaks sufficiently perfect to show costæ on the tips, if they belong to the species, which no doubt is the case.

UNIO WYMANII. Pl. 42. fig. 289.

Testâ lævi, anticè subsuleatâ, quadratâ, compressâ, ad latere planulatâ, inæquilaterali, posticè obtusè angulatâ, anticè rotundatâ; valvulis suberassis, anticè crassioribus; natibus prominulis, ad apices divaricatè undulatis; epidermide tenebroso-olivâ, vel radiatâ vel obsolete radiatâ; dentibus cardinalibus compressis, erectis, crenulatis, in utroque valvulo duplicibus; lateralibus longis, crenulatis subcurvisque; margaritâ argenteâ et valdè iridescente.

Shell smooth, somewhat sulcate before, quadrate, compressed, flattened at the sides, inequilateral, obtusely angular behind and rounded before; valves rather thick, thicker before; beaks somewhat prominent, with diverging undulations at the tips; epidermis dark olive, without rays, or obscurely rayed; cardinal teeth

compressed, erect, crenulate, double in both valves; lateral teeth long, crenulate and slightly curved; nacre silver-white and very iridescent.

*Hab.*—Uruguay River, South America, Prof. J. Wyman.

My cabinet.

Diam. 1.1,

Length 1.9,

Breadth 2.9 inches.

Shell smooth, somewhat sulcate before, quadrate, compressed, flattened at the sides, inequilateral, obtusely angular behind and rounded before; substance of the shell rather thick, thicker before; beaks somewhat prominent, with diverging undulations at the tips extending but a short distance; ligament rather long, somewhat thick and light-brown; epidermis dark-olive, striate, subsulcate, without rays or very obscurely rayed, disposed to be darker on the posterior half, with somewhat distant marks of growth; umbonial slope slightly raised and rounded; posterior slope elevated into a well-defined carina, with one indistinct impressed line in each valve from the beak to the posterior margin; cardinal teeth compressed, erect, crenulate, double in both valves; lateral teeth long, crenulate and slightly curved; anterior cicatrices confluent, well impressed; posterior cicatrices confluent and very slightly impressed; dorsal cicatrices placed in a row across the cavity of the beaks; cavity of the shell rather shallow and wide; cavity of the beaks shallow and rounded; nacre white and very iridescent.

*Remarks.*—This species is near to *U. Uruguayensis*, herein described, and belongs to that group of which *luteolus*, Lam., may be considered the type. It is more compressed and more quadrate than the latter, but has the same divergent undulations, is of nearly the same color in the nacre and epidermis, and is about the same size. The nacre is of a remarkable brilliant silvery white. The larger of the two specimens before me is disposed to be trifid in both cardinal teeth; but this character will, I think, be found not to be common. I have great pleasure in naming this species after my friend Prof. J. Wyman, who liberally placed in my hands all the specimens of *Unionidæ* which he collected during his voyage to Uruguay.

UNIO GRATUS. Pl. 43, fig. 290.

Testâ lævi, subrotundâ, subinflatâ, inæquilaterali, anticè et posticè rotundatâ; valvulis subcrassis, anticè aliquantò crassioribus; natibus subprominentibus, ad apices divaricatè undulatis; epidermide tenebroso-fuscâ, micante, obsoletè radiatâ; dentibus cardinalibus parviusculis, compressis striatisque; lateralibus sublongis subeurvisque; margaritâ albâ et iridescente.

Shell smooth, subrotund, somewhat inflated, inequilateral, rounded before and behind; valves somewhat thick, rather thicker before; beaks a little prominent, with diverging undulations at the tips; epidermis dark-brown, shining, obsoletely rayed; cardinal teeth rather small, compressed and striate; lateral teeth rather long and somewhat curved; nacre white and iridescent.

*Hab.*—Uruguay River, South America, Prof. J. Wyman.

My cabinet.

Diam. .8,

Length 1.4,

Breadth 1.9 inch.

Shell smooth, subrotund, somewhat inflated, inequilateral, rounded before and behind, slightly flattened on the sides; substance of the shell somewhat thick, rather thicker before; beaks a little prominent, with diverging undulations at the tips; ligament short, rather thin and dark-brown; epidermis dark olive-brown, striate, somewhat shining, with distant marks of growth; umbonial slope inflated and rounded; posterior slope rather contracted, slightly sulcate, raised into a well-defined carina; cardinal teeth rather small, compressed, striate and somewhat lamellar; lateral teeth rather long, somewhat curved and terminating somewhat abruptly; anterior cicatrices rather large, well impressed, confluent with the lower, but distinct from the upper; posterior cicatrices rather large, confluent and slightly impressed; dorsal cicatrices placed across the centre of the cavity of the beaks; cavity of the shell rather shallow and wide; cavity of the beaks shallow and rounded; nacre white and iridescent.

*Remarks.*—This species is of a graceful form and appearance, and probably is never large. A single specimen only was received, which has four distinct growths. It is two inches wide. Its outline is disposed to be subtriangular, but it belongs more to the subrotund group, which so much prevails in South America. In this specimen the posterior portion of the cardinal teeth in both valves is slightly divided so as to give it at that point the appearance of the small teeth of the genus *Tellina*. This may not, however, be found to be characteristic and prevail in other individuals. There is a slight disposition in the thickened part of the nacre of this specimen to be yellowish. The beaks are not entirely perfect, but they display diverging undulations for a short distance to exist. The very obscure rays which may be observed by close inspection in this specimen, are accompanied by very obscure raised lines, which pass from the undulations of the beaks to the basal margin. This character is not uncommon in some of the South American subrotund species, but it does not prevail as a permanent character, I believe, with any of the species. This species is less rotund than any of the rotund group in this paper, and it is higher over the umbonial slope and the portion anterior to it. It is not very far removed from *patelloides*, herein described, but is not so lenticular as that species.

UNIO PATELLOIDES. Pl. 43, fig. 291.

Testâ lævi, subrotundâ, subcompressâ, subæquilaterali, anticè et posticè rotundatâ; valvulis suberassis, anticè crassioribus; natibus prominulis, ad apices divaricatè undulatis; epidermide tenebrosocastaneâ, striatâ, eradiatâ; dentibus cardinalibus longis, compressis, obliquis, crenulatis corrugatisque; lateralibus longis, crenulatis curvisque; margaritâ argenteâ et iridescente.





brown, minutely striate and obscurely rayed; cardinal teeth rather small, lamellar and crenulate; lateral teeth rather long, striate and curved; nacre white and iridescent.

*Hab.*—Uruguay River, South America, Prof. J. Wyman.

My Cabinet.

Diam. .5,

Length 1.3,

Breadth 1.5 inch.

Shell smooth, subrotund, very much compressed, very inequilateral, rounded before and behind; substance of the shell somewhat thick, slightly thicker before; beaks a little prominent with divergent undulations; ligament rather short, thin and light-brown; epidermis dark chestnut-brown, minutely striate, obscurely rayed and with distant marks of growth; umbonial slope very slightly raised and rounded; posterior slope narrow, raised into a well formed carina; cardinal teeth rather small, lamellar, striate, crenulate; and disposed to be much divided; lateral teeth rather long, arched, striate, curved and truncate at the end; anterior cicatrices small, well impressed, confluent with the lower and distinct from the upper; posterior cicatrices confluent and very indistinct; dorsal cicatrices well impressed and placed in a row across the centre of the cavity of the beaks; cavity of the shell very shallow and very wide; cavity of the beaks shallow and rounded; nacre white and iridescent.

*Remarks.*—A single specimen only was brought by Prof. Wyman. It is probably not full grown, being only about one and half inch in length and breadth, and bearing the appearance of not being adult. The nacre is a rich white with the posterior portion disposed to golden-yellow. It is nearly allied to *Paranensis* (nobis) in outline, but it is probably a much smaller species, is not inflated like that species, nor has it the polished epidermis. It also closely resembles in outline *Fontainiana*, D'Orb., and *rotundum*, Spix, but it is more circular than either, and has a higher carina on the posterior slope. The divergent undulations of the tips are small, and do not extend to any distance. The epidermis is so finely striate that it has a satin-like aspect. The striation is fuller near to the margin.

#### UNIO TRIFIDUS. Pl. 44, fig. 295.

Testâ lævi, obliquo-oblongâ, ad latere planulatâ, valdè inæquilaterali, posticè acutè angulatâ, anticè rotundâ; valvulis crassiusculis, anticè crassioribus; natibus prominentibus, ad apices asperè et divaricatè undulatis; epidermide micante, luteo-viridi, eradiatâ; dentibus cardinalibus grandibus, trifidis, sulcatis; lateralibus longis, crenulatis, in valvulo dextro trifidis; margaritâ argenteâ et iridescente.

Shell smooth, obliquely oblong, flattened at the side, very inequilateral, acutely angular behind and round before; valves rather thick, thicker before; beaks prominent, with divergent coarse undulations at the tips; epidermis shining, yellowish-green, eradiate; cardinal teeth large, trifold, sulcate; lateral teeth long, crenulate, and trifold in the right valve; nacre silver-white and iridescent.



*Hab.*—Buenos Ayres, South America, M. D'Orbigny.

My cabinet.

Diam. .6,

Length 1.8,

Breadth 1.6 inch.

Shell smooth, obliquely oblong, flattened at the sides, and enlarged towards the anterior margin, very inequilateral, acutely angular behind and round before; substance of the shell rather thick, thicker before; beaks prominent, with divergent coarse undulations at the tips; ligament rather long, thin and light-brown; epidermis shining, yellowish-green, with dark green transverse bands, without rays, and with rather distant marks of growth; umbonial slope raised into a somewhat acute angle; posterior slope rather narrow, somewhat flattened, and furnished with undulations towards the beaks; cardinal teeth large, *trifid in both valves*, sulcate and crenulate; lateral teeth long, crenulate, *trifid in the right valve*, and double in the left; anterior cicatrices small, well impressed, confluent with the lower, but distinct from the upper; posterior cicatrices well impressed and confluent; dorsal cicatrices placed across the centre of the cavity of the beaks; cavity of the shell shallow and wide; cavity of the beaks shallow and rounded; naere silver-white and iridescent.

*Remarks.*—A single specimen was sent to me many years since by M. D'Orbigny as a young *Burroughianus* (nobis), but I have always been satisfied that it was distinct from that species of which I have a good suite of nearly all ages. It is certainly closely allied to it, being of the same greenish color, with yellowish and green bands, and nearly the same kind of large divergent undulations or costæ at the beaks. It differs, however, in being oblong, while the other is elliptical, and in the cardinal and lateral teeth there is a very remarkable difference, the *Burroughianus* being of the normal type, while this species has the aberrant form of being *trifid*. It is also flattened on the sides, while the other is inflated there. There is another South American species which it reminds one of—the *parallelopipedon* (nobis.) Like that species it is green, is enlarged at the anterior region, and has transverse bands, but it is not by any means so transverse, nor of so dark a green, nor does it agree in the teeth. The *trifidus* more nearly resembles a young *trapezialis* (nobis), than any of our indigenous species, the outline and flattened sides being somewhat alike, but it has no folds on the sides nor is it so transverse. This specimen having been given to me among other and various fine species by that distinguished and lamented naturalist, A. D'Orbigny, collected by himself, during many years of perilous journeying in South America, it would seem to be only due in courtesy to name it in honor of him, but his name is already occupied by a species described by Deville and Huppé, from the Upper Amazon.

UNIO FIGER. Pl. 45, fig. 296.

Testâ levi, ellipticâ, inflata, subæquilateralî, posticè obtusè angulatâ, anticè obliquè rotundatâ; valvulis crassiusculis, anticè aliquantò crassioribus; natibus subprominentibus, inflatis, ad apices divaricatè

undulatis ; epidermide nigro-fuscâ, striatâ, obsoletè radiatâ ; dentibus cardinalibus compressis, crenulatis ; lateralibus sublongis curvisque ; margaritâ argenteâ et iridescente.

Shell smooth, elliptical, inflated, subequilateral, obtusely angular behind, obliquely rounded before ; valves somewhat thick, slightly thicker before ; beaks rather prominent, inflated, with divergent undulations at the tips ; epidermis blackish-brown, striate and obscurely rayed ; cardinal teeth compressed, crenulate ; lateral teeth rather long and curved ; nacre silver-white and iridescent.

*Hab.*—Uruguay River, South America, Prof. J. Wyman.

My cabinet.

Diam. 1,

Length 1.5,

Breadth 2.2 inches.

Shell smooth, elliptical, inflated, nearly equilateral, obtusely angular behind and obliquely rounded before ; substance of the shell rather thin, thicker before ; beaks rather prominent, inflated, with divergent undulations at the tips ; ligament short and dark brown ; epidermis blackish brown, striate and obscurely rayed, with very indistinct somewhat distant marks of growth ; umbonial slope much raised and rounded ; posterior slope wide, obscurely sulcate, dark-brown, almost black ; cardinal teeth compressed, crenulate, slightly curved, distinctly *double* in the *right* valve and slightly double in the left valve ; lateral teeth rather long and curved ; anterior cicatrices small, well impressed, confluent with the lower but distinct from the upper ; posterior cicatrices rather small, confluent and very slightly impressed ; dorsal cicatrices placed across the centre of the cavity of the beaks ; cavity of the beaks somewhat deep and rounded ; nacre silver-white and iridescent.

*Remarks.*—Only a single specimen was brought by Prof. Wyman, and this without perfect beaks. There are points, however, of the divergent costæ observable which shew that the usual South American character of the tips of the beaks belong to it. It is nearly allied to *Uruguayensis*, herein described, but it is a smaller species, rather rounder, has a darker and much less shining epidermis. It belongs to the group of which *delodontus*, Lam., may be considered the type, but it is not so oblique as that species, and differs altogether in the color of the epidermis.

#### UNIO URUGUAYENSIS. Pl. 45, fig. 298.

Testâ lævi, anticè subsulcatâ, ellipticâ, inflatâ, subæquilaterali, posticè obtusè angulatâ, anticè rotundatâ ; valvulis suberassis, anticè crassioribus ; natibus subprominentibus, ad apices divaricatè undulatis ; epidermide virido-fuscâ, posticè tenebricosâ, politâ, obsoletè radiatâ ; dentibus cardinalibus compressis, crenulatis suberectisque ; lateralibus longis suberectisque ; margaritâ argenteâ et iridescente.

Shell smooth, subsulcate before, elliptical, inflated, subequilateral ; obtusely angular behind, rounded before ; valves rather thick, thicker before ; beaks a little prominent, with divergent undulations at the tips ; epidermis greenish-brown, darker

behind, polished, obsolete radiated; cardinal teeth compressed, crenulate and somewhat erect; lateral teeth long and nearly straight; nacre silver-white and iridescent.

*Hab.*—Uruguay River, South America, Prof. J. Wyman.

My cabinet.

Diam. 1·2,

Length 1·7,

Breadth 2·7 inches.

Shell smooth, subsulcate before, elliptical, inflated, nearly equilateral, obtusely angular behind, rounded before and slightly curved on the dorsal line; substance of the shell rather thick, thicker before; beaks a little prominent, with divergent undulations at the tips; ligament rather small, very dark-brown; epidermis greenish-brown, darker behind, polished, obscurely rayed, with distant marks of growth; umbonal slope much raised and rounded; posterior slope wide, subsulcate, very dark-green, almost black, somewhat carinate; cardinal teeth compressed, long, crenulate, single in the right and double in the left valve; lateral teeth long, striate and nearly straight; anterior cicatrices small, well impressed, confluent with the lower but distinct from the upper; posterior cicatrices large, confluent and very slightly impressed; dorsal cicatrices placed across the centre of the cavity of the beaks; cavity of the shell deep and rounded; cavity of the beaks shallow and rounded; nacre silver-white and iridescent.

*Remarks.*—But a single specimen was received among the specimens from Prof. Wyman. It is nearly allied to *delodontus*, Lam., and belongs to the same group, but it is not so wide and has a smooth and darker epidermis. It is more ventricose and more elliptical than *Wymanii*, herein described. The sulcations on the anterior third are well marked, but they do not extend over the remainder of the disk, or the species would be placed in the sulcate group. The beaks of this specimen are so much eroded as only to leave a few of the divergent undulations, which prove that they extended to the tip of the beaks. The epidermis is so well polished as to be quite brilliant. The first mark of growth in this specimen forms a well-defined yellow line; the second one is of a very dark brown. In other specimens this character will be likely to vary.

UNIO LEPIDUS. Pl. 50, fig. 306.

Testâ lævi, ellipticâ, subinflatâ, valdè inæquilaterali, posticè subrotundatâ, anticè rotundâ; valvulis subtenuibus, anticè aliquantò crassioribus; natibus prominulis, ad apices rugosè et divaricatè undulatis; epidermide politâ, fusco-virente, striatâ, radiatâ; dentibus cardinalibus parviusculis, compressis, obliquis; lateralibus sublongis subcurvisque; margaritâ cæruleo-albâ et valdè iridescente.

Shell smooth, elliptical, somewhat inflated, very inequilateral, subrotund behind and round before; valves rather thin, slightly thicker before; beaks somewhat

prominent, with rugose and divergent undulations at the tips; epidermis polished, brownish-green, striate and radiate; cardinal teeth rather small, compressed, oblique; lateral teeth rather long and curved; nacre bluish-white and iridescent.

*Hab.*—Uruguay River, South America, Prof. J. Wyman.

My cabinet and cabinet of C. M. Wheatley.

Diam. .6,

Length 1.1,

Breadth 1.8 inch.

Shell smooth, elliptical, somewhat inflated, very inequilateral, subrotund behind and round before; substance of the shell rather thin, slightly thicker before; beaks somewhat prominent, with large rugose divergent undulations at the tips; ligament rather long, thin and light-brown; epidermis polished, brownish-green, finely striate, radiate, with distant brown marks of growth; umbonial slope slightly raised and rounded; posterior slope rather compressed, elliptical, with a raised line on each valve from the beak to the posterior margin; cardinal teeth rather small, compressed, oblique, double in both valves; lateral teeth rather long and curved; anterior cicatrices rather small, well impressed, confluent with the lower, but distinct from the upper; posterior cicatrices confluent, rather large and very slightly impressed; dorsal cicatrices well impressed and placed across the cavity of the beaks; cavity of the shell rather deep and wide; cavity of the beaks very shallow and rounded; nacre bluish white and iridescent.

*Remarks.*—Three specimens are before me. This species belongs to the group of which *atratus* (Niäa, Swain.), from Chili, may be considered the type. It is, however, a smaller species, rather more transverse and somewhat thicker. It very closely resembles it in the color of the epidermis and the nacre, and form of the teeth, There is a marked difference, however, in the divergent undulations of the beaks, which in *atratus* are small and rather delicate, while in *lepidus* they are rather large, long and more numerous. In all the three specimens the posterior half is dark-green, caused by closely-set rays, the anterior half having but a few indistinct rays over a yellowish ground.

ANODONTA WYMANII. Pl. 44, fig. 294.

Testâ lævi, ellipticâ, subinflatâ, inæquilaterali, posticè subbiangulatâ, anticè regulariter rotundatâ; valvulis crassis, anticè aliquantò crassioribus; natibus prominulis, ad apices æquis; epidermide cinnomeâ, vel eradiatâ vel obsolete radiatâ; margaritâ roseâ et valdè iridescente.

Shell smooth, elliptical, somewhat inflated, inequilateral, subbiangular behind, regularly rounded before; valves thick, somewhat thicker before; beaks slightly prominent, smooth at the tips; epidermis cinnamon-red, without rays, or obscurely rayed; nacre rose-colored and very iridescent.

*Hab.*—Uruguay River, South America, Prof. J. Wyman.

My cabinet and cabinet of C. M. Wheatley.

Diam. 1·3,

Length 2·1,

Breadth 3·4 inches.

Shell smooth, elliptical, inflated, inequilateral, subbiangular behind, regularly rounded before; substance of the shell thick, somewhat thicker before, with a deep red, broad margin on the inside; beaks slightly prominent, smooth at the tips, being entirely without undulations; ligament rather large, not prominent; epidermis cinnamon-red, lighter towards the beaks and much darker at the margin, with distant marks of growth, without rays or very obscurely rayed; umbonial slope flattened; posterior slope carinate, with two obscure, colored lines on each valve, one of which follows a slightly-impressed line; anterior cicatrices distinct and well impressed; posterior cicatrices confluent and slightly impressed; dorsal cicatrices apparently none; palleal cicatrices slightly impressed and distant from the margin; cavity of the shell rather deep and wide; cavity of the beaks shallow and subangular; nacre of a fine light rose color,—the broad, deep red margin presenting a deep contrast,—beautifully iridescent.

*Soft Parts.*—*Branchial uterus* not charged, but minute ova were found in one of the only two received in alcohol. *Branchiæ* large, nearly semicircular, all very nearly the same size, united the whole length of abdominal sack. *Pulpi* rather large, *round*, united only at the upper part. Mantle rather thin in the male specimen and thick in the female, thickened at the edges, with numerous papillæ below the branchial opening. *Branchial opening* large, with numerous small dark-brown papillæ on the inner edges, inside of which the edges are nearly black. *Anal opening* large, with a dark edge not furnished with papillæ. *Super-anal opening* large, not united below. Color of the mass dirty white.

*Remarks.*—This very beautiful species belongs to the group of which *An. Wheatleyi*, Lea, may be considered the type. It differs from that species in being larger, more ponderous, having a greater axis minor and being of a darker red. It has the usual triangular sinus at the end of the ligament,—a character prevailing with the South American species. The smaller of the anterior cicatrices is unusually proportionately small. Most of the specimens before me, which consist of a good suite, present an obscure line on the middle, from the beak to the base, posterior to which the epidermis is slightly darker. The impressed line on the posterior slope causes a slight emargination on the posterior margin. This is certainly one of the most beautiful of the genus, and I have great pleasure in dedicating it to Prof. Jeffries Wyman, of the University of Cambridge, Massachusetts. It was captured in the Uruguay River by him, with many other fine *Unionidæ*, many of which have not before been observed.

A very remarkable character in the round form of the *palpi* is found in this species and in *An. lato-marginata*, (nobis.) They differ in this from all North American species I have examined. and it is a very interesting point to ascertain if this be the

general form in the South American species. Besides this roundness of the *palpi*, there is a peculiarity of the *branchiæ*,—they being all of the same size,—and also of the anal and super-anal opening being ununited. In these specimens there is a deposit on the side of the abdominal sack, in the *palpi* and along the inferior portion of the mantle, as well as on the dorsal membranes, which is hard and almost stony. This may have been deposited after they were put into alcohol, but it seems to be inside of the membranous matter.

ANODONTA RUBICUNDA. Pl. 46, fig. 299.

Testâ alatâ, lævi, subrotundâ, inflatâ, subæquilaterali, anticè et posticè rotundatâ; valvulis subtenuibus; natibus elevatis, tumidis, rosaceis; epidermide tenebroso-rufo-fuscâ, vel obsoletè radiatâ vel eradiatâ, margaritâ rufo-salmoneo colore tinctâ et valdè iridescente.

Shell winged, smooth, subrotund, inflated, nearly equilateral, rounded before and behind; valves rather thin; beaks raised, swollen and rose-colored; epidermis dark reddish-brown, obsoletely rayed or without rays; nacre reddish-salmon and very iridescent.

*Hab.*—Uruguay River, Prof. J. Wyman.

My cabinet.

Diam. 1·2,

Length 2,

Breadth 2·3 inches.

Shell alate, smooth, subrotund, inflated, subequilateral, rounded behind and before, subangular on the wing and with a slightly-curved dorsal margin; substance of the shell rather thin; beaks raised, swollen, rose-colored, apparently without any undulations at the tips; ligament rather short, somewhat thick and partly concealed; epidermis dark reddish-brown, obsoletely rayed or without rays, and with rather distant marks of growth; umbonial slope very slightly raised and rounded; posterior slope raised into a wing, with two obscure lines on each valve, from the beaks to the posterior margin; anterior cicatrices confluent and slightly impressed; posterior cicatrices confluent and scarcely visible; dorsal cicatrices invisible; cavity of the shell deep and rounded; cavity of the beaks rather shallow and angular; nacre reddish-salmon, whitish or purplish towards the beaks and very iridescent.

*Remarks.*—Two specimens, an adult and a young one, only were obtained by Prof. Wyman. It is near to *rotunda*, Spix, but is rounder, has a higher wing, is smaller and thinner, and probably is never white in the nacre; it therefore cannot be confounded with that species. There is a remarkable redness in this species. The deposit of the base membrane seems to be reddish throughout, while the pearly deposit is white in the adult specimen and purplish in the junior one. Therefore, where the epidermis is worn off, the color is quite red. The adult is without rays, while the junior has very obscure rays. The sinus at the end of the ligament is triangular, as usual with the South American species.

## ANODONTA FORBESIANA. Pl. 47, fig. 301.

Testâ lævi, suboblongâ, ventricosâ, inæquilaterali; valvulis, crassiuseulis; natibus elevatis, inflatis; epidermide luteo-fuscâ, micante, vel eradiatâ vel obsoletè radiatâ; margaritâ albidâ et valdè iridescente.

Shell smooth, suboblong, ventricose, inequilateral, valves somewhat thick; beaks raised, inflated; epidermis yellowish-brown, shining, without rays or very obscurely rayed; nacre whitish and very iridescent.

*Hab.*—Uruguay River, South America, Prof. J. Wyman.

My cabinet and cabinet of C. M. Wheatley.

Diam. 2·1,

Length 2·6,

Breadth 4·5 inches.

Shell smooth, suboblong, very much inflated, inequilateral, obliquely rounded before and subangular behind; substance of the shell somewhat thick; beaks raised, large and inflated; ligament large, long and dark-brown; epidermis yellowish-brown, shining, darker before and behind, without rays, or obscurely rayed, and with very distant marks of growth; umbonial slope much inflated and obtusely angular; posterior slope very wide, raised into an obtuse angle and very dark-brown; anterior cicatrices very large, distinct and well impressed; posterior cicatrices very large, confluent and slightly impressed; dorsal cicatrices invisible; cavity of the shell very wide and very deep; cavity of the beaks rather deep and rounded; nacre whitish and very iridescent.

*Remarks.*—Several specimens are before me, all of which have been more or less injured on the posterior margin, which has caused a change of outline in that part, and perhaps has made it more inflated. All the specimens are more or less open at the anterior basal margin. Neither of the specimens are perfect enough to show any undulations at the tips. The sinus at the end of the ligament is large and triangular. The nacre of all is more or less spotted with green or reddish epidermal matter. Two of the specimens are inclined to salmon color in the cavity. This species inclines to *trapezialis*, Lam., on one side, and *anserina*, Spix, on the other, but *trapezialis* is more triangular and by no means so quadrate or so ventricose. In outline it is near to *Anodonta doliaris* (my MSS.), from Stewart's Mill, Union County, N. C. I name this species after R. B. Forbes, Esq., of Boston, whose liberality assisted so much in the development of the natural history of the Uruguay River.

## ANODONTA URUGUAYENSIS. Pl. 48, fig. 302.

Testâ lævi, obovatâ, ventricosâ, valdè inæquilaterali; valvulis suberassis, anticè aliquantò crassioribus; natibus subelevatis, tumidis; epidermide tenebroso-olivâ, eradiatâ; margaritâ cæruleo-albâ et valdè iridescente.

Shell smooth, obovate, much inflated, very inequilateral; valves rather thick,

thicker before; beaks rather elevated, swollen; epidermis dark-olive, without rays; nacre bluish-white and very iridescent.

*Hab.*—Uruguay River, Prof. J. Wyman.

My cabinet.

Diam. 1·6,                                      Length 2·4,                                      Breadth 3·5 inches.

Shell smooth, obovate, much inflated, very inequilateral, obtusely angular behind and obliquely rounded before; substance of the shell rather thick, somewhat thicker before; beaks rather elevated, swollen; ligament large, rather long and dark-brown; epidermis dark-olive, without rays, with distant marks of growth; umbonial slope inflated and rounded; posterior slope raised into a carina; with an impressed line from the beaks on each valve to the posterior margin; anterior cicatrices confluent and somewhat impressed; posterior cicatrices confluent and very slightly impressed; dorsal cicatrices invisible; cavity of the shell very deep and rounded; cavity of the beaks shallow and angular; nacre white and very iridescent.

*Remarks.*—A single, much worn and imperfect specimen only was brought by Prof. Wyman. It seems to be between *Blainvilliana* (nobis) and *trapezialis*, Lam., not being so oblique or transverse as the former, and the substance of the shell is thicker than either. It is more ventricose than either, the larger transverse diameter being in the middle of the shell and not towards the beaks. The sinus at the end of the ligament is triangular, as usual with the South American species, but in this specimen it is more acute and inflected than usual. The margin at the base is very wide, but that is not the case anteriorly or posteriorly. The beaks being very imperfect, it is impossible to say what may be the nature of the undulations of the tips, if it has any.

#### ANODONTA LATO-MARGINATA, Lea.

[From Amer. Philos. Soc., vol. v. pl. 12. Obs. vol. i. page 188.]

*Soft Parts.*—*Branchial uterus* ——. No ova were found in the only specimen received. Probably a female from the form. *Branchiæ* large, rounded below, inner one rather the larger, united the whole length of the abdominal sack. *Palpi* rather large, round, united only at the upper part. *Mantle* thin, thickened at the edges, with numerous very small papillæ below the branchial opening. *Branchial opening* large, with numerous very small, brown papillæ on the inner edges. *Anal opening* large, with dark-brown edges, not furnished with papillæ. *Super-anal opening* large, not united below. Color of the mass whitish.

It will be observed that this species is very like to *Wymanii* in the anatomy, having those remarkable rounded *palpi*, but they differ much in the outer covering as regards form and color.



## ANODONTA CAILLIAUDII. Pl. 45, fig. 297.

Testâ lævi, rotundâ, ventricosâ, inæquilaterali, anticè supernè angulatâ; valvulis crassis, anticè aliquantò crassioribus; natibus elevatis, tumidis, incurvis; epidermide nigro-fuscâ, obsoletè radiatâ, supernè micante, infernè exilissimè striatâ; margaritâ argenteâ et valdè iridescente.

Shell smooth, round, ventricose, inequilateral, angular above in front; valves thick, a little thicker before; beaks raised, swollen and incurved; epidermis blackish-brown, obsoletely radiate, shining above and finely striate below; nacre silver-white and very iridescent.

*Hab.*—Brazil, Monsieur F. Cailliaud.

My cabinet and cabinet of M. Cailliaud.

Diam. 1·5,

Length 2·4,

Breadth 2·9 inches.

Shell smooth, round, ventricose, inequilateral, angular above in front; substance of the shell thick, a little thicker before; beaks raised, swollen and incurved; ligament rather short, thin and concealed; epidermis blackish-brown, obscurely rayed, very bright over the umbones and finely striate on the inferior part; umbonial slope not raised, but rounded; posterior slope broad, slightly raised, with two dark and two yellow lines on each valve, from the beaks to the posterior margin; anterior cicatrices confluent, very large and slightly impressed; posterior cicatrices very large, confluent and very slightly impressed; dorsal cicatrices above and within the cavity of the beaks; cavity of the shell very deep, very wide and rounded; cavity of the beaks somewhat deep and subangular; nacre silvery-white and very iridescent.

*Remarks.*—I owe to the kindness of Monsieur Cailliaud the possession of a single specimen of this with several other fine shells. It belongs to the same group with *An. rotunda*, Spix, but differs in being larger, more rotund, in being much darker and without strong rays. It is remarkable for its extremely regular roundness, and its fine dark epidermis, which is unusually smooth and beautiful. The nacre is of most uncommon brilliancy, being the purest silver-white, and is accompanied by a most unusual display of iridescence. I have great pleasure in naming it after the distinguished African traveller, who has done so much to develop the natural history of his own and of foreign countries.

## ANODONTA AMAZONENSIS. Pl. 46, fig. 300.

Testâ lævi, transversâ, subinflatâ, valdè inæquilaterali, posticè subbiangulatâ, anticè rotundâ; valvulis suberassis; natibus subelevatis, tumidis; epidermide micante, tenebroso-viridi, nigricante, vel radiatâ vel obsoletè radiatâ; margaritâ intus subroseâ et valdè iridescente.

Shell smooth, transverse, somewhat inflated, very inequilateral, somewhat biangular behind and rounded before; valves rather thick; beaks somewhat raised and

swollen; epidermis shining, very dark-green or blackish, obsolete-ly rayed or without rays; nacre within the cavity inclined to rose color and very iridescent.

*Hab.*—Upper Amazon, Brazil, C. M. Wheatley.

My cabinet and cabinet of C. M. Wheatley.

Diam. .9,

Length 1.4,

Breadth 3.1 inches.

Shell smooth, transverse, somewhat oblique, rather inflated, very inequilateral, somewhat biangular behind and rounded before; substance of the shell rather thick, thick on the dorsal margin; beaks somewhat raised, swollen, apparently without undulations at the tips; ligament long and thin; epidermis shining, very dark-green, almost black, obsolete-ly rayed, or without rays, with distant marks of growth; umbonal slope slightly raised and flattened; posterior slope blackish, rather narrow, depressed, with three indistinct, raised lines on each valve, from the beaks to the posterior margin; anterior cicatrices distinct and well impressed; posterior cicatrices confluent, large and slightly impressed; dorsal cicatrices scarcely visible; cavity of the shell rather shallow; cavity of the beaks very shallow and rounded; nacre within the cavity inclined to rose color and very iridescent.

*Remarks.*—Several specimens were kindly submitted to me by Mr. Wheatley, and I was at first disposed think they might be a variety of *Wheatleyi* (nobis), or *solidula*, Deville and Huppé; but it is a larger species than the first, not quite so thick in the nacre, nor of so brilliant a nacre, and in the epidermis they differ very much,—the *Amazonensis* being nearly black, while the other is cinnamon-red. In outline it is very near to *solidula*; but that species is described as being deep brown, while this is a deep green and is more oblique. Still it may prove to be but a variety, when complete suites are observed. The beaks of none of the specimens before me are entirely perfect—they may have small undulations at the tips, but there is no appearance of any in these specimens. When young, the epidermis will be found probably of a dark green and with rays, as the older ones show a slight inclination to rays. The sinus at the end of the ligament has the usual triangular form of the South American species.

ANODONTA MORICANDII. Pl. 49, fig. 303.

Testâ lævi, obliquè quadratâ, subinflatâ, ad laterè planulatâ, valdè inæquilaterali, posticè obtusè angulatâ et hiantè; anticè obliquè rotundatâ et valdè hiantè; valvulis tenuibus, diaphinis; natibus subprominentibus; epidermide luteo-olivâ, politâ, obsolete radiatâ; margaritâ cæruleo-albâ et valdè iridescente.

Shell smooth, obliquely quadrate, slightly inflated, flattened at the side, very inequilateral, obtusely angular behind, obliquely rounded before and very much gaping behind and before; valves very thin, semitransparent; beaks somewhat prominent;

epidermis yellowish olive, polished, obscurely radiate: nacre bluish-white and very iridescent.

*Hab.*—Bahia, Brazil, S. Moricand, Geneva, Switzerland.

My cabinet and cabinet of M. Moricand.

Diam. 1·2,

Length 2·1,

Breadth 4·3 inches.

Shell smooth, obliquely quadrate, slightly inflated, flattened at the side, very inequilateral, obtusely angular behind, obliquely rounded before and very much gaping behind and before; substance of the shell very thin and semitransparent; beaks somewhat prominent; ligament very long, rather thin and light-brown; epidermis yellowish-olive, greenish on the posterior slope, polished, obscurely radiate, with distant marks of growth; umbonial slope slightly raised and rounded; posterior slope narrow, compressed, with a somewhat elevated carina; anterior cicatrices rather large, confluent and very slightly impressed; posterior cicatrices very large, confluent and very slightly impressed; dorsal cicatrices placed in the centre of the cavity of the beaks; cavity of the shell rather shallow and wide; cavity of the beaks very shallow and very obtusely angular; nacre bluish-white and very iridescent all over the interior.

*Remarks.*—Three specimens of this species were sent to me by Monsieur Moricand many years since, under the name of *anserina*, Spix, but it cannot be the same as described and figured in Spix's work on Brazilian Testacea under that name. The *Moricandii* is much more oblong, is yellowish-olive and not "dark-green;" the valves are very thin and not "solid;" the umbones are flattened and not "ventricose." There cannot be a doubt but that this is not the shell described by Spix as *anserina*, and I am much disposed to think that Spix's description and figure were made of a middle-aged *trapezialis*, Lam. The *Moricandii* is more nearly allied to *Forbesiana*, herein described, than to any South American species I know. It may be distinguished by its outline not being quite so quadrate, by its being a much thinner, lighter shell, and by its being compressed and having a light yellowish-olive epidermis. All three of my specimens have the sides irregularly flattened, which is very remarkable. The epidermis is very smooth and shining on the side, and rough and dark-green on the posterior slope. The beaks of all are too much eroded to satisfy me as to their being divergently undulate, but one of them has some indication of their being so. The eroded surface towards the tips has the nacre bluish. The gaping of the anterior and posterior portions are quite remarkable for their size and extent. I have great pleasure in dedicating this species to the memory of my late lamented friend, Monsieur S. Moricand, of Geneva, to whom I am indebted for it and many interesting fresh-water and land shells of Brazil.



Shell smooth, very wide, compressed, emarginate, flattened at the side, inflated before, widened and flattened out behind; valves very thin, diaphanous; beaks small and a little prominent; epidermis yellowish horn-color, very much striate, shining, eradiate; nacre bluish-white and very iridescent.

*Hab.*—Siam, S. R. House, M. D.

Cabinet of Mr. Haines.

Diam. .6,

Length 1.2,

Breadth 4.9 inches.

Shell smooth, very wide, compressed, emarginate on the anterior basal margin, flattened on the sides, inflated rather suddenly anteriorly from the beaks obliquely to the basal margin, widened and flattened out behind; substance of the shell very thin, translucent; beaks small, a little prominent and pointed; ligament very long, thin and dark-brown; epidermis yellowish horn-color, very much striate, shining and without rays; umbonial slope slightly raised and rounded; posterior slope much compressed, raised into a high keel, with an indented line from the beak to the posterior margin in both valves; dorsal line furnished with a slight, long rising, almost amounting to an acicular tooth; anterior cicatrices large, indistinct, apparently confluent; posterior cicatrices large, confluent and very indistinct; cavity of the shell shallow and very wide; cavity of the beaks very shallow; nacre bluish-white and very iridescent.

*Remarks.*—This very remarkable shell was submitted to me by Mr. Haines, who has done so much in bringing to light the Siamese and other Molluscs. I had doubts, on first receiving it, whether it could be from the East, as we have not before seen a *Mycetopus* out of South America,—considering the genus to belong exclusively there. Mr. Haines, however, informs me, on reviewing the matter, that it came from Dr. House, who has sent him so many new river Molluscs which I have described in a previous volume. We have in this species a character which I have never before observed in any one of the family,—an enlargement, or inflation of the anterior fifth of the valves, commencing at the beaks and inclining obliquely to the anterior basal margin, which is emarginate and gaping. A disposition to putting on a long, acicular lateral tooth in each valve, presents the first time such a case in any *Mycetopus* I have seen. In the left valve, immediately under the beak, there is an indistinct callus, resembling an incipient tooth; but this may be accidental. That portion of the valves which is not inflated has a very strong resemblance to *M. siliquosus*, D'Orb.

MONOCONDYLÆA WHEATLEYI. Pl. 50, fig. 307.

Testâ lævi, oblongâ, subcompressâ, valdè inæquilaterali, anticè obliquè rotundatâ, posticè truncatâ; valvulis subcrassis, anticè aliquantò crassioribus; natibus parvis, acuminatis, ad apices minutissimè undulatis; epidermide luteâ, nitidâ, eradiatâ; dentibus cardinalibus parvis, erectis, in utroque valvulo unotuberculatis; margaritâ albâ et valdè iridescente.

Shell smooth, oblong, rather compressed, very inequilateral, obliquely rounded before and truncate behind; valves rather thick, slightly thicker before; beaks small, acuminate and very minutely undulate at the tips; epidermis yellow, shining, without rays; cardinal teeth small, erect, a single tuberculated one on each valve; nacre pearly-white and very iridescent.

*Hab.*—River Tigris, Assyria, C. M. Wheatley.

My cabinet and cabinet of Mr. Wheatley.

Diam. .7,

Length 1.3,

Breadth 2.3 inches.

Shell smooth, oblong, rather compressed, very inequilateral, obliquely rounded before and truncate behind; substance of the shell rather thick, slightly thicker before; beaks small, acuminate and very minutely undulate at the tips; ligament somewhat large and dark-brown; epidermis yellow, shining, without rays and with two or three distant marks of growth; umbonial slope very slightly raised and rounded; posterior slope, raised into a compressed carina; cardinal teeth small, erect, a single tuberculated one in each valve; anterior cicatrices distinct, rather large, well impressed; posterior cicatrices confluent, large and slightly impressed; dorsal cicatrices in a row across the centre of the cavity of the beaks; cavity of the shell shallow and wide; cavity of the beaks very shallow and obtusely angular; nacre beautifully pearly-white, with a satin lustre and very iridescent.

*Remarks.*—Two specimens of this beautiful species are before me. It is the second species we have seen from Western Asia. The genus was first observed by D'Orbigny in South America, subsequently, several species were described by me from Eastern Asia. The above-described species differs from any I have seen in its outline and in the consistence of the nacre, and in the color of the epidermis. It is nearest, perhaps, to *planulata* (nobis), but differs much in the outline being quadrate, in having a less elevated carina and in having the posterior slope yellowish, and not greenish, and in having much larger teeth.

ART. IX.—*Descriptions of the Soft Parts of one hundred and forty-three species and some Embryonic Forms of Unionidae of the United States.*

By ISAAC LEA.

Until within a recent date, comparatively few writers on Conchology had given attention to the soft parts of the animals included in the shell,—the outward enveloping parts. Poli, Cuvier, Lamarck, Carus, Moquin-Tandon, and a few others, taught the importance of making diagnoses of such species as could be procured, and thus more natural classifications have been made. Having, about thirty-five years since, observed in our *Unionidae* structural differences of the branchial uterus—then called oviducts—I carefully described and figured in my first paper on our Fresh-Water Mollusca, (Trans. Amer. Phil. Soc., Nov., 1827,) the singular and interesting structure of the *Unio irroratus*, then first described. And, in the same paper, I stated the uses, in this family, of some of the muscles and the vast reproductive capability of some of the species. Subsequently, in the same Transactions, 1836, I described the forms of the branchial uterus of five species and gave correct representations of them, (see vol. vi. pl. 15). About eight years since, I entered into the examination of a large number of species, kindly sent to me by various friends from different States, in a living condition or in alcohol. Some of them have been published in the Journ. of the Acad. of Nat. Sci., in 1858 and subsequent years. In that year I also published diagnoses and figures of the forms of the embryonic shell of thirty-eight species. It is not my intention here to redescribe the outward or hard parts—the exoskeleton—of those species which have been described, but simply the included *soft parts* of such as have come into my possession and have not heretofore been given. The labor has been very great, for in some cases fifty to one hundred specimens of a species have been carefully examined before the diagnosis was made. As most of the specimens were in alcohol, allowance must be made for difference in color, shrinkage, as well also for difference of age, as sometimes only a few or a single one was in my possession. In my vols. i., ii., vi., vii., viii. and ix., taken from the Trans. Amer. Phil. Soc. and the Journal

of the Acad. Nat. Sci., I have published descriptions of the soft parts of ninety-one species, which, with those herein described, will make two hundred and thirty-four.

#### Genus UNIO.

UNIO LUTEOLUS, Lam. An. sans. Vert., vol. vi. p. 79.

*Branchial uterus* large. In the fine specimen under examination, there are about forty large ovisacks on each outer branchia, each one of which ovisacks contains a large number of embryos of a regular pouch shape.\* These sacks occupy nearly the half of the outer branchiæ posteriorly. In this it resembles *cariosus* and *ochraceus*. *Branchiæ* rather large, curved below and united the whole length of abdominal sack. *Palpi* rather large, subtriangular and united one-fourth down the posterior edges. *Mantle* rather thick, much thickened at the margin. *Branchial opening* large, with numerous large brown papillæ, which continue below to the basal margin. Below the branchial opening, on the outside, there is a black, round spot on each side of the mantle, putting on the appearance of eyes. These are more observable in the females than the males. *Anal opening* small, with numerous small, light-brown papillæ. *Super-anal opening*† rather small, lined on the inner edges and united below. Color of the mass whitish, the foot being light salmon color.

*Remarks.*—In the female there is a fleshy process like that in *radiatus*,‡ some distance below the branchial opening, which is fringed, and the papillæ extend below the process. One of the females under examination was found to form the super-anal opening into four distinct holes,—the three posterior ones round, the anterior one subovate. This species is very widely distributed, being found in the Mississippi, Missouri and Ohio basins, as well in the St. Lawrence and Moose Rivers, in the Great Lakes, Winnipeg and Slave Lakes and River Saskatchewan.

UNIO PAULUS, Lea. Trans. Amer. Phil. Soc., vol. viii. pl. 15, fig. 9 and Obs. vol. iii. p. 51.

*Branchial uterus* small, placed on the posterior portion of the branchiæ, with about ten sacks like *heterodon*, the edges tipped with black. *Branchiæ* small, thin, the inner ones much the larger, curved below, free nearly the whole length of the abdominal sack. *Palpi* small, subtriangular, not united on the posterior edges. *Mantle* very thin, with a dark line on the outer posterior edges. *Branchial opening* rather large, with numerous light-brown papillæ on the inner edges. *Anal opening* rather small, with numerous small papillæ. *Super-anal opening* rather large and united below. Color of the mass whitish to light salmon.

\* See Journal Acad. Nat. Sci., vol. iv. pl. 5, fig. 10 and Obs. vol. vi. p. 47.

† This is called by Pfeiffer the slit of Bojanus.

‡ Trans. Amer. Phil. Soc., vol. vi. pl. 15, fig. 49.



*Embryonic shell* ovato-pouch-shape, very nearly the same with *parvus*.

*Remarks*.—The female of this species has a spongy mass on the inside of both sides of the mantle, below the branchial opening, like that of *parvus*,\* resembling the lachrymal caruncle of the human eye.

The specimens examined were from Georgia, and kindly sent to me by Dr. Lewis and Mr. N. A. Pratt, Jr.

UNIO BOYKINIANUS, Lea. Trans. Amer. Phil. Soc., vol. viii. pl. 13, fig. 22. Obs. vol. iii. p. 46.

*Branchial uterus*—none had charged uteri. *Branchiæ* very large, inner ones much the larger, very much curved below, free, the largest specimen near only to the posterior end of abdominal sack, the smaller ones more than half the length of abdominal sack. *Palpi* very long, pointed and united far down on the posterior edges. *Mantle* thin, with a broad margin, dark bordered on the inner posterior edges. *Branchial opening* very large, with numerous small, dark-brown papillæ on the inner edges. *Anal opening* very large, with exceedingly minute, dark-brown papillæ on the inner edges. *Super-anal opening* large, with a brown line on the inner edges, not united below. Color of the mass whitish.

*Remarks*.—Taken in the Chattahoochee and Flint Rivers in May, 1855, and were kindly sent to me by Bishop Elliott.

UNIO ALATUS, Say. Nicholson's Encyc., Am. ed., Article Conch., pl. 4.

*Branchial uterus* occupies the posterior half of the outer branchiæ. In this specimen there were about thirty ovisacks in each of the two leaves. *Branchiæ* very large, rounded below, inner ones much the larger, united the whole length of abdominal sack. *Palpi* rather small, subtriangular, attached nearly the whole length of the posterior edges. *Mantle* thin, much thickened at the edges. *Branchial opening* very large, with numerous small papillæ on the inner edges. *Anal opening* very small, with very minute, dark papillæ. *Super-anal opening* very long, united for a short distance below. Color of the mass whitish.

*Embryonic shell* wedge-shape, clear white, has four small hook-like processes. See Journ. Acad. Nat. Sci., vol. iv. pl. 5, fig. 25. Obs. vol. vi. p. 48.

Buffalo, New York, Mr. A. T. Jackson.

UNIO NASUTUS, Say. Nicholson's Encyc., Amer. Ed., Art. Conch., pl. 4, fig. 1.

*Branchial uterus* occupies the whole length of the outer branchiæ. *Branchiæ* rather large, inner ones somewhat the larger, free only at the extreme posterior end of abdominal sack. *Palpi* small, subtriangular, thin, united for a short distance on the posterior edges. *Mantle* thin, much thickened at the edges. *Branchial opening* rather large, with numerous dark papillæ on the inner edges. *Anal opening*

\* See Journal Acad. Nat. Sci., vol. iv. pl. 29, fig. 102 and Obs. vol. vii. p. 39.

rather small, with very minute, brown papillæ. *Super-anal opening* long, united for a short distance below. Color of the mass whitish.

*Embryonic shell* short, pouch-shape, very nearly like to that of *phaseolus*, Hild. Jour. Acad. Nat. Sci., vol. iv. pl. 5, fig. 12. Obs. vol. vi. p. 46.

Schuylkill River, near Philadelphia, and Buffalo, New York, by Mr. A. T. Jackson.

*Remarks.*—Prof. Agassiz says\* that in this species, which he assigns to the genus *Eurynia*, Raf., that the gills are united the whole length of the foot. On the contrary, they are *free* at the posterior end of the foot.

UNIO OBESUS, Lea. Trans. Amer. Phil. Soc., vol. iv. pl. 13, fig. 26. Obs. vol. i. p. 106.

*Branchial uterus* occupies the whole length of the outer branchiæ. *Branchiæ* large, inner ones the larger, round below, free nearly the whole length of abdominal sack. *Palpi* very small, subtriangular, not united on the posterior edges. *Mantle* very thin, slightly thickened on the edge. *Branchial opening* rather large, with numerous small, brownish papillæ. *Anal opening* small, with very small, numerous brownish papillæ. *Super-anal opening* small, united below. Color of the mass dirty white.

The specimens were from Columbus, Georgia, sent by Bishop Elliott.

UNIO KLEINIANUS Lea. Trans. Amer. Phil. Soc., vol. x. pl. 17, fig. 18. Obs. vol. v. p. 21.

*Branchial uterus* occupies both leaves of the branchiæ on both sides. Ova were also found in the ovarium. *Branchiæ* large, nearly semi-circular, inner ones much the larger, free half the length of abdominal sack. *Palpi* rather large, subtriangular, united half way down the posterior edges. *Mantle* thin, white and slightly thickened at the edges. *Branchial opening* small, with small, light-brown papillæ. *Anal opening* rather large, dark, *without* papillæ. *Super-anal opening* large, slightly united below. Color of the mass white.

Columbus, Georgia, by Bishop Elliott and G. Hallenbeck.

UNIO DARIENSIS, Lea. Trans. Amer. Phil. Soc., vol. viii. pl. 26, fig. 61. Obs. vol. iii. pl. 84.

*Branchial uterus* occupies the whole length of the outer branchiæ. *Branchiæ* very large, much rounded below, free rather more than half the length of the abdominal sack. *Palpi* moderately large, subtriangular, united half way on the posterior edges. *Mantle* thin, with a broad margin, angular at the posterior basal margin. *Branchial opening* large, with numerous small, brown papillæ. *Anal opening* large, with numerous, small, brown papillæ. *Super-anal opening* rather large and united below. Color of the mass whitish. The ova were nearly matured in the branchial uterus, but not enough to make out the form perfectly. They appeared to be subtriangular.

\* See "Shells of New England, by Stimpson," MSS., quoted; and Agassiz's paper in "Archiv für Naturgeschichte," 1852.

*Remarks.*—These specimens were sent by Bishop Elliott, from Tobesaufkie Creek, below Macon, Georgia. They were from five to six inches wide by three to four inches long.

UNIO ANGUSTATUS, Lea. Trans. Amer. Phil. Soc., vol. iv. pl. 17, fig. 43. Obs. vol. i. pl. 124.

*Branchial uterus* occupies the whole length of the outer branchiæ, like *nasutus*. *Branchiæ* wide, slightly curved below, the inner ones the larger, free nearly half the length of the abdominal sack. *Pulpi* large, thin, curved below and rounded at the end, united half way down the posterior edges. *Mantle* very thin, with a broad thickened margin. *Branchial opening* rather large, with small brown papillæ on the inner edges. *Anal opening* rather large, with very small brown papillæ on the inner edges. *Super-anal opening* large, united for a short distance below. Color of the mass light salmon.

From Tobesaufkie Creek, Georgia, Bishop Elliott.

UNIO DECISUS, Lea. Trans. Amer. Phil. Soc., vol. iv. pl. 12, fig. 23. Obs. vol. i. p. 102.

*Branchial uterus* occupies the whole length of the outer leaves of the branchiæ. *Ova* not matured enough to show the embryonic form. *Branchiæ* rather large, rounded below, inner ones much the longer, free more than half the length of abdominal sack. *Pulpi* small, ovate, united above or a short distance on the posterior edges. *Mantle* very thin, slightly thickened on the edges. *Branchial opening* small, with very small papillæ. *Anal opening* very small, with very minute papillæ. *Super-anal opening* rather large, colored within and united below for a short distance. Color of the mass whitish.

Othcalooga Creek, Georgia, Bishop Elliott; and Columbus, Mississippi, Dr. Spillman.

UNIO GLANS, Lea. Trans. Amer. Phil. Soc., vol. iv. pl. 8, fig. 12. Obs. vol. ii. p. 92.

*Branchial uterus* occupies the posterior of the outer branchiæ, like *heterodon*, having a few large ovisacks. *Branchiæ* rather small, rounded below, the inner ones rather the larger, free for a short distance. *Pulpi* small, subtriangular, not united on the posterior edges. *Mantle* thin, with a broad thick margin. *Branchial opening* large, with numerous brown papillæ on the inner edges. *Anal opening* small, with small brown papillæ on the inner edges. *Super-anal opening* rather small, not united below on the edges.

*Embryonic shell* pouch-shape, very near to that of *parvus*, which is near to *rectus*, but it is more rounded. It has no hooks.

*Remarks.*—On the inner edges of both sides there is a caruncle immediately below the branchial opening, similar to that described in *parvus* and *paulus*.

Othcalooga Creek, Georgia, by Bishop Elliott.

UNIO NITENS, Lea. Trans. Amer. Phil. Soc., vol. viii. pl. 12, fig. 19. Obs. vol. iii. p. 43.

*Branchial uterus* occupies nearly the whole length of the outer branchiæ and is blackish on the lower edge. *Branchiæ* rather wide, slightly rounded below, the inner ones much the larger, slightly free at the posterior end of abdominal sack. *Palpi* small, subovate, not united on the posterior edges. *Mantle* very thin, with a broad, slightly thickened margin. *Branchial opening* large, with numerous dark-brown papillæ, which are continued in a dark border below the opening to the basal margin. *Anal opening* very small, with very minute brown papillæ. *Anal opening* small, with very minute brown papillæ. *Super-anal opening* small, united for some distance below. Color of the mass light salmon.

*Embryonic shell* elongate pouch-shape, white, very much in outline like *obtusus*, has no hooks. See Journal Acad. Nat. Sci., vol. iv. pl. 5, fig. 1. Obs. vol. vi. p. 46. Othcalooga Creek, Georgia, Bishop Elliott.

UNIO ANODONTOIDES, Lea. Trans. Amer. Phil. Soc., vol. iv. pl. 8, fig. 11. Obs. vol. i. p. 91.

*Branchial uterus* filled with rather coarse ovisacks on the posterior half of the outer branchiæ, forming thick lobes like *cariosus*, the lower border being black. *Branchiæ* very wide, slightly curved below, the inner ones extending much beyond the outer ones, united the whole length of abdominal sack. *Palpi* moderately large, subtriangular, united half way down the posterior edges. *Mantle* very thin, with a rather large, thickened margin. *Branchial opening* very small, with numerous light-brown papillæ. *Anal opening* very small, with numerous light-brown papillæ. *Super-anal opening* small, united for some distance below. Color of the mass whitish.

*Embryonic shell* elongate pouch-shape, clear white, has no hooks. See Journal Acad. Nat. Sci., vol. iv. pl. 5, fig. 2. Obs. vol. vi. p. 46.

Uchee Bar, below Columbus, Bishop Elliott; and Ohio River, J. Clark.

UNIO OBTUSUS, Lea. Trans. Amer. Phil. Soc., vol. viii. pl. 11, fig. 13. Obs. vol. iii. p. 39.

*Branchial uterus* filled with large ovisacks on the posterior half of the outer branchiæ, like *cariosus*, having a dark inferior edge. *Branchiæ* large, nearly semi-circular, the inner ones extending anteriorly much beyond the outer ones, united the whole length of abdominal sack. *Palpi* very large, subelliptical, united one-third down the posterior edges. *Mantle* thin, thicker at the margin, has large dark papillæ below the branchial opening. *Branchial opening* large, with numerous brownish and black papillæ. *Anal opening* small, with numerous very small, brownish papillæ, maculate with black. *Super-anal opening* rather large, colored within and slightly united below. The rim of the anus seems to be crenulate. color of the mass whitish.

*Embryonic shell* elongate pouch-shape. See Journ. Acad. Nat. Sci., vol. iv. pl. 5, fig. 1. Obs. vol. vi. p. 46.

Uchee Bar, below Columbus, Georgia, Bishop Elliott and Dr. Niesler.

UNIO INFUCATUS, Con. New Fr. Wat. Shells, pl. 3, fig. 2.

*Branchial uterus* ——. No ova were found here, but they were found in the ovarium. *Branchiæ* large, subangular, rounded below, inner ones much the larger, free for a short distance. *Palpi* large, falcate, united more than half way down the posterior edges. *Mantle* very thin, thickened at the margin. *Branchial opening* large, with numerous brown papillæ. *Anal opening* without papillæ. *Super-anal opening* large, colored within the edges, united below. Color of the mass white.

Uchee Bar, below Columbus, Georgia, Bishop Elliott; and Roswell, Cobb County, Georgia, N. A. Pratt, Jr.

UNIO LINEATUS, Lea. Trans. Amer. Phil. Soc., vol. viii. pl. 12, fig. 20. Obs. vol. iii. p. 44.

*Branchial uterus* occupies the posterior part of the outer branchiæ in about a dozen large ovisacks, like *carosus*, the lower border being blackish. *Branchiæ* rather large, rounded below, inner ones much the larger anteriorly, united the whole length of abdominal sack. *Palpi* large, semilunate, united two-thirds down the posterior edges. *Mantle* rather thin, thickened at the margin, furnished with a thickened, fleshy, fringed process below the branchial opening. This process is bright brown or reddish, with a black border, and immediately below the branchial opening. On this process there is, on the outer edges, a corresponding round black dot on each side, which put on the appearance of eyes. These spots are very much the same as in *radiatus*.\* *Branchial opening* small, with numerous brownish papillæ. *Anal opening* small, with very minute brownish papillæ. *Super-anal opening* rather large, reddish within the edges, not united below. Color of the mass whitish.

*Embryonic shell* elongate pouch-shape, white, very much in outline like *anodontoïdes*. See Journ. Acad. Nat. Sci., vol. iv. pl. 5, fig. 2. Obs. vol. vi. p. 46.

Uchee Bar, Georgia, Bishop Elliott; and Altamaha River, J. Postell.

UNIO LIMATULUS, Con. Journ. Acad. Nat. Sci., vol. i. 2d ser. p. 276.

*Branchial uterus* ——. No ova were found here, but they were found in the ovarium. *Branchiæ* large, very much curved below, angular at the posterior end, inner ones much the larger, attached by a thread-like muscle to the margin, free nearly the whole length of the abdominal sack. *Palpi* wide, subangular, united only at the upper part of the posterior edges. *Mantle* very thin, slightly thickened at the margin. *Branchial opening* small, with very small brownish papillæ. *Anal*

\* See Observations, vol. ii. pl. 15, fig. 49.

*opening* very small, with small brown papillæ. *Super-anal opening* very long, united below for a short distance. Color of the mass whitish.

Uchee Bar, Georgia, Bishop Elliott.

UNIO BARRATTII, Lea. Trans. Amer. Phil. Soc., vol. x. pl. 13, fig. 5. Obs. vol. v. p. 12.

*Branchial uterus* occupies the whole of the outer leaves of the branchiæ. *Branchiæ* wide, gently curved below, inner ones the larger, united more than half the length of abdominal sack. *Palpi* rather long, subangular, united only a short distance on the posterior edges. *Mantle* very thin, thickened at the margin. *Branchial opening* large, with numerous brown papillæ. *Anal opening* large, with small brown papillæ. *Super-anal opening* very long, slightly united below. Color of the mass light salmon.

*Embryonic shell* short pouch-shape, whitish, nearly the same with *phaseolus*, has no hooks. See Journ. Acad. Nat. Sci., vol. iv. pl. 5, fig. 12. Obs. vol. vi. p. 47.

Buck Head Creek, Burke County, Georgia, Bishop Elliott.

UNIO SLOATIANUS, Lea. Trans. Amer. Phil. Soc., vol. viii. pl. 16, fig. 33. Obs. vol. iii. p. 55.

Three specimens all males.

*Branchiæ* very large, thin, nearly circular below, inner ones much the larger, free nearly the whole length of abdominal sack. *Palpi* rather small, rounded below and not united on the posterior edges. *Mantle* thin, with a broad margin, blackened on the inner posterior border. *Branchial opening* large, with numerous dark-brown papillæ. *Anal opening* very large, with numerous minute dark-brown papillæ. *Super-anal opening* very large, colored on the inner edges and not united below. Color of the mass whitish.

Flint River, Georgia, Bishop Elliott.

UNIO SUBANGULATUS, Lea. Trans. Amer. Phil. Soc., vol. viii. pl. 13, fig. 23. Obs. vol. iii. p. 47.

*Branchial uterus* occupies about half the length of the outer branchiæ, but does not extend to the posterior end; the ovisacks are large and numerous (in one specimen seventeen, in the other thirty), inserted half way up the leaf and pendant below the line of the branchiæ. *Branchiæ* very large, nearly semicircular below, inner ones much the larger, united the whole length of the abdominal sack. *Palpi* rather large, suboval, united a short distance on the posterior edges. *Mantle* thin, with a rather narrow, thickened border, fringed and colored from the branchial opening to the base. *Branchial opening* rather large, with numerous brown papillæ on the inner edges, the inner ones being much the largest. *Anal opening* moderately large, with numerous minute brown papillæ on the inner edges. *Super-anal opening* rather small and united below. Color of the mass light salmon.

*Embryonic shell* pouch-shape, whitish, nearly the same with *multiradiatus*, has no hooks. See Journ. Acad. Nat. Sci., vol. iv. pl. 5, fig. 17. Obs. vol. vi. p. 47.

Flint River, Georgia, Bishop Elliott; Roswell, Cobb County, Georgia, N. A. Pratt, junior.

UNIO INCRASSATUS, Lea. Trans. Amer. Phil. Soc., vol. viii. pl. 16, fig. 34. Obs. vol. iii. p. 55.

*Branchial uterus* occupies the whole of the outer branchiæ. *Branchiæ* very large, nearly semicircular, inner ones much the larger, free more than half the length of abdominal sack. *Palpi* rather small, suboval, not united on the posterior edges. *Mantle* thin, with a broad margin. *Branchial opening* large, with rather large, dark papillæ. *Anal opening* very large, with small dark-brown papillæ. *Super-anal opening* rather small, slightly united below. Color of the mass light salmon.

*Embryonic shell* brownish, triangular, has no apparent hooks. In outline very much the same with *Anodonta imbecilis*. See Journ. Acad. Nat. Sci., vol. iv. pl. 5, fig. 36. Obs. vol. vi. p. 50.

Flint River, Georgia, Bishop Elliott.

UNIO NIGELLUS, Lea. Trans. Amer. Phil. Soc., vol. x. pl. 24, fig. 42. Obs. vol. v. p. 49.

*Branchial uterus* occupies the outer branchiæ in long ovisacks. *Branchiæ* large, much rounded below, inner ones much the larger, free nearly the whole length of abdominal sack. *Palpi* rather small, suboval, united only at the upper part of the posterior edges. *Mantle* very thin, with a rather broad margin. *Branchial opening* large, with numerous brown papillæ. *Anal opening* very large, with very numerous very small brown papillæ. *Super-anal opening* small, slightly united below. Color of the mass whitish.

*Embryonic shell*, while rather broad pouch-shape, has no hooks, very nearly the same with *nasutus*, Say.

Flint River, Georgia, Bishop Elliott.

UNIO TORTIVUS, Lea. Trans. Amer. Phil. Soc., vol. viii. pl. 12, fig. 17. Obs. vol. 3, p. 42.

*Branchial uterus* occupies the whole length of the outer branchiæ, but not the upper portion. *Branchiæ* large, rounded below, inner ones much the larger, free nearly the whole length of abdominal sack. *Palpi* small, suboval, not united on the posterior edges. *Mantle* thin, with a slightly thickened broad margin. *Branchial opening* large, with brown papillæ. *Anal opening* large, with numerous very small, dark-brown papillæ. *Super-anal opening* small, united below.

*Embryonic shell* broad pouch-shape, white, has no hooks.

Flint River and Chatahoochee River, Georgia, Bishop Elliott.

UNIO FRATERNUS, Lea. Trans. Amer. Phil. Soc., vol. x. pl. 16, fig. 15. Obs. vol. v. p. 19.

*Branchial uterus* ——. No ova were found here, but small, imperfect ones were found in abundance in the ovarium. *Branchiæ* large, much curved below, inner ones very much the larger, free nearly the whole length of abdominal sack. *Palpi* small, subtriangular, not united on the posterior edges. *Mantle* very thin, with a very large margin. *Branchial opening* rather large, with small, dark-brown papillæ. *Anal opening* very large, with numerous very minute, dark-brown papillæ. *Super-anal opening* very small, not united below. Color of the mass whitish.

Flint River, near Albany, Georgia, Bishop Elliott.

UNIO CRASSIDENS, Lam. An. sans Vert., vol. vi. p. 71.

*Branchial uterus* ——. No ova were found here, but the ovarium was filled. *Branchiæ* very large, rounded below, angular posteriorly, inner ones much the larger, free nearly two-thirds the length of the abdominal sack. *Palpi* small, round below, not united on the posterior edges. *Mantle* thin, with a very broad margin. *Branchial opening* rather large, with small, brownish papillæ. *Anal opening* very large, with numerous small, brownish papillæ. *Super-anal opening* rather small, slightly attached below. Color of the mass whitish.

Etowah River, Cass County, Georgia, Bishop Elliott. Common in the Ohio Basin.

UNIO CONRADIANUS, Lea. Trans. Amer. Phil. Soc., vol. v. pl. 9, fig. 23. Obs. vol. 1, p. 175.

*Branchial uterus* ——. No ova were found here, but the ovarium was filled. *Branchiæ* rather large, inner ones extending much anteriorly, free nearly half of the abdominal sack. *Palpi* small, suboval, not united on the posterior edges. *Mantle* thin, black on the posterior margin to the middle of the base. *Branchial opening* small, with small, brown papillæ. *Anal opening* large, with very small, brown papillæ. *Super-anal opening* rather small, not united below. Color of the mass whitish.

Etowah River, Georgia, Bishop Elliott.

*Remarks.*—In one of the three specimens before me, I found a filamentous *byssus*. The other two had the cicatrix where it was once united. The cicatrix is attached to the central part of the basal edge of the foot, in a longitudinal impression or cut. Posterior and close to this filament are the rudiments of a second one, which may, perhaps, be the remains of one severed close to the cut. The filament which remains is nearly one-fourth of an inch long, and is evidently broken off, so that it is impossible to say with certainty what was its original length when attached to the foreign substance to which it adhered. In this specimen the byssus is not thicker than a human hair, but in a specimen of *acutissimus* it was an inch long, and much thicker and flatter.



UNIO ACUTISSIMUS, Lea. Trans. Amer. Phil. Soc., vol. iv. pl. 10, fig. 18. Obs. vol. i. p. 99.

*Branchial uterus* occupies the whole width of the outer branchiæ, like that of *penicellatus*. *Branchiæ* wide, slightly curved below, inner ones much the larger, free nearly the whole length of abdominal sack. *Palpi* very small, suboval, not united on the posterior edges. *Mantle* thin, thickened on the margin, colored on the posterior basal inner edge. *Branchial opening* small, protruded, with small, brown papillæ. *Anal opening* large, with very minute brownish papillæ. *Super-anal opening* large, slightly united below. Color of the mass whitish.

*Embryonic shell* elongate pouch-shape, white, near to that of *penicellatus*, has no hooks. See Journ. Acad. Nat. Sci., vol. iv. pl. 5, fig. 5 and Obs. vol. vi. p. 47.

Etowah River, Georgia, Bishop Elliott.

*Remarks*—In one of the five specimens before me there is a fine filamentous *byssus* about an inch long, thicker than a horse hair, flattened and semitransparent, without the appearance of fibre, but rather horn-like. The point of attachment is in the posterior base of the foot, which is there a little enlarged and rounded, presenting the rudiments or remains of a second *byssus*. The outer end of the filament, in this specimen, where it was attached to the foreign substance to which the animal had anchored itself, is evidently perfect, showing the true length of the *byssus*. At this outer end it is divided into four filaments each evidently having been fastened to the foreign substance. While but one of these five specimens has the *byssus* remaining, it is evident, from the cicatrix or impressed cut, that all have been endowed with it, and that it is characteristic of this species and *Conradianus* to be anchored, and, where they are not found so, a rupture has taken place and thus given them the power of locomotion. That young *Uniones* of some, if not all the species, are anchored by a *byssus* was long since discovered by Dr. Kirtland, but it has never before, I believe, been observed in adults. (See more extended remarks on this subject in Proceed. Acad. Nat. Sci., Sept., 1856.)

UNIO STRIGOSUS, Lea. Trans. Amer. Phil. Soc., vol. viii. pl. 9, fig. 9. Obs. vol. iii. p. 36.

*Branchial uterus* ——. No ova were found here, but the ovarium was full. *Branchiæ* very wide, curved below and oblique posteriorly, inner ones much the larger, free nearly the whole length of abdominal sack. *Palpi* small, suboval, not united on the posterior edges. *Mantle* thin, thickened at the margin. *Branchial opening* small, with small, brownish papillæ. *Anal opening* large, with numerous small papillæ. *Super-anal opening* small, brownish on the inner edges, united below. Color of the mass whitish.

Columbus, Georgia, Bishop Elliott.

UNIO RADIATUS, Lam. An. sans Vert., vol. vi. p. 73.

*Branchial uterus* occupies the posterior portion of the outer branchiæ and extends

below the inferior border. The ovisacks are very large, subovate, blackish below and in one of the specimens there were eighteen on each side.\* *Branchiæ* very large, rounded below, inner ones the larger, blackish on the lower edges, united the whole length of abdominal sack. *Palpi* very large, subtriangular, attached about half way down the posterior edges. *Mantle* rather thin, very much thickened and dark on the posterior and basal margins, a coarse fringe extending below the branchial opening.† *Branchial opening* large, with numerous closely-set, dark-brown papillæ, on the ends of which the eyes are very perceptible, they being very sensitive in this species. *Anal opening* rather small, usually with very minute, brown papillæ, but in some specimens these papillæ are replaced by a mere corrugated edge. *Super-anal opening* [not very large, united below. Color of the mass whitish.

*Embryonic shell* ovately pouch-shape, white, some specimens had imperfect hooks at the base. See Journ. Acad. Nat. Sci., vol. iv. pl. 5, fig. 20. Obs. vol. vi. p. 48.

Mohawk, N. York, James Lewis, M. D.

UNIO COMPLANATUS = *Mya complanata*, Soland, MSS. in British Museum and Dillwyn's Des. Cat.

*Branchial uterus* ——. No ova were found here, but an immense number were found in the ovarium. *Branchiæ* very large, curved below, inner ones much the larger, free nearly the whole length of abdominal sack. *Palpi* rather large, subtriangular, united nearly half way down the posterior edges. *Mantle* thick, thicker at the margin. *Branchial opening* rather large, with numerous dark-brown papillæ. *Anal opening* large, with numerous, very small, dark-brown papillæ. *Super-anal opening* large, not united below, with a dark line on the exterior edges. Color of the mass whitish.

Schuylkill River, near Philadelphia; Schuyler's Lake, N. York, J. Lewis, M. D.; and Potomac River at Fort Washington, Prof. S. F. Baird.

*Remarks*.—I examined about one hundred living specimens from the Potomac on the 19th May, and observed but one with the branchial uterus charged, having segmented ova, while the females of *radiatus* from the same place were all fully charged with developed, pouch-shaped young. Thus the period of the two species seems to be very different.

\* I have observed, in November and December, that the young of *radiatus* are extruded in ovate sacks, perfectly white, 9-20ths by 4-20ths by 1-20th, containing about 1200. The young are complete, the valves usually lying open. January 31st, 1857, a fine, large sack was thrown out. February 2d, another. February 11th, two. February 13th, two. February 17th, two. March 2d, two. March 5th, two. Observations were not carried further. Subsequently, May 19th, 1863, I found many with full charged branchial uterus.

† In these specimens, from Mohawk, N. Y., there is a striking difference from those described by me from the Schuylkill. See Trans. Amer. Phil. Soc., vol. vi. pl. 15. Obs., vol. i. p. 52. The papillæ of the fringe are numerous and very close, obtuse, matted and speckled, and terminate below by a sudden enlargement, edged by larger papillæ.

UNIO SPINOSUS, Lea. Trans. Amer. Phil. Soc., vol. vi. pl. 16, fig. 50. Obs. vol. ii. p. 57.

*Branchial uterus* occupies the whole length of the outer branchiæ, the ovisacks being filled with ova not developed enough to give the form of the shell. *Branchiæ* very large, rounded below, the interior ones much the larger, free nearly the whole length of the abdominal sack. *Palpi* very large, suboval, united nearly half way down the posterior edges. *Mantle* thickened and somewhat doubled at the basal edge, having minute papillæ below the branchial opening. *Branchial opening* with numerous small, obtuse, subconical, light-brown papillæ. *Anal opening* with regular, small, closely-set, light-brown papillæ. *Super-anal opening* long, slightly colored on the inner edges and united below. Color of the mass whitish.

Altamaha River, near Darien, Georgia, J. Hamilton Couper, Esq.

*Remarks.*—The form of the ovisack is somewhat peculiar, being obliquely rounded at the lower end and pointed at the upper. It is very flat and white, a half inch long and about an eighth wide in the middle. A single ovisack contains an immense number of very small, white ova which seem to be arranged in regular oblique rows. In some specimens the ovisacks were found in the cavity over the branchiæ, evidently having passed from the uterus on their way out above. They were lying there superimposed on each other in great number. The cicatrices made by muscular attachment in the shell are very deep, that of the mantle unusually so and particularly below the branchial opening, where there is quite a lunate cicatrix enlarged on the line of the palleal cicatrix. There are also deep cicatrices running from the base of the spines, inside, towards the palleal cicatrix, and generally enlarging in the latter. A half-grown specimen presented the two lower (4th) spines perfectly hollow to the end, they being not more than half the usual length. The hole on the interior of both valves is perfect. In another specimen there was but one long spine, and this had a long extension of the side of the mantle, like the finger of a glove, which passed from the edge of the mantle, united to it for a quarter of an inch and then passed under the arch of the spinal cavity into the spine to the top. This finger-like extension being quite an inch long.

UNIO DOLABRÆFORMIS, Lea. Trans. Amer. Phil. Soc., (2), vol. vi. pl. 24, fig. 113. Obs. vol. iv. p. 103.

*Branchial uterus* occupies the posterior portion of the outer branchiæ in fifteen to twenty large ovisacks, very like *cariosus*, the inferior border being blackish. *Branchiæ* very large, round below, inner ones the larger, united the whole length of abdominal sack, except at the posterior point where the hole is so small as scarcely to be detected. *Palpi* very large, suboval, united half way down the posterior edges. *Mantle* rather thick, with a broad, thickened margin, colored along the posterior basal portion. *Branchial opening* large, with numerous large and small reddish-brown papillæ. *Anal opening* rather small, with numerous very small.

reddish papillæ. *Super-anal opening* large, colored on the inner edges and united below. Between the anal and super-anal opening the edges of the mantle are attached for some distance, presenting a flat, colored, fleshy attachment. Through this there are, in all the ten specimens before me, one or two small, oval holes leading into the great cavity. The surface of the space is mottled reddish color.\* Color of the mass whitish. Immediately below the branchial opening the edge of the mantle is much thickened, and there are a few small papillæ, which fringe the edges. On the upper part of this thickening there is a black dot on the outer sides similar to that observed in *lineatus*. The lower part of this thickening is terminated by a fleshy process.

*Embryonic shell* elongate pouch-shape, near to that of *U. anodontoides*, has no hooks. See Journ. Acad. Nat. Sci. vol. iv. pl. 5, fig. 2. Obs. vol. vi. p. 46.

Altamaha River, near Darien, J. Hamilton Couper, Esq.

UNIO SPLENDIDUS, Lea. Trans. Amer. Phil. Soc. (2), vol. vi. pl. 19, fig. 61. Obs. vol. ii. p. 70.

*Branchial uterus* ——. No ova were found here, nor in the ovarium. *Branchiæ* large, curved below, inner ones much the larger, united the whole length of the abdominal sack. *Pulpi* very large, thick, suboval, united half way down the posterior edges. *Mantle* rather thick, much thickened and double on the inferior edges. *Branchial opening* with small, dark-brown papillæ. *Anal opening* with dark-brown papillæ. *Super-anal opening* rather large, dark on the interior edges and united below. Color of the mass whitish.

Hopeton, near Darien, Georgia, Major T. C. Downie.

*Remarks*.—Among the eleven specimens before me none had ova, although several were evidently females by the outward form of the shell.

UNIO LUGUBRIS, Lea. Trans. Amer. Phil. Soc. (2), vol. vi. pl. 96, fig. 25. Obs. vol. ii. p. 30.

*Branchial uterus* occupies nearly the whole length of abdominal sack, very much as in *complanatus*. *Branchiæ* wide, slightly curved below, the inner ones very much the larger, free nearly the whole length of the abdominal sack. *Pulpi* large, ovately triangular, united for a short distance on the posterior edges. *Mantle* brownish, white along the margin. *Branchial opening* small, with small, blackish papillæ. *Anal opening* rather large, with numerous very small, blackish papillæ. *Super-anal opening* rather small, blackish on the inner edges and united below. Color of the mass whitish.

Altamaha River, near Darien, Georgia, J. Hamilton Couper, Esq.; and Satilla River, Major T. C. Downie.

\* I have never observed this character before, except in a single specimen of *luteolus*, where there were four holes. See description, ante, page 402.

*Remarks.*—About sixty specimens were received from the above two habitats, none of which had the embryonic shell formed. Those from Major Downie were collected in March, and the females had passed some of their ova into the branchial uterus, which were there becoming matured.

UNIO TENERUS, Ravenel. Catalogue.

*Branchial uterus* occupies the posterior portion of the outer branchiæ, like *cariosus*, in large ovisacks, and having a dark border below. There were sixteen ovisacks in each of the outer branchiæ. *Branchiæ* rather small, inner ones much the larger, edge of the branchia not attached to abdominal sack, but still there appears to be *no opening* to the interior of the leaf. *Palpi* rather long, subtriangular, united but a short distance. *Mantle* thickened at the lower margin, where it is slightly lead color, has papillæ below the branchial opening. *Branchial opening* with numerous small, dark papillæ. *Anal opening* small, with numerous minute papillæ. *Super-anal opening* not very large, edges colored, united below. Color of the mass whitish.

Near Darien, Georgia, J. Hamilton Couper, Esq. and Major T. C. Downie.

UNIO SHEPARDIANUS, Lea. Trans. Amer. Phil. Soc. (2), vol. v. pl. 13, fig. 38. Obs. vol. i. p. 207.

*Branchial uterus* ——. No ova were found here, but they were numerous in the ovarium. *Branchiæ* very wide and narrow, nearly straight below, the inner ones somewhat the larger, free nearly the whole length of the abdominal sack. *Palpi* long, transverse, short at the posterior end, where the edges are not united. *Mantle* dark, whitish along the lower margin, edges not colored. *Branchial opening* rather large, with numerous small papillæ within the row of which the lining is black. *Anal opening* rather small, with numerous small papillæ, inside of which there is a black line. *Super-anal opening* very large, bordered with a black line inside and out, that on the outside continuing along the edge to the basal margin, united for some distance below. Color of the mass whitish.

Near Darien, Georgia, J. Hamilton Couper, Esq.

*Remarks.*—The specimens were about four inches wide. Several had ventral muscular attachments.

UNIO HOPETONENSIS, Lea. Trans. Amer. Phil. Soc., vol. vi. pl. 9, fig. 24. Obs. vol. ii. p. 29.

*Branchial uterus* ——. No ova were found here, but a number had ova in the ovarium. *Branchiæ* large, much curved below, inner ones nearly double the size of the outer, free rather more than half the length of abdominal sack. *Palpi* rather large, subtriangular, united for a short distance on the posterior edges. *Mantle* dark colored, thickened at the margin. *Branchial opening* large, with numerous small, brownish papillæ. *Anal opening* very large, with very minute papillæ. *Super-anal*

*opening* not very large, bordered within with a black line, united below. Color of the mass impure white.

Near Darien, Georgia, J. Hamilton Couper, Esq.

UNIO CAMPTODON, Say = *Sayii*, Tappan. Am. Conch., pl. 42.

*Branchial uterus* ——. No ova were found here, but an immense number were in the ovarium. *Branchiæ* rather large, light-salmon, curved below, inner ones much the larger, free nearly the whole length of abdominal sack. *Palpi* large, subtriangular, united one-third down the posterior edges. *Mantle* rather thick, thicker and double along the margin, dark-brown inside of the posterior edges. *Branchial opening* with numerous uncolored papillæ, which are branched or dendritic when the water is flowing through. *Anal opening* small, with numerous minute papillæ on the inner edges, except on the upper portion. *Super-anal opening* large, united below. Color of the mass whitish.

H. Moores, Columbus, Ohio.

*Remarks.*—The liver of all the specimens examined—quite a number—were remarkably yellow. Usually in other species it is greenish. The vitellus of the ova, which were granulating, was also found to be more yellow than usual, and was surrounded by pure white liquor amnii.

UNIO RUBIGINOSUS, Lea. Trans. Amer. Phil. Soc. (2), vol. iii. pl. 8, fig. 10. Obs. vol. i. p. 41.

*Branchial uterus* occupies the whole of *both branchiæ on both sides*. The ovisacks are long and narrow, pointed at both ends, and contain about four hundred ova. None were matured into the embryonic shell, and the ovisacks are probably extruded before they are so matured. The ova are bright red, minute, in immense quantity, and the color may be seen through the integuments of the abdominal sack as well as in the branchiæ. *Branchiæ* large, nearly semicircular, the inner ones rather the larger, free nearly the whole length of the abdominal sack. *Palpi* very wide, thin, subtriangular, united half way down the posterior edges. *Branchial opening* rather large, with numerous delicate, salmon-colored papillæ. *Anal opening* with very delicate papillæ. *Super-anal opening* small, near to the anal opening and united below. Color of the mass white or salmon-color, sometimes deep orange, much deeper in the adductor muscles and in the foot, which is remarkably triangular in its form.

Cincinnati, T. G. Lea and D. H. Schaffer; Columbus, Ohio, H. Moores.

*Remarks.*—The *U. subrotundus* was the first species I met with which has that remarkable characteristic of bright *red eggs*. It is also remarkable in having the branchial uterus pervading all the *four leaves* of the *branchiæ*. Subsequently I found that *U. rubiginosus* and *Æsopus* had this remarkable character of *red eggs*, but the

latter had not the uterus pervading the four leaves of the branchiæ as the former has. This multiplied uterus also exists in *U. multiplicatus*\* and *Kleinianus*. The ovisacks of *rubiginosus* are long and slender, and when extruded by the parent they are rose red, the eggs giving a color to the whole ovisack. The eggs were only so far advanced as to present the *vitellus* granulated, and this was bright red, surrounded by white liquor amnii. We therefore have four species with the uterus pervading the four leaves of the branchiæ,—viz. :

*Unio multiplicatus.*

*Unio rubiginosus.*

*Unio Kleinianus,*

*Unio subrotundus.*

And three species with the remarkable character of red eggs,—viz. :

*Unio rubiginosus,*

*Unio subrotundus.*

*Unio Æsopus.*

The first two being included in the list of the four branchiæ being occupied by the uterus. See remarks on *subrotundus*.

UNIO UNULATUS, Bar. Amer. Jour. Sci., vol. vi. p. 120.

*Branchial uterus* occupies the whole of the outer branchiæ. *Branchiæ* rather large, semicircular, inner ones very much the larger, free the whole length of abdominal sack. *Palpi* large, oval, thin, united half way down the posterior edges. *Mantle* rather thin, thickened at the edges. *Branchial opening* large, with numerous brownish papillæ. *Anal opening* large, with numerous, very small, pale papillæ. *Super-anal opening* very large, with a linear black edge, not united below. Color of the mass whitish.

*Embryonic shell* triangular, brown or white, has no hooks. See Jour. Acad. Nat. Sci., vol. iv. pl. 5, fig. 22, and Obs. vol. vi. p. 48.

Columbus, Ohio, H. Moores.

*Remarks.*—I have never before observed in the embryonic shells a difference in those of the same parent. In the only female I have received of this species, with the embryonic shells matured, some were clear white, while others were dark-brown.

UNIO GIBBOSUS, Bar. Amer. Jour. Sci., vol. vi. p. 262.

*Branchial uterus* occupies the whole width of the outer branchiæ. *Branchiæ* very wide, curved below, inner one much the larger, free more than half the length of the abdominal sack. *Palpi* very small, subtriangular, free the whole length of the posterior edges. *Mantle* thin, thickened on the margin. *Branchial opening* large,

\* See Journ. Acad. Nat. Sci., vol. iv. pl. 30, fig. 105, and Obs. vol. vii. p. 40. Also Proc. Acad. Nat. Sci., December 6th. 1859.

with numerous small, blackish papillæ. *Anal opening* large, with numerous small, black papillæ. *Super-anal opening* large, black on the edge and united below. Color of the mass dirty white.

*Embryonic shell* short pouch-shape, white, has no hooks, very nearly of the same form as *phaseolus*. See Journ. Acad. Nat. Sci., vol. iv. pl. 5, fig. 12. Obs. vol. vi. p. 47.

Columbus, Mississippi, Dr. Spillman; Fox River, Illinois, H. C. Grosvenor.

*Remarks.*—The female described above was from Dr. Spillman. Others examined were from Mr. Grosvenor and were smaller. Two of these were females having ova in the ovarium. I was surprised to find these of an elliptical form, quite different from the ordinary globular form.

UNIO EXIGUUS, Lea. Trans. Amer. Phil. Soc., (2,) vol. viii. pl. 7, fig. 1. Obs. vol. iii. p. 29.

Only a single specimen, a male, was examined.

*Branchiæ* very large, much rounded below, the inner ones the larger, united the whole length of abdominal sack. *Palpi* large, subtriangular, thick, united for a short distance on the posterior edges. *Mantle* thin, double and thick on the lower margin, which is dark and maculate, and has papillæ along the edges. *Branchial opening* large, with numerous reddish-brown and black, rather coarse papillæ. *Anal opening* large, very dark reddish-brown, with small papillæ on the edges. *Super-anal opening* very large, dark-brown and maculate on the inner edges, united below. Color of the mass whitish.

Roswell, Cobb County, Georgia, N. A. Pratt, Jr.

UNIO STRIATUS, Lea. Trans. Amer. Phil. Soc., (2,) vol. viii. pl. 12, fig. 16. Obs. iii. p. 41.

*Branchial uterus* ——. No ova were found, but they were in quantity in the ovarium. *Branchiæ* large, nearly semicircular, inner ones much the larger, free nearly the whole length of abdominal sack. *Palpi* small, subelliptical, united only at the upper part of the posterior edges. *Mantle* thin. *Branchial opening* rather small, with very small papillæ. *Anal opening* large, with numerous very small papillæ. *Super-anal opening* large, united below. Color of the mass whitish or light-salmon.

Roswell, Cobb County, Georgia, N. A. Pratt, Jr.; and Baldwin County, Georgia, J. Postell.

UNIO OCCIDENS, Lea. Trans. Amer. Phil. Soc., (2,) vol. iii. pl. 10, fig. 16. Obs. vol. i. p. 49.

*Branchial uterus* occupies about one-third of the posterior portion of the outer branchiæ, being in long ovisacks, which are extended below the line of the branchiæ and are blackish on the lower margin. *Branchiæ* large, semicircular, inner one the larger, united the whole length of abdominal sack. *Palpi* rather large, thin, subangular, united nearly half way down the posterior edges. *Mantle* rather thin, with



a broad, thickened margin and a fleshy, fringed thickening below the branchial opening, which terminates in a more or less enlarged, flattened process, which has somewhat long papillæ. On the upper exterior part of this fleshy border there is on each side a black spot in the female, but not the male, like to that in *lineatus*, *radiatus* and *dolabræformis*. *Branchial opening* large, with rather large papillæ. *Anal opening* rather small, with thick, spotted edges, which appear to be devoid of papillæ. *Super-anal opening* large, slightly colored on the inner edges and united below. Color of the mass whitish.

*Embryonic shell* ovately-pouch-shape, white, has no hooks. See Journ. Acad. Nat. Sci. (2), vol. iv. pl. 5, fig. 13, and Obs. vol. vi. p. 47.

Columbus, Ohio, H. Moores; and Fox River, Illinois, H. C. Grosvenor.

UNIO IRIS, Lea. Trans. Amer. Phil. Soc., vol. iii. (2.) pl. 11, fig. 18, and Obs. vol. i. p. 53.

A single male specimen only received.

*Branchiæ* large, very thin, inner one much the larger, free nearly the whole length of abdominal sack. *Palpi* small, very thin, subtriangular, united only for a short distance on the posterior edges. *Mantle* very thin, colored on the margin only about the siphonal openings. *Branchial opening* rather large, with very numerous small papillæ. *Anal opening* small, blackish, with very small papillæ. *Super-anal opening* large, spotted within and united below. Color of the mass white.

Columbus, Ohio, H. Moores.

UNIO NOVI-EBORACI, Lea. Trans. Amer. Phil. Soc., (2.) vol. vi. pl. 24, fig. 114. Obs. vol. ii. p. 104.

*Branchial uterus* occupies nearly the whole length of outer branchiæ, blackish on the inferior margin, each sack terminating with a whitish spot. *Branchiæ* large, thin, inner ones much the larger, some free only a short distance on the posterior portion of abdominal sack and some not free. *Palpi* small, thin, subtriangular, attached but a short distance on the posterior edges. *Mantle* very thin, thickened at the margin and fringed below the branchial opening. *Branchial opening* rather large, with very numerous small papillæ. *Anal opening* small, blackish, with minute papillæ. *Super-anal opening* long, spotted within and united below. Color of the mass whitish.

*Embryonic shell* pouch-shape, clear white, has no hooks. See Journ. Acad. Nat. Sci., (2.) vol. iv. pl. 5, fig. 14, and Obs. vol. vi. p. 47.

Fox River, Illinois, H. C. Grosvenor.

*Remarks.*—Six females which were examined had from fifteen to twenty rather large ovisacks in each of the outer branchiæ. It is remarkable that the branchiæ in two specimens should be united the whole length of the abdominal sack, while others should be open for a short distance, showing that this is not a character of

sufficient importance to make generic divisions as proposed by Prof. Agassiz. The papillæ on the margin of the mantle below the branchial opening were larger, more distant than on the branchial opening, and were colored. On the posterior inner margin of the mantle, inside of the papillæ, the females have an enlargement for some distance, which was covered with whitish clouded spots.

UNIO PERPLEXUS, Lea. Trans. Amer. Phil. Soc., (2,) vol. iv. pl. 17, fig. 42, and Obs. vol. i. p. 122.

*Branchial uterus* occupies the posterior half of the outer branchiæ. *Branchiæ* small, light liver-brown, rather thick, rounded below, inner ones the larger, united the whole length of abdominal sack. *Palpi* rather small, transverse, subrotund, united half way down the posterior edges. *Mantle* rather thick, dark on the margin, very much enlarged, thickened, and extended into a flap offset on the posterior inferior margin, blackish on the border, the inner double edges having numerous small papillæ. *Branchial opening* rather large, brown, with numerous small, brown papillæ. *Anal opening* small, with very minute brown papillæ. *Super-anal opening* moderately large, brownish and somewhat maculate within, edges thick and united below. Color of the mass whitish, inclined to salmon.

*Embryonic shell* subrotund, clear white, has no hooks. See Jour. Acad. Nat. Sci. (2,) vol. iv. pl. 5, fig. 21, and Obs. vol. vi. p. 48.

Columbus, Ohio, H. Moores. White River, Indiana, D. H. Shaffer.

*Remarks.*—The remarkably extended form of the posterior part of the valves of the female indicate the extended fleshy flap, which is always found in the female of this species. A number of fine specimens were sent to me from the two habitats mentioned above. The fleshy margin and the flap extending beyond are white outside, but inside the margin is black while the flap extending beyond is brownish, maculate with black. In one of the female specimens there is a small process, like a style, coming apparently from the liver over the anterior adductor muscle. It is white and thread-like, about half an inch long and enlarged at the point. It suggested the idea of an ovipositor if such a thing ever existed in the *Unionidæ*. The style found in the female of *cariosus* is much larger and longer than this and is transparent.

UNIO TRIANGULARIS, Bar. Am. Jour. Sci., vol. vi. p. 272.

*Branchial uterus* occupies the posterior part of the outer branchiæ; it is large, white and crenulate at the lower edges. *Branchiæ* not large, inner ones the larger anteriorly, united the whole length of abdominal sack. *Palpi* very small, subelliptical, united a short distance on the posterior edges. *Mantle* thin, thickened on the margin, maculate on the outer posterior edges; below the branchial opening there is a fleshy, brownish black enlargement and numerous rather large papillæ. *Branchial opening* rather small, with very small papillæ. *Anal opening* without papillæ, but corrugated on the edges. *Super-anal opening* small, united below. Color of the mass very white.

The posterior adductor muscle is enormously large, exhibiting great power in closing the valves.

*Embryonic shell* clear white, ovately pouch-shape, has no hooks. See Journ. Acad. Nat. Sci., vol. iv. pl. 5, fig. 19, and Obs. vol. vi. p. 48.

Columbus, Ohio, H. Moores.

*Remarks.*—This well-known and well-characterized species is remarkable for its outward form, and particularly in the enlargement of the female on the posterior basal margin and umbonial slope. The fleshy enlargement of the flap is hard. The absence of papillæ on the anal opening is very remarkable in a *Unio*.

UNIO CYLINDRICUS, Say. Nich. Ency., Amer. ed., Art. *Conch.*, pl. 4, fig. 3.

*Branchial uterus* ——. No ova were found here, but the ovarium was found filled with dark saffron-yellow ova, which were well developed. *Branchiæ* very wide, the lower margin nearly parallel with the upper margin, inner ones rather the larger, free nearly the whole length of the abdominal sack. *Palpi* large, rather transverse, subelliptical, angular at the posterior end, united half way down the posterior edges. *Mantle* rather thick, much thicker on the margin, saffron-yellow, deeper on the margin, the outer edge of which is blackish. *Branchial opening* rather large, with numerous small papillæ, covered with *pigmentum nigrum*. *Anal opening* very large, *without papillæ*, but with slightly crenulate edges, inside edges black, outside edges yellowish. *Super-anal opening* very large, dark-brown on the edges, covered with *pigmentum nigrum* within, slightly united below. Color of the mass saffron, deeper in the larger muscles and foot, which is covered with *pigmentum nigrum*. On the inner side of the mantle, along the junction with the branchiæ, the veins leading to the branchiæ are beautifully displayed, the interspaces being covered with *pigmentum nigrum*.

Columbus, Ohio, H. Moores.

*Remarks.*—The remarkable outline of the valves of this species would lead one to expect some essential difference in the form of the soft parts, but there does not appear to be any very remarkable difference. The color is unusually saffron, and the absence of papillæ on the *anal opening* is remarkable, as well as the *pigmentum nigrum*. It is to be regretted that none of the specimens had developed embryonic shells. It is possible that when observed they may be found to differ from any species yet described.

UNIO STRIATULUS, Lea. Journ. Acad. Nat. Sci., (2,) vol. v. p. 55, and Obs. vol. viii. p. 59.

*Branchial uterus* ——. No ova were found here, but minute ones were in the ovarium. *Branchiæ* large, thin, nearly semicircular, free two-thirds the length of abdominal sack. *Palpi* rather large, thin, subtriangular, united nearly half way

down the posterior edges. *Mantle* thin, thickened at the edges. *Branchial opening* small, with a few brownish papillæ. *Anal opening* rather large, with numerous small, brownish papillæ. *Super-anal opening* rather small, united below. Color of the mass whitish.

Flint River, Butler County, Georgia, H. M. Neisler, M. D.

*Remarks.*—A single specimen only was received in alcohol. Although the habitat is so far removed from specimens sent by Dr. Emmons from N. Carolina, I cannot perceive any difference in the characters of the outward hard parts.

UNIO MONODONTUS, Say = *soleniformis*, Lea. Disseminator, 1829; and Am. Conch., pl. 6.

*Branchial uterus* —. No ova were found here, but they were in the ovarium. *Branchiæ* very wide and short, nearly straight below, the inner ones much the larger, free two-thirds the length of the abdominal sack, the posterior extremity not attached to the mantle as it usually is, but is unconnected for nearly half an inch, the point standing out free and some distance from the edge of the mantle. *Palpi* very large, transverse, subfalcate, united more than half way down the posterior edges. *Branchial opening* brownish, very large, with numerous irregular papillæ in groups. *Anal opening* large, black on the inner edges, with very small papillæ. *Super-anal opening* rather larger, black on the inner edges, not united below. Color of the mass dirty white. The abdomen is long and rather lank, the foot being at the anterior end and not along the whole inferior part of the abdominal sack as usual.

Ohio River at Jeffersonville, Indiana, Capt. S. S. Lyon, U. S. Engineer Corps.

*Remarks.*—It is to be regretted that none of the specimens had the embryos matured enough to observe the form of the embryonic shell. The form of the outer hard parts as well as the soft parts is so different from other *Unionidæ*, except *Margaritana margaritifera*, that we might expect to find a strong variation in the important part of the embryonic shell, but, unfortunately, we have not yet seen the embryonic shell of either of them. The most remarkable characteristic of both these shells is the *off-setting* posterior point of the branchiæ. I have not seen it in any other of the numerous species which I have examined. In other characters there are also strong affinities. See description of *M. margaritifera*, Journal Acad. Nat. Sci., (2,) vol. iv. p. 224 and Obs. vol. vii. p. 42. In one of the specimens examined I found the two inner leaves of the branchiæ united in a line from top to bottom.

UNIO PATULUS, Lea. Trans. Amer. Phil. Soc., (2,) vol. iii. pl. 12, fig. 20. Obs. vol. i. p. 55.

*Branchial uterus* —. No ova were found here, but they were in the ovarium. *Branchiæ* very large, much rounded below, inner ones much the larger, free nearly

the whole length of the abdominal sack. *Palpi* small, transverse, suboval, not united on the posterior edges. *Mantle* thin, thicker on the margin. *Branchial opening* large, with rather large papillæ. *Anal opening* small, with very small papillæ. *Super-anal opening* very large, colored on the inner edges and united below. Color of the mass whitish.

Columbus, Ohio, H. Moores.

UNIO FABALIS, Lea, = *capillus*, Say, = *lapillus*, Say. Trans. Amer. Phil. Soc., (2,) vol. iv. pl. 10, fig. 16, and Obs. vol. i. p. 96.

*Branchial uterus* occupies the posterior part of the outer branchiæ. *Branchiæ* small, the inner ones the larger, curved below, free about half the length of the abdominal sack. *Palpi* small, somewhat transverse, oval, not united on the posterior edges. *Mantle* thin, dark-brown on the margin, inside and out, fringed below the branchial opening, with maculations somewhat like *Margaritana marginata*. *Branchial opening* rather large, with rather brown small papillæ. *Anal opening* small, with numerous small papillæ. *Super-anal opening* rather large, dark-brown and maculate on the outer edges, united below. Color of the mass whitish.

UNIO PRESSUS, Lea. Trans. Amer. Phil. Soc., (2,) vol. iii. pl. 12, fig. 22, and Obs. vol. i. p. 64.

*Branchial uterus* occupies the whole of the outer branchiæ. *Branchiæ* large, rounded below, free nearly the whole length of abdominal sack. *Palpi* small, subangular, united half way down the posterior edges. *Mantle* thin, slightly thickened on the margin. *Branchial opening* large, blackish on the edges and with numerous papillæ. *Anal opening* rather small, blackish and *without papillæ*. *Super-anal opening* rather large, united for some distance below, blackish on the edges. Color of the mass dirty white.

*Embryonic shell* subtriangular, light-brown, has hooks. See Journ. Acad. Nat. Sci., (2,) vol. iv. pl. 5, fig. 23 and Obs. vol. vi. p. 48.

Cincinnati, Ohio, T. G. Lea; Fox River, Illinois, H. C. Grosvenor; and Columbus, Ohio, H. Moores.

*Remarks*.—This species is remarkable in its outward hard parts for its small lateral teeth, and in the soft parts not having papillæ on the edges of the *anal opening*.

UNIO COCCINEUS, Lea. Trans. Amer. Phil. Soc., (2,) vol. vi. pl. 5, fig. 12, and Obs. vol. ii. p. 12.

*Branchial uterus* ——. No ova were found here, but the ovarium was filled with them. *Branchiæ* large, semicircular, inner ones much the larger, free nearly the whole length of abdominal sack. *Palpi* small, subtriangular, united a short distance on the posterior edges. *Branchial opening* rather large, with numerous colored papillæ. *Anal opening* rather large, with very small, colored papillæ. *Super-anal opening* large, colored within and united below. Color of the mass whitish.

Fox River, Illinois, H. C. Grosvenor.

UNIO SPATULATUS, Lea. Trans. Amer. Phil. Soc., (2,) vol. x. pl. 8, fig. 22 and Obs. vol. iv. p. 54

*Branchial uterus* occupies the posterior half of the outer branchiæ, colored on the lower edges, with about fifteen large ovisacks in each of the outer leaves. *Branchiæ* large, rounded below, the inner ones much the larger, united the whole length of the abdominal sack. *Palpi* small, subtriangular, united only a small distance down the posterior edges. *Mantle* very thin, slightly thickened and colored on the edges. *Branchial opening* rather large, with numerous small colored papillæ. *Anal opening* rather small, with very minute papillæ. *Super-anal opening* somewhat large, colored along the inner edges and united below. Color of the mass dirty white.

*Embryonic shell* pouch shape, clear white, has no hooks. See Jour. Acad. Nat. Sci., vol. iv. pl. 5, fig. 9. Obs. vol. vi. p. 47.

Fox River, Illinois, H. C. Grosvenor.

UNIO LIGAMENTINUS, Lam. An. sans Vert. vol. vi. p. 72.

*Branchial uterus* occupies two-thirds the width of the outer branchiæ and is enormously distended, measuring two and half inches wide and one and a quarter long by one-tenth thick. There were nearly forty ovisacks in each lobe, which was nearly semicircular. These ovisacks extended nearly half an inch below the lower margin of the branchiæ. *Branchiæ* very large, nearly circular below, inner ones much the larger, united the whole length of the abdominal sack. *Palpi* small, subelliptical, united about one-third down the posterior edges. *Mantle* rather thin, thickened at the margin and slightly colored at the edges. *Branchial opening* large, with numerous small brownish papillæ. *Anal opening* large, with an irregular creniform edge. *Super-anal opening* large, colored within and united below. Color of the mass dirty white.

*Embryonic shell* pouch shape, clear white, has no hooks. See Journ. Acad. Nat. Sci., (2) vol. iv. pl. 5, fig. 18 and Obs. vol. vi. p. 47.

Fox River, Illinois, H. C. Grosvenor, and Columbus, Ohio, H. Moores.

*Remarks.*—The ovisacks in the full grown of this species are of great size. In one of the specimens measuring six inches wide, I found the uterus enormously extended, and some of the ovisacks were one and a half inch long, four-tenths thick and two-tenths wide. There were forty ovisacks on each side and a single one probably containing over 10,000 embryonic shells, producing nearly a million in one season by a single female! This species seems to be another which has not papillæ on the anal opening.

UNIO EBENUS, Lea. Trans. Amer. Phil. Soc., (2) vol. iv. pl. 9, fig. 14. Obs. vol. vi. p. 94.

*Branchial uterus* —. No ova were found here, but they were in the ovarium. *Branchiæ* large, rounded below, inner ones much the larger, free nearly three-fourths of the length of the abdominal sack. *Palpi* large, subelliptical, transverse, united

one-third down the posterior edges. *Mantle* rather thick, thickened and colored on the margin. *Branchial opening* very large, with numerous small colored papillæ. *Anal opening* large, with numerous very small colored papillæ. *Super-anal opening* rather large, colored within and united below. Color of the mass dirty white.

Cincinnati, Ohio, J. Clark; and Columbus, Ohio, H. Moores.

UNIO LÆVISSIMUS, Lea, (*Symphanota*,) Trans. Amer. Phil. Soc. (2,) vol. iii. pl. 13, fig. 23, and Obs. vol. i. p. 58.

*Branchial uterus* occupies one-third of the posterior portion of the abdominal sack, is pendent, curving posteriorly, and is crenulate on the inferior edges. *Branchiæ* very small, slightly rounded below, inner ones the larger anteriorly, but small posteriorly, united the whole length of abdominal sack. *Pulpi* rather large, rather transverse, subelliptical, united half way down the posterior edges. *Mantle* thin, very much thickened at the posterior inferior border, and extended into the wing. *Branchial opening* small with very minute colored papillæ. *Anal opening* rather large, without papillæ. *Super-anal opening* large, united for some distance below. Color of the mass whitish. The adductor muscles are very large, and the anterior tractor muscle is so large as to make a cicatrix like that of *Iridina*. The dorsal muscles are numerous and large.

*Embryonic shell* wedge-shape, clear white, with a hook-like process at each lower angle. See Journ. Acad. Nat. Sci. (2,) vol. iv. pl. 5, fig. 24. Obs. vol. vi. p. 48.

Cincinnati, Ohio, J. Clark; and Columbus, Ohio, H. Moores.

*Remarks.*—The *wedge-shape* form of this embryonic shell is very remarkable. I have observed but two others which take this form, viz., *Unio alatus* and *Unio purpuratus*. It will be observed that they form, in this character, a distinctive group, totally different from all the other species yet observed. In the branchial uterus ova and well formed embryonic shells were found. In the old specimens I found that the space between the anal and super-anal openings was interrupted by one, two or three holes, the edges being disunited.

UNIO TUBERCULATUS, Bar. Am. Journ. Sci. vol. vi. p. 125.

*Branchial uterus* —. No ova were found here, but they were in the ovarium. *Branchiæ* very wide, rounded below, inner ones much the larger, free two-thirds the length of the abdominal sack. *Pulpi* very large, thin, nearly transverse, subtriangular, united nearly half way down the posterior edges. *Mantle* rather thin, with a broad thickened border. *Branchial opening* rather large, with numerous, rather large, dark papillæ. *Anal opening* enormously large, with numerous very minute papillæ. *Super-*

*anal opening* enormously large, colored on the edges and united below. Color of the mass whitish. The adducted muscles very large.

Cincinnati, Ohio, J. Clark; and Columbus, Ohio, H. Moores.

UNIO RANGIANUS, Lea. Trans. Amer. Phil. Soc., (2,) vol. vi. pl. 18, fig. 26, and Obs. vol. ii. p. 95.

*Branchial uterus* —. No ova were found here, but they were in the ovarium. *Branchiæ* rather large, nearly semicircular, inner ones much the larger, united the whole length of abdominal sack. *Palpi* rather small, suboval, not united on the posterior edges. *Mantle* thin, very much thickened and prolonged on the inferior posterior portion, which is here enlarged into a flap on each side, having an offset, the edge of which is slightly crenulate. *Branchial opening* rather small, with minute papillæ. *Super-anal opening* rather large, colored on the inner edges. Color of the mass whitish.

Columbus, Ohio, H. Moores.

*Remarks.*—This species is very nearly allied to *perplexus* in the outward hard parts, and the soft parts seem to differ but little. Two of the female specimens examined were not found to have the edges below the super-anal opening united, but this may have been accidental, as they were not in good order.

UNIO MULTIRADIATUS, Lea. Trans. Amer. Phil. Soc. (2) vol. iii. pl. 9, fig. 15, and Obs. vol. i. p. 48.

*Branchial uterus* occupies the posterior half of the outer branchiæ like *cariosus*. There were thirteen ovisacks on one side, but not so many on the other. *Branchiæ* large, nearly semicircular, inner ones much the larger, united the whole length of the abdominal sack. *Palpi* small, subtriangular, united a very short distance down the posterior edges. *Mantle* thin, thicker along the margin, with a few papillæ below the branchial opening, which are larger in the female than in the male. In the female there is at the lower termination of these papillæ a flat enlargement or flap-like process, as in *ventricosus* and other allied species. *Branchial opening* rather large, with numerous rather large papillæ. *Anal opening* small, crenulate on the edges. *Super-anal opening* rather large and united for some distance below. Color of the mass whitish.

*Embryonic shell* ovato pouch-shape, clear white, has no hooks. See Journ. Acad. Nat. Sci., (2) vol. iv. pl. 5, fig. 17, and Obs. vol. vi. p. 47.

Columbus, Ohio, H. Moores.

*Remarks.*—This is one of the species of *Unio* in which the papillæ are absent on the *anal opening*.

UNIO RECTUS, Lam. An. sans Vert., vol. vi. p. 74.

*Branchial uterus* occupies the posterior half of the outer branchiæ, there being



thirty-one ovisacks on each side, three-fourths of an inch long. *Branchiæ* very wide and large, rounded below, inner ones the larger, united the whole length of abdominal sack. *Palpi* large, suboval, united half way down the posterior edges. *Mantle* thin, thicker and doubled along the margin, which is colored and furnished with branching papillæ below the branchial opening. In the male these papillæ are very small. Between this line and the outer edge of the mantle the interspace is granulate. *Branchial opening* rather large, with numerous rather small papillæ. *Anal opening* rather small, colored, with granulations on the inner edges. *Super-anal opening* rather large, colored on the inner edges and united below. Color of the mass whitish.

*Embryonic shell* pouch-shape, clear white, has no hooks. See Journ. Acad. Nat. Sci., (2), vol. iv. pl. 5, fig. 11. Obs. vol. vi. p. 47.

Columbus, Ohio, H. Moores.

*Remarks.*—This is another of the *Uniones* which are without papillæ on the edges of the anal opening. Its outward form and general character of the hard parts is very different from the previously described species.

UNIO VERRUCOSUS, Bar. Amer. Journ. Sci., vol. vi. p. 123.

*Branchial uterus* —. No ova were found here, but they were in the ovarium. *Branchiæ* very large, nearly semicircular, inner ones very much the larger, free nearly the whole width of the abdominal sack. *Palpi* large, subtriangular, united one-third down the posterior edges. *Mantle* thin, with a wide thickened border. *Branchial opening* very large, with numerous rather small, colored papillæ. *Anal opening* large, without papillæ. *Super-anal opening* very large, not united below. Color of the mass whitish.

Columbus, Ohio, H. Moores. White River, Indiana, D. H. Shaffer.

*Remarks.*—This is another of the *Uniones* which have the edges of the anal opening without papillæ. The anal and super-anal openings not being united cause a long slit.

UNIO SUBROTUNDUS, Lea. Trans. Amer. Phil. Soc., (2), vol. iv. pl. 18, fig. 45. Obs. vol. i. p. 127.

*Branchial uterus* occupies the four leaves of the branchiæ, and the ovarium was filled with red ova, but no developed embryonic shells were in the branchiæ. *Branchiæ* large, semicircular, nearly of equal size, free nearly the whole length of the abdominal sack. *Palpi* rather large, subelliptical, united half way down the posterior edges. *Mantle* thin, with a very wide, broad, thickened, red margin, black on the edge, inside of which it is yellowish and salmon. *Branchial opening* large, with numerous dark-brown papillæ, branching, dendritic form, somewhat like *Margaritana margaritifera*. *Anal opening* very large, with numerous minute brown papillæ almost like crenulations. *Super-anal opening* rather large, colored within the edges

and slightly united below. Color of the mass very dark salmon, the adductor muscles and the foot being almost red.

Columbus, Ohio, H. Moores. Cincinnati, Ohio, D. H. Shaffer.

*Remarks.*—This is a very remarkable species in several respects. It is one of the four among all the *Uniones* I know, which have all four of the branchial leaves occupied by the uterus;\* it is one of the only three which have *red ova*;† and it is peculiar, so far as I know, in the male having red spermatic matter in the glandular flattened lobules of the scrotum, the color of which, however, is not of so deep a red as the ova in the female. See remarks on *rubiginosus*, page 416.

UNIO PUSTULOSUS, Lea. Trans. Amer. Phil. Soc. (2), vol. iv. pl. 7, fig. 7. Obs. vol. i. p. 86.

*Branchial uterus* —. No ova were found here, but they were in the ovarium. *Branchiæ* not large, nearly semicircular, inner ones much the larger, free two-thirds the length of the abdominal sack. *Palpi* rather long, subtriangular, united one-half down the posterior edges. *Mantle* thin, with a wide, thickened margin. *Branchial opening* large, with rather small, branching papillæ of a nearly white color. *Anal opening* not large, has no papillæ, but has very small crenulations on the inner edges. *Super-anal opening* exceedingly large, united below. Color of the mass whitish.

Columbus, Ohio, H. Moores. White River, Indiana, D. H. Shaffer.

*Remarks.*—This species was found to be very sensitive to light.

UNIO LENS, Lea. Trans. Amer. Phil. Soc. (2), vol. iv. pl. 8, fig. 10, and Obs. vol. i. p. 90.

The several specimens examined were all males. *Branchiæ* small, semicircular, united the whole length of the abdominal sack, which is very large. *Palpi* very small, elliptical, united but a very short distance on the posterior edges. *Mantle* thin, thicker doubled and colored on the margin, fringed below the branchial opening. *Branchial opening* rather small, with very small papillæ. *Anal opening* very small, with very small papillæ. *Super-anal opening* rather large, united below. Color of the mass whitish. Columbus, Ohio, H. Moores.

UNIO TRIGONUS, Lea. Trans. Amer. Phil. Soc. (2), vol. iv. pl. 16, fig. 40, and Obs. vol. i. p. 120.

*Branchial uterus* —. No ova were found here, but ova were found in the ovarium. *Branchiæ* rather small, semicircular, free two-thirds the length of the abdominal sack. *Palpi* rather small, subelliptical, united half way down the posterior edges. *Mantle* thin, thicker and darker on the border. *Branchial opening* small, with very small papillæ. *Anal opening* small, with minute papillæ. *Super-anal opening* rather large, united below. Color of the mass whitish.

Columbus, Ohio, H. Moores.

\**Multiplicatus*, *rubiginosus*, *Kleinianus* and *subrotundus*. †*Rubiginosus*, *Æsopus* and *subrotundus*.

*Remarks.*—The specimens of this species received from Mr. Moores were not in very good order, and the colors described may not be perfectly correct from that cause. A dried specimen, sent to me by my brother, T. G. Lea, in 1838, has the following note on the paper to which it was attached. “*U. trigonus*, the stomach opened, showing the red internal part; it is white externally. The red portion may be the ovary or the ova, before they are transferred to the branchiæ.”

UNIO SOLIDUS, Lea. Trans. Amer. Phil. Soc., (2), vol. vi. pl. 5, fig. 13. Obs. vol. ii. p. 13.

All the specimens received seemed to be males.

*Branchiæ* large, semicircular, inner ones much the larger, free nearly the whole length of the abdominal sack. *Palpi* rather large, subelliptical, united half way down the posterior edges. *Mantle* thin, thickened along the edges. *Branchial opening* rather large, with numerous small, closely crowded papillæ. *Anal opening* rather large, finely crenulate on the inner edges. *Super-anal opening* rather large, and united for some distance below. Color of the mass whitish or salmon.

Columbus, Ohio, H. Moores.

UNIO CORNUTUS, Bar. Am. Jour. Science, vol. vi. p. 122.

*Branchial uterus* occupies the posterior inferior part of the outer branchiæ in six or seven ovisacks pendent below the edge of the branchial leaf. *Branchiæ* rather small, rounded below, inner ones much the larger, free nearly the whole length of the abdominal sack. *Palpi* rather small, subtriangular, united half way down the posterior edges. *Mantle* very thin, with a very broad thin margin. *Branchial opening* small, with numerous small thickly set papillæ. *Anal opening* very small, with apparently very small crenulations. *Super-anal opening* very large, united below for some distance. Color of the mass whitish, inclining to faint salmon-color.

Cincinnati, Ohio, J. Clark.

*Remarks.*—The position and appearance of the ovisacks are remarkable. In two specimens, one had six in each of the outer branchiæ, and the other had seven, and these are in a curve of the posterior part of the branchiæ hanging below the edge of the leaf.

UNIO PUSTULATUS, Lea. Trans. Amer. Phil. Soc., (2), vol. iv. pl. 7 fig. 9. Obs. vol. i. p. 89.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. These ova appeared to be more elliptical than round. *Branchiæ* large, thin, nearly semi-circular, free two-thirds the length of the abdominal sack. *Palpi* not large, transverse, suboval, united half way down the posterior edges. *Mantle* thin, thicker and slightly colored on the margin. *Branchial opening* rather large, with numerous small papillæ. *Anal opening* very small, with minute papillæ. *Super-anal opening* very

large, colored on the edges and united for some distance below. Color of the mass whitish.

Cincinnati, Ohio, J. Clark.

UNIO ZIGZAG, Lea. Trans. Amer. Phil. Soc., (2), vol. iii. pl. 12 fig. 19. Obs. vol. i. p. 54.

Only two specimens were received, both males. *Branchiæ* small, inner ones much the smaller, nearly semi-circular, free only at the posterior end of the abdominal sack. *Palpi* small, thin, oval, united only at the upper part on the posterior edges. *Mantle* very thin, thickened along the margin. *Branchial opening* rather large, with numerous brownish papillæ. *Anal opening* rather small, with numerous small brownish papillæ. *Super-anal opening* rather large, colored on the edges and united below. Color of the mass whitish.

Cincinnati, Ohio, J. Clark.

UNIO COOPERIANUS, Lea. Trans. Amer. Phil. Soc., (2), vol. v. pl. 8, fig. 21. Obs. vol. i. p. 173.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. *Branchiæ* large, nearly semi-circular, free two-thirds the length of the abdominal sack. *Palpi* rather small, elliptical, attached for a short distance down the posterior edges. *Mantle* thin, with a wide and thickened margin. *Branchial opening* very large, with numerous small papillæ. *Anal opening* large, with numerous small papillæ. *Super-anal opening* rather large, united below. Color of the mass yellowish white.

Cincinnati, Ohio, J. Clark.

UNIO METANEVRUS, Raf. An. des Sci. Phys. vol. v. p. 305.

*Branchial uterus* ——. No ova were found here, but ova were in the ovarium. *Branchiæ* rather large, inner ones much the larger, curved posteriorly, but nearly straight on the lower edges, free more than half the length of the abdominal sack. *Palpi* large, thin, subtriangular, rather transverse, united for a short distance on the posterior edges. *Branchial opening* very large, with numerous small brownish papillæ. *Anal opening* very small, with no apparent papillæ. *Super-anal opening* very long, with well marked deep brown edges, united slightly below. Color of the mass yellowish.

Cincinnati, Ohio, J. Clark. Columbus, Mississippi, Dr. Spillman.

*Remarks.*—This is another of the *Uniones* which are without papillæ on the edges of the super-anal opening. In about a dozen specimens examined, I found that the females had the umbonial slope more raised than in the female. One of the dozen had the super-anal opening not united below.

UNIO ORBICULATUS, Hild. Am. Journ. Sci. vol. 14.

Both specimens received were males. *Branchiæ* very large, very much rounded

below, inner ones very much the larger, united the whole length of the abdominal sack. *Palpi* large, thick, rather oblique, suboval. *Mantle* thin, double along the inferior edges. *Branchial opening* very large, with small, dark papillæ. *Anal opening* rather large, with numerous, very small, brownish papillæ. *Super-anal opening* rather large, slightly colored on the edges and united below. Color of the mass whitish inclining to salmon.

*Embryonic shell* almost exactly the same with *multiradiatus*. See Jour. Acad. Nat. Sci. (2), vol. iv. pl. 5, fig. 17, and Obs. vol. vi. p. 47.

Cincinnati, Ohio, J. Clark.

UNIO Plicatus, Lesueur, Say. Nich. Ency. Am. Ed. Art. Conch.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. *Branchiæ* large, rather thick, rounded below, inner ones much the larger, free two-thirds the length of the abdominal sack. *Palpi* rather small, subelliptical, rounded at the end, united one-third down the posterior edges. *Mantle* rather thin, with a very broad border. *Branchial opening* very large, with numerous small papillæ. *Anal opening* rather large, with very minute papillæ. *Super-anal opening* remarkably large, colored on the edges and slightly united below. Color of the mass whitish.

Cincinnati, Ohio, J. Clark.

UNIO LACRYMOSUS, Lea. Trans. Am. Phil. Soc. (2), vol. iii. pl. 6, fig. 8, and Obs. vol. i. p. 14.

Both specimens received were males. *Branchiæ* very large, inner ones very much the larger, rather thick, very much rounded below, free nearly the whole length of the abdominal sack. *Palpi* very large, transverse, rather thin, subelliptical, united half way down the posterior edges. *Mantle* rather thin, with a broad and thickened margin. *Branchial opening* very large, with numerous rather small branched papillæ. *Anal opening* rather small without papillæ. *Super-anal opening* very large, slightly colored on the edges, united for a small distance below. Color of the mass whitish.

Cincinnati, Ohio, J. Clark and D. H. Shaffer.

*Remarks.*—Some of these specimens were in a living state, as well as in alcohol. I could not find any papillæ in the *anal opening* of any of them.

UNIO SECURIS, Lea. Trans. Amer. Phil. Soc., (2), vol. iii. pl. 11, fig. 17. Obs. vol. i. p. 51.

*Branchial uterus* occupies the posterior half of the outer branchiæ, blackish on the inferior margin, with about twenty ovisacks on each side, very like to *cariosus*. *Branchiæ* rather large, very much rounded below, inner ones the larger, free nearly half the length of the abdominal sack. *Palpi* small, subtriangular, united a short distance down the posterior edges. *Mantle* very thin, dark along the edges, with a wide margin, slightly thickened and fringed below the branchial opening. *Branchial*

*opening* rather large, with numerous small brownish papillæ. *Anal opening* small, with minute brownish crenulations on the inner edges, scarcely amounting to papillæ. *Super-anal opening* large, blackish along the edges, united for a short distance below. Color of the mass dirty white inclined to yellowish, the lower portion of the foot being blackish.

*Embryonic shell* elongately pouch-shape, clear white, has no hooks. See Jour. Acad. Nat. Nat. Sci. (2), vol. iv. pl. 5, fig. 6, and Obs. vol. vi. p. 47.

Cincinnati, Ohio, J. Clark.

*Remarks.*—This species, so well characterized by the form and markings of the outward hard parts, belongs to that group of *Uniones* which have not well developed papillæ on the edges of the anal opening, but which still are not entirely smooth, being somewhat crenulate.

UNIO ÆSOPUS, Green. Journ. Maclurean Lyceum 1827, pl. 3.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium, and had the remarkable character of being *red*. *Branchiæ* rather large, somewhat thick, rounded below, inner ones much the larger, free nearly the whole length of the abdominal sack. *Pulpi* rather large, rather thick, united about one-fourth down the posterior edges. *Mantle* very thin, with a broad margin. *Branchial opening* rather large, with numerous brownish papillæ in clusters. *Anal opening* very large, with numerous very minute papillæ. *Super-anal opening* very large, united below for a short distance. Color of the mass yellowish, inclining to salmon, the foot being deep salmon.

Cincinnati, Ohio, J. Clark. White River, Indiana, D. H. Shaffer.

*Remarks.*—This is one of the only three species which I know to have *red ova*. The other two are *rubiginosus* and *subrotundus*.\* It is to be regretted that we have not a specimen of *Æsopus* with the matured embryonic shells, to judge of their form as well as to ascertain if they be red in the *branchial uterus*.

UNIO ELLIPSIS, Lea. Trans. Amer. Phil. Soc., (2), vol. iii. pl. 4, fig. 4. Obs. vol. i. p. 10.

A single specimen only—a male—was received. *Branchiæ* rather large, thin, rounded below, inner ones much the larger, united the whole length of the abdominal sack. *Pulpi* rather large, thin, subtriangular, united half way down the posterior edges. *Mantle* thin, with a rather large margin, thickened at the edges, and slightly crenulate below the branchial opening. *Branchial opening* very large, with numerous very small, brownish papillæ. *Anal opening* rather small, brownish, with very minute crenulations on the inner edges. *Super-anal opening* large, united for a short distance below. Color of the mass yellowish, inclining to salmon.

Cincinnati, Ohio, J. Clark.

\*See Remarks, page 416.

UNIO RETUSUS, Lam. An. sans Vert., vol. vi. p. 72.

*Branchial uterus* occupies the posterior part of the outer branchiæ, having about twenty-five ovisacks on each side protruding beyond the lower edge of the branchiæ, and are altogether like those of *cariosus*. *Branchiæ* rather small, thin, rounded below, united the whole length of the abdominal sack. *Palpi* small, subtriangular, united only a short distance down the posterior edges. *Mantle* very thin, with a broad margin, thickened and colored on the edges. *Branchial opening* rather large, with small brownish papillæ. *Anal opening* very small, with very minute crenulations on the inner edges. *Super-anal opening* large, united slightly below. Color of the mass dilute salmon.

*Embryonic shell* elongately pouch-shape, clear white, has no hooks. Journ. Acad. Nat. Sci. (2), vol. iv. pl. 5, fig. 7. Obs. vol. vi. p. 47.

Cincinnati, Ohio, T. G. Lea and J. Clark.

*Remarks.*—In 1838 I received from my brother a dried specimen of a female with the ovisacks fully charged. More recently I received four specimens in alcohol from Mr. Clark. All these proved to have no papillæ on the edges of the anal opening, but they were crenulate.

UNIO PYRAMIDATUS, Trans. Am. Phil. Soc. (2), vol. iv. pl. 16, fig. 39, and Obs. vol. i. p. 119.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. *Branchiæ* large, nearly semicircular, inner ones much the larger; in the female before me, the lower edges are irregular and very minutely crenulate, free nearly the whole length of the abdominal sack. *Palpi* rather large, thin, subtriangular, united one-third down the posterior edges. *Mantle* very thin, with a broad margin, slightly thickened on the edges. *Branchial opening* rather large, with numerous small, brownish papillæ. *Anal opening* large, brown on the edges, with numerous small papillæ. *Super-anal opening* rather large, dark on the edges and slightly united below. Color of the mass dirty white.

Cincinnati, Ohio, J. Clark.

*Remarks.*—The living specimens which I had for observation, I found to be unusually sensitive to light.

UNIO IRRORATUS, Lea. Trans. Amer. Phil. Soc. (2), vol. iii. pl. 5, fig. 5. Obs. vol. i. p. 11.

*Branchial uterus* occupies a small portion of the posterior part of the outer branchiæ, in seven or eight pendant ovisacks on each side, these ovisacks being volutes of different lengths, but the embryos were not sufficiently developed to indicate the form of the embryonic shell. *Branchiæ* rather large, very oblique, rounded below, inner one much the larger, free about half the length of the abdominal sack. *Palpi* rather small, subtriangular, not united on the posterior edges. *Mantle* very thin, with a

broad thin margin, colored at the edges. *Branchial opening* very large, with numerous minute papillæ slightly colored. *Anal opening* rather large, without papillæ but slightly crenulated. *Super-anal opening* very large, colored on the edges and slightly united below. Color of the mass whitish, the superior part being raised very much into the arch of the cavity.

Cincinnati, Ohio, T. G. Lea and J. Clark. White River, Indiana, D. H. Shaffer.

*Remarks.*—Among ten specimens, in alcohol, from Mr. Clark, none had ova. They appeared all to be males, but some specimens sent to me in 1827 by my brother, T. G. Lea, in alcohol, and in a dried state also, enabled me then to describe the very extraordinary arrangement of the branchial uterus. See Trans. Amer. Phil. Soc. (2), vol. iii. pl. 5, fig. 5, and Obs. vol. i. p. 11, where I have fully described this singular arrangement. It is, as far as my observation has extended, the only species which has even an approach to the extraordinary arrangement of the ovisacks. I have described, as referred to above, their curious geometrical adaptation to the small cavity or area of the interior. It is greatly to be regretted that the embryonic shell has not yet been observed, as it might present some novelty co-ordinate with the unique ovisacks. I have in vain endeavored to obtain the female with mature embryonic shells. Of two specimens, both males, from White River, sent to me in a living state, one had a blackish exterior border to the mantle, while the other was maculate, as the *Margaritana* usually are.

UNIO GRACILIS, Bar. Am. Jour. Sci., vol. vi. p. 274.

*Branchial uterus* occupies the posterior fourth part of the outer branchiæ, being rounded below and having three rows of crenulations. No ova were found here, but very minute ones were in the ovarium. *Branchiæ* rather large, thick, much rounded below, the inner ones very oblique posteriorly and rather the larger, united the whole length of the abdominal sack. *Palpi* very large, thick, suboval, obtusely angular at the end, united for a short distance down the posterior edges. *Mantle* rather thin, with a broad margin, thickened, doubled and blackish on the posterior edges. *Branchial opening* rather small, crowded with numerous brownish papillæ. *Anal opening* small, with numerous small colored papillæ. *Super-anal opening* very large, colored on the edges and united for a short distance below. Color of the mass dirty white. The adductor and tractor muscles are very large.

Cincinnati, Ohio, J. Clark. Columbus, Mississippi, Dr. Spillman.

*Remarks.*—It is greatly to be regretted that none of the specimens received had the embryonic shell, as we might expect in this winged species to find the wedge-shape form, as in *levissimus* and *alatus*, all three being much raised in the wing and connate over the ligament. Those from Columbus were sent in November, and the ova were found in the ovarium, so minute as to require a high power to detect them.



UNIO OVATUS, Say. Nich. Encyc., Am. ed., Article Conch., pl. 2. fig. 7.

*Branchial uterus* occupies the posterior part of the outer branchiæ, rather small, pendant, blackish on the inferior edges, having about twenty ovisacks, and is altogether very like *cariosus*. *Branchiæ* very large, nearly semicircular, inner ones much the larger, united the whole length of the abdominal sack. *Pulpi* large, rather thick, suboval, united one-third down the posterior edges. *Mantle* thin, with a very broad margin, thicker on the edges, *the female* having a large fleshy process below the branchial opening. *Branchial opening* rather small, with small papillæ. *Anal opening* small, slightly crenulate on the inner edges. *Super-anal opening* very large, slightly united below. Color of the mass whitish. Adductor muscles very large.

*Embryonic shell* pouch-shape, clear white, has no hooks. See Journ. Acad. Nat. Sci. (2), vol. iv. pl. 5, fig. 15, and Obs. vol. vi. p. 47.

Cincinnati, Ohio, J. Clark. White River, Indiana, D. H. Shaffer.

*Remarks.*—Two females taken in White River early in November had the ovisacks of the branchial uterus fully occupied with developed embryonic shells.

UNIO BLANDINGIANUS, Lea. Trans. Amer. Phil. Soc., vol. v. pl. 15, fig. 44. Obs. vol. i. p. 213

*Branchial uterus* occupies the whole width of the outer branchiæ. *Branchiæ* rather large, inner ones much the larger, slightly curved below, free nearly the whole length of the abdominal sack. *Pulpi* thin, elliptical, united half down the posterior edges. *Mantle* rather thick, dirty white, thicker and whiter on the margin and particularly so at the branchial opening. *Branchial opening* large, dark brown on the inner edges, with small papillæ. *Anal opening* large, deep brown, with very minute papillæ. *Super-anal opening* rather large, united for a short distance below. Color of the mass dirty white.

Satilla River, Camden City, Georgia, Major T. C. Downie.

*Remarks.*—While there were ova in the ovarium, as well as in the branchial uterus, there were no embryonic shells perfected.

UNIO INFLATUS, Lea. = (*Symphynota inflata*,) Lea. Trans. Amer. Phil. Soc., (2), vol. iv. pl. 14, fig. 28, and Obs. vol. i. p. 109.

Only two specimens were received, both being males.

*Branchiæ* large, rounded below, inner ones somewhat the larger, united the whole length of the abdominal sack. *Pulpi* large, rounded below, nearly semicircular, united one-third down the posterior edges. *Mantle* thin, with a wide margin, extending into a large triangular flap to the wing. *Branchial opening* large, with numerous small, brownish papillæ on the inner edges. *Anal opening* small, with numerous small papillæ. *Super-anal opening* enormously large, united for some distance below. Color of the mass whitish.

Columbus, Mississippi, Dr. Spillman.

*Remarks.*—It is greatly to be regretted that we had not in these specimens a female with the embryonic shell, as I believe it more than probable the form would be wedge-shape, analogous to that of its allied species *alatus*.

UNIO PURPURATUS, Lam. An. sans Vert., vol. vi. p. 71.

*Branchial uterus* occupies the posterior half of the outer branchiæ, rounded and enlarged at the end, in very large ovisacks, about twelve on each side. *Branchiæ* large, rounded below, inner ones rather the larger, united the whole length of the abdominal sack. *Palpi* large oblique, united one-third down the posterior edges. *Mantle* thin, thicker on the margin, which is broad. *Branchial opening* rather small, with numerous, small, brownish papillæ, inside of which there is a line of salmon color and below this a dark brown line. *Anal opening* small, with minute, scarcely observable crenulations. The rim of the anus crenulate and the lower end pointed. *Super-anal opening* rather large, colored on the edges and united below for a short distance. Color of the mass whitish.

*Embryonic shell* wedge-shape, light brown, has four well developed hooks, very like *alatus*. See Jour. Acad. Nat. Sci. (2), vol. iv. pl. 5, fig. 25, and Obs. vol. vi. p. 48.

Columbus, Mississippi, Dr. Spillman; and Coosa River, Alabama, Dr. Showalter.

UNIO CLAIBORNENSIS, Lea. Trans. Amer. Phil. Soc., (2), vol. vi. pl. 24, fig. 15, and Obs. vol. ii. p. 105.

*Branchial uterus* occupies nearly the half of the posterior part of the outer branchiæ very like *cariosus*, the ovisacks being long and extending beyond the inferior line of the leaf for one-tenth of an inch, blackish on the lower edges. *Branchiæ* large, inner ones rather the larger, united the whole length of the abdominal sack. *Palpi* large, subelliptical, oblique, united half way down the posterior edges. *Mantle* thin, with a broad border, much thickened below the branchial opening where there is a black or deep brown line on a white fleshy expansion and fringed for some distance. *Branchial opening* rather large, with numerous, brown papillæ, and with a small blackish round spot on each side below exteriorly. *Anal opening* small, with small, brown papillæ. *Super-anal opening* small, slightly colored within the edges and united below. Color of the mass whitish.

*Embryonic shell* elongate pouch-shaped, nearly clear white, has no hooks.

Columbus, Mississippi, Dr. Spillman.

*Remarks.*—In one of the specimens I observed holes at the lower end of the ovisacks, evidently made by the passing out of the embryonic shell. This is one of the species which have the black spot on the mantle below the branchial opening.

UNIO TRAPEZOIDES, Lea. Trans. Amer. Phil. Soc., (2), vol. iv. pl. 3, fig. 1. Obs. vol. i. p. 79.

*Branchial uterus* ——. No ova were found here, but they were abundant in the

ovarium. *Branchiæ* large, nearly semicircular, inner ones much the larger, free three-fourths the length of the abdominal sack. *Palpi* not very large, rather thick, elliptical, united about one-third down the posterior edges. *Mantle* thin, with a broad margin, attached near the centre of the cavity of the valves on each side posterior to the anterior tractor cicatrix, and forming there a well impressed cicatrix. *Branchial opening* rather large, with numerous small, brown papillæ. *Anal opening* rather small, with numerous, very minute, brown papillæ. *Super-anal opening* large, united below for a short distance. Color of the mass whitish.

Columbus, Mississippi. Dr. Spillman.

*Remarks.*—This well characterized species is in the possession of a ventral cicatrix, formed by the adhesion of the middle of the mantle. In some specimens this muscular attachment is large, in others it is small and sometimes obscure.

UNIO ASPER, Lea. Trans. Amer. Phil. Soc., (2), vol. iv. pl. 9, fig. 15. Obs. vol. i. p. 95.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. *Branchiæ* large, nearly semicircular, inner ones much the larger, free two-thirds the length of the abdominal sack. *Palpi* large, oblique, subelliptical, united half way down the posterior edges. *Mantle* thin, having a broad thickened margin, blackish on the posterior outer edges. *Branchial opening* rather large, with numerous small, dark brown papillæ. *Anal opening* small, blackish on the inner edges, without papillæ, but with a very slight disposition to crenulation. *Super-anal opening* very large, colored on the edges and united below. Color of the mass whitish.

Columbus, Mississippi, Dr. Spillman.

*Remarks.*—In this species we have another *Unio* which has no papillæ on the anal opening.

UNIO ATROCOSTATUS, Lea. Trans. Amer. Phil. Soc., (2), vol. x. pl. 2, fig. 5. Obs. vol. iv. p. 44.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. *Branchiæ* very large, very nearly semicircular, inner ones much the larger, free three-fourths the length of the abdominal sack. *Palpi* rather large, oblique, subangular posteriorly, united one-third down the posterior edges. *Mantle* thin, with a very broad, thickened margin. *Branchial opening* small, with very small, brown papillæ. *Anal opening* large, with very minute colored papillæ. *Super-anal opening* large, slightly colored within and very slightly colored below. Color of the mass whitish.

Columbus, Mississippi, Dr. Spillman.

UNIO DECLIVIS, Say. Trans. Jour. Med., vol., iv., 1831.

*Branchial uterus* occupies the whole width of the outer branchiæ. *Branchiæ* very wide, slightly curved below, inner ones much the larger, free nearly the whole

length of the abdominal sack. *Palpi* rather large, very transverse, somewhat thick, subelliptical, united nearly half way down the posterior edges. *Mantle* rather thick, with a broad margin, crenulated on the edges below the branchial opening. *Branchial opening* large, with very small, dark brown papillæ. *Anal opening* small, without papillæ, but slightly crenulate on the inner edges. *Super-anal opening* rather large, united below. Color of the mass dirty white.

Columbus, Mississippi, Dr. Spillman. Rutersville, Texas, Prof. Forshey.

*Remarks.*—The ova found in the branchial uterus were very small, perfectly round and granulated in the middle. They were found also in the ovarium. This is another species of *Unio* which has no papillæ in the anal opening.

UNIO CIRCULUS, Lea. Trans. Amer. Phil. Soc., (2,) vol. iii. pl. 9, fig. 14, and Obs. vol. i. p. 47.

Only three specimens were received, all being males. *Branchiæ* rather large, somewhat thick, nearly semicircular, united the whole length of the abdominal sack. *Palpi* rather small, subtriangular; united one-third down the posterior edges. *Mantle* very thin, thickened on the margin, furnished with very minute papillæ below the branchial opening. *Branchial opening* rather small, with numerous small, brownish papillæ. *Anal opening* rather small, with very minute papillæ. *Super-anal opening* rather large, colored on the inner edges and united below. Color of the mass whitish.

Columbus, Mississippi, Dr. Spillman.

UNIO CROCATUS, Lea. Trans. Am. Phil. Soc. (2) vol. viii. pl. 22, fig. 52. Obs. vol. iii. p. 76.

*Branchial uterus* occupies, very much like *ochraceus*, more than half of the posterior portion of the outer branchiæ, one of the specimens having about forty ovisacks on each side, the longest being seven-tenths of an inch long. The whole lobe is nearly semicircular, and the lower portion is black, with a bright brown border. None of the ova in any of the specimens were advanced beyond granulation, and yet the ovisacks seemed ready to be extruded by the parent, enveloped together in the integuments of the sack, as I have observed in *U. complanatus*. *Branchiæ* large, nearly semicircular, inner ones much the larger, united the whole length of the abdominal sack. *Palpi* rather large, subtriangular, united about one-third down the posterior edges. *Mantle* rather thin, with a very broad margin, slightly colored on the lower edges, much thickened below the branchial opening, where it is black and reddish brown and furnished with papillæ on the inner edges. *Branchial opening* rather large, black and reddish brown, with numerous papillæ. *Anal opening* rather small, with numerous very small papillæ. *Super-anal opening* large, colored on the inside and united below. Color of the mass whitish.

Columbus, Mississippi, Dr. Spillman.

*Remarks.*—This species is closely allied to *ochraceous*, but the outer hard parts are

much thicker and it is not quite so much inflated. The ovisacks are extended below the line of the branchiæ, and in one of the specimens several of the ovisacks were produced and extended below the margin. In another female I found some of the ovisacks in the cavity below the anus, apparently passing out in that direction, while the embryonic shell had not yet formed.

UNIO CASTANUS, Lea. Trans. Am. Phil. Soc. (2), vol. iv. pl. 11, Fig. 21. Obs. vol. i. p. 101.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. *Branchiæ* very thin, very small, nearly straight below, rounded at the ends, united the whole length of the abdominal sack. *Pulpi* small, subtriangular, united one-third down the posterior edges. *Mantle* very thin, with rather a broad margin and with small distant papillæ below the branchial opening. *Branchial opening* small, with rather large, brownish papillæ. *Anal opening* very small, with very minute papillæ. *Super-anal opening* very small, colored within and united below. Color of the mass whitish.

Columbus, Mississippi, Dr. Spillman.

UNIO NASHVILLENSIS, Lea. Trans. Am. Phil. Soc. (2) vol. v. pl. 14, fig. 43. Obs. vol. i. p. 212.

*Branchial uterus* occupies the posterior half of the outer branchiæ, consisting of twenty to thirty ovisacks in each leaf, extending beyond the line of the branchiæ and forming a semilunate lobe. *Branchiæ* rather large, inner ones much the larger, united the whole length of the abdominal sack. *Pulpi* small, suboval, united only at the upper part of the posterior edges. *Mantle* thin, with a broad margin, thickened at the edges and furnished with papillæ below the branchial opening, where there is a dark line. *Branchial opening* rather large, with numerous, small, brownish papillæ. *Anal opening* very small, with numerous small papillæ on the inner edges, where it is nearly black. *Super-anal opening* rather small, colored on the inner edges and united below. Color of the mass whitish.

*Embryonic shell* elongate pouch-shape, light brown, has no hooks, very similar to *securis*. See Journ. Acad. Nat. Sci. (2), vol. iv. pl. 5, fig. 6, and Obs. vol. vi. p. 47.

Columbus, Mississippi, Dr. Spillman.

UNIO NUX, Lea. Trans. Amer. Phil. Soc. (2), vol. x. pl. 24, fig. 43. Obs. vol. v. p. 39.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. *Branchiæ* large, thin, rounded below, the posterior ends not attached at the point, but a short distance below, by a U shaped muscle, to the side of the branchial opening, free nearly the whole length of the abdominal sack. *Pulpi* rather large, sub-oval, united for a short distance on the posterior edges. *Mantle* very thin, with rather a broad margin. *Branchial opening* small, with very minute brown papillæ.

*Anal opening* rather large, with numerous small, brownish papillæ. *Super-anal opening* rather large, united below. Color of the mass yellowish white.

Columbus, Mississippi, Dr. Spillman.

UNIO PENITUS, Con. New Fr. Wat. Shells, pl. 5, fig. 1.

*Branchial uterus* occupies the posterior portion of the branchiæ and extends below the margin, which present a triple crenulate border. *Branchiæ* small, thin, rounded below, and oblique posteriorly, inner ones much the larger, at the posterior end united to the mantle by a V-shaped muscle, united the whole length of the abdominal sack. *Pulpi* very small, very thin, united on the posterior edges only at the extreme upper part. *Mantle* very thin, with a wide margin, colored on the edges, maculate on the posterior exterior edges, furnished below the branchial opening with minute papillæ and with a small white fleshy mass, on each side, of a subsigmoid form, rounded at the bottom and pointed at the top, and furnished with some crenulations in the middle, outside of which there is a small, expanded, nearly black flap. *Branchial opening* small, with rather large, brown papillæ. *Anal opening* small, with numerous small, brown papillæ. *Super-anal opening* rather large, brown, and corrugate on the inner edges. *Anus* corrugate on the rim. Color of the mass white.

Columbus, Mississippi, Dr. Spillman.

*Remarks.*—This is a well characterized species, as well in the soft parts as the hard outer parts. I have never seen in any other species the subsigmoid fleshy process on the edges below the branchial opening. Its position is analogous to the caruncle of *parvus* and other allied species, but the form is entirely different, the *parvus* having it subrotund. In the only female specimen of *penitus* which I have there are below this fleshy process, on each margin, three other processes very like papillæ, but they are white and truncate at the end. The possession of crenulated edges on the super-anal opening is also remarkable. The brown maculations on the posterior exterior margin remind one of those found usually on *Margaritana*, but they are not quadrate, being pointed above. The rays on the epidermis are somewhat like those of *securis*, but are not so chain-like, but like a series of angles filling into each other.

UNIO DEHISCENS, Say, = (*oriens*, Lea). Disseminator vol. 2, p. 308, and Am. Conch. pl. 24.

A single male specimen only received. *Branchiæ* very wide, light liver brown color, inner ones slightly the larger, free nearly the whole length of the abdominal sack. *Pulpi* rather large, subtriangular, united only at the upper posterior portion of the edges. *Mantle* rather thick, thickened and light brown on the margin and blackish on the dorsal margin around the ligament. *Branchial opening* rather large, thickened and light brown inside and outside the edges, with rather large papillæ. *Anal opening* rather large, thickened and light brown outside the edges, *without*

*papillæ or crenulations.* *Super-anal opening* rather large, united below, with a thin dark brown line on the outer edges. Color of the mass whitish, slightly tinted with salmon on the foot, which is long and capable of great extension.

*Remarks.*—It inhabits six to twelve inches below the surface of the sand.

White River, Indiana, D. H. Shaffer.

UNIO TENUISSIMUS, Lea = *Sympyanota tenuissima*, Lea. Trans. Amer. Phil. Soc., (2,) vol. iii. pl. 11, fig. 21. Obs. vol. i. p. 67.

Two only were received, and both males.

*Branchiæ* large, very thin, rounded below, the inner one slightly the larger, united the whole length of the abdominal sack. *Pulpi* large, suboval, very thin, nearly transverse, united at the upper posterior edges. *Mantle* very thin, thickened at the margin. *Branchial opening* large, with small papillæ. *Anal opening* rather small, with very small papillæ. *Super-anal opening* large, black on the outside edges, united below. Color of the mass whitish.

White River, Indiana, D. H. Shaffer.

UNIO CLAVUS, Lam. An. sans Vert., vol. vi. p. 74.

Two males only received.

*Branchiæ* rather large, thin, light liver-brown, rounded below, inner ones the larger, free nearly the whole length of abdominal sack. *Mantle* rather thick, dirty white, thickened at the margin, which is salmon-colored. *Pulpi* rather large, thin, salmon-colored, united one-third down the posterior edges. *Branchial opening* rather large, with numerous small, light-colored papillæ, the edges being black, with a line of brown inside. *Anal opening* rather small, with numerous very small, brownish papillæ. *Super-anal opening* very large, not united below, dark-brown on the edges. Color of the mass salmon, whitish on the abdominal sack, but deep salmon on the foot, adductor muscles and border of the mantle.

White River, Indiana, D. H. Shaffer.

*Remarks.*—The description above was made from a full-grown specimen. The second specimen was an old one, and the color was not deep salmon, but of a dirty white and a light-salmon tint.

UNIO OBLIQUUS, Lam. (= *undatus*, Bar.) An. sans Vert., vol. vi. p. 72.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. *Branchiæ* large, nearly semicircular, inner ones much the larger, color light liver-brown, free nearly the whole length of the abdominal sack. *Pulpi* rather large, oval, united only at the upper part of the posterior edges. *Mantle* rather thin, thicker at the margin. *Branchial opening* large, with numerous small, dark papillæ.

*Anal opening* small, with numerous very small, dark-brown papillæ. *Super-anal opening* large, deeply colored on the edges and slightly united below. Color of the mass whitish.

UNIO OBSCURUS, Lea. Trans. Amer. Phil. Soc., (2,) vol. vi. pl. 3, fig. 7, and Obs. vol. ii. p. 7.

Two specimens only received, both males.

*Branchiæ* large, nearly semicircular, light liver-brown, united the whole length of the abdominal sack, the inner lobes have a thin whitish line along the lower edge. *Palpi* rather small, thick, suboval, united half way down the posterior edges. *Mantle* rather thin, thickened on the margin, dark-brown and with dark papillæ on the margin below the branchial opening. *Branchial opening* large, with numerous long, thin, brown papillæ. *Anal opening* small, with very minute, brownish papillæ. The border, inside, beyond the papillæ, is larger than usual, and is dark striped on a light-brown ground. *Super-anal opening* rather small, with dark spots on the inner margin, united below. Color of the mass very light salmon, almost white.

White River, Indiana, D. H. Shaffer.

UNIO PERSONATUS, Say = (*capillaris*, Lea.) Disseminator, 1829.

*Branchial uterus* occupies the whole width of the outer branchiæ.

*Embryonic shell* white, subrotund, without hooks, very nearly like *perplexus*. See Journ. Acad. Nat. Sci., (2,) vol. iv. pl. 5, fig. 21, and Obs. vol. vi. p. 48.

*Remarks.*—The above imperfect description was made from a dried specimen sent by my brother twenty-five years since. It was taken September 28, 1838. The young seem to occupy the whole width of the branchiæ, but not the upper part.

UNIO HETERODON, Lea. Trans. Amer. Phil. Soc., (2,) vol. iii. pl. 8, fig. 11, and Obs. vol. i. p. 42.

*Branchial uterus* occupies the whole width of the outer branchiæ.

*Embryonic shell* subtriangular, white, has hooks, and is closely allied to *pressus* in form. See Journ. Acad. Nat. Sci., (2,) vol. iv. pl. 5, fig. 23. Obs. vol. vi. p. 48.

*Remarks.*—The above imperfect description was made from a dried specimen taken March 20th in the Schuylkill, near the Falls.

UNIO RIDIBUNDUS, Say (= *sulcatus*, Lea.) Am. Conch., pl. 5.

*Branchial uterus* occupies nearly the whole length of the outer branchiæ, very like to *heterodon*. *Branchial opening* is blackish, and has small, very dark papillæ. The *mantle* is enlarged below the *branchial opening*, is very black on the posterior margin and has a few papillæ.

*Embryonic shell* pouch-shape, white, has no hooks, very nearly the same with *phaseolus*, Hild. See Journ. Acad. Nat. Sci., (2,) vol. iv. pl. 5, fig. 12, and Obs. vol. vi. p. 47.

Cincinnati, Ohio, T. G. Lea.



*Remarks.*—The specimens being dried, the description is consequently imperfect. They were taken September 28, 1838. The shell which I described under the name of *sulcatus* is the male of *ridibundus*, and is usually much larger than the female.

UNIO FOLIATUS, Hild. Am. Journ. Sci., vol. 14.

*Branchial uterus* occupies the whole width of the outer branchiæ, very much like *ridibundus*. *Branchiæ* rather small. *Mantle* thickened on the margin, with elongate ciliæ on the inner edge and an extended flap below the branchial opening.

*Embryonic shell* subtriangular, white, has no hooks, nearly the same as *undulatus*, Hild. See Journ. Acad. Nat. Sci., (2,) vol. iv. pl. 5, fig. 22. Obs. vol. vi. p. 48.

Cincinnati, Ohio, T. G. Lea. September 28, 1838.

*Remarks.*—An imperfect dried specimen and, of course, an imperfect description.

UNIO SUBGIBBOSUS, Lea. Jour. Acad. Nat. Sci., (2,) vol. iv. pl. 6, fig. 36. Obs. vol. vi. p. 53.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. *Branchiæ* very wide, very thin, and curved below, inner ones much the larger, free nearly the whole length of the abdominal sack. *Palpi* very small, thin, oblique, sub-oval, united only at the upper posterior edges. *Mantle* very thin, thickened at the inferior edges, dirty white. *Branchial opening* large, with numerous small, brownish papillæ. *Anal opening* large, with very numerous small, blackish papillæ. *Super-anal opening* rather large, lined on the edges and united below. Color of the mass dirty white.

Coosa River, near Wetumpka, Alabama, E. R. Showalter, M. D.

UNIO FIBULOIDES, Lea. Journ. Acad. Nat. Sci., (2,) vol. iv. pl. 28, fig. 100. Obs. vol. vii. p. 37.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. *Branchiæ* small, semicircular, inner ones rather the larger, free nearly the whole length of the abdominal sack, united to the edge by a filament. *Palpi* small, subovate, united a short distance on the posterior edges. *Mantle* thin, thickened on the margin. *Branchial opening* small, with very small, brownish papillæ. *Anal opening* small, with minute, brownish papillæ on the inner edges. *Super-anal opening* small, slightly united below. Color of the mass dirty white.

Coosa River, near Wetumpka, Alabama, E. R. Showalter, M. D.

UNIO FORMANIANUS, Lea. Trans. Amer. Phil. Soc., (2,) vol. viii. pl. 27, fig. 64. Obs. vol. iii. p. 85.

*Branchial uterus* occupies the lower half of the whole width of the outer branchiæ; and lies in folds like *phaseolus* and *Woodwardianus*. (See figures in Journ. Acad. Nat. Sci., (2,) vol. iv. pl. 29 and Obs. vol. viii. pl. 29, figs. 101 and 103.) *Branchiæ* large, thin, nearly semicircular, inner ones much the larger, free about half

the length of the abdominal sack. *Palpi* very small, suboval, united at the upper posterior part. *Mantle* very thin, with a delicate-colored margin. *Branchial opening* rather large, with numerous small, brownish papillæ. *Anal opening* large, with numerous small, brownish papillæ. *Super-anal opening* colored within the edges and slightly united below. Color of the mass whitish.

*Embryonic shell* pouch-shape, white, has no hooks.

Uniontown, Alabama, E. R. Showalter, M. D.

*Remarks.*—This is one of the group of three species which have that very remarkable characteristic of *folded branchial uterus*, which I have described and figured, as referred to above. The specimens examined had from ten to fifteen folds in each of the outer branchiæ, like *phaseolus* and *Woodwardianus*, but there are differences in each of them. The embryonic shell is allied to both, but it is more elongate than *phaseolus* and less so than *Woodwardianus*. In the general character of the soft parts it is like *Woodwardianus*.

UNIO COMPACTUS, Lea. Jour. Acad. Nat. Sci., (2), vol. iv. pl. 28, fig. 98, and Obs. vol. vii. p. 36.

*Branchial uterus* occupies the posterior portion of the outer branchiæ in about a dozen ovisacks. *Branchiæ* large, nearly semicircular, inner ones much the larger, free about half the length of the abdominal sack. *Palpi* very small, nearly oval, united only at the upper part of the posterior edges. *Mantle* thin, thickened at the margin, below the branchial opening on each side is placed a singular enlargement, which is black inside and has crenulated edges, the posterior basal margin having papillæ. *Branchial opening* large, with small reddish brown papillæ. *Anal opening* small, with minute light brown papillæ. *Super-anal opening* rather large, with colored edges and slightly united below. Color of the mass whitish.

*Embryonic shell* light brown, subrotund, has no hooks, near to *perplexus*. See Jour. Acad. Nat. Sci. (2) vol. iv. pl. v, fig. 21. Obs. vol. vi. p. 48.

Coosa River, Alabama, E. R. Showalter, M. D.

*Remarks.*—This small species is near to *penitus*, Con., in its outline and epidermal markings. The outline of the embryonic shell is nearly the same as that of *perplexus*, but it differs in the *compactus* being more rotund, the dorsal line being shorter. The enlargement below the branchial opening is different from any I have seen, being rather small, the segment of about the third of a circle, black inside and regularly crenulate on the edge. This process, while placed nearly in the same position, is entirely different in its form from the caruncle in *parvus*, Bar., figured in the Jour. Acad. Nat. Sci. (2), vol. iv. pl. 29, fig. 102. Obs. vol. vii. p. 39.

UNIO TUOMEYI, Lea. Trans. Amer. Phil. Soc. (2), vol. x. pl. 13, fig. 4. Obs. vol. v. p. 12.

*Branchial uterus* occupies the whole length of the outer branchiæ. Ova were

found in the ovarium as well as in the branchial uterus. *Branchiæ* large, inner ones much the larger, rounded below, free nearly the whole length of the abdominal sack. *Palpi* rather large, subtriangular, united a short distance on the posterior edges. *Mantle* very thin, thickened on the margin. *Branchial opening* rather large, with numerous small, dark brown papillæ. *Anal opening* large, with numerous small, dark brown papillæ. *Super-anal opening* large, slightly united below. Color of the mass light salmon.

Abbeville, South Carolina, Prof. Tuomey, and Macon, Georgia, J. C. Plant, Esq.

*Remarks.*—This species belongs to the group of which *complanatus* may be considered the type. The branchial uterus in all respects resembles that species. There were no ova sufficiently developed to give the embryonic form of the shell.

UNIO ABBEVILLENSIS, Lea. Jour. Acad. Nat. Sci. (2), vol. iv. p. 51, and Obs. vol. vi. p. 51.

*Branchial uterus* —. *Branchiæ* rather large, inner ones the larger, much rounded below, free nearly the whole length of the abdominal sack. *Palpi* small, subtriangular, united only at the upper posterior edges. *Mantle* thin, thickened at the margin. *Branchial opening* rather small, with numerous small, brown papillæ. *Anal opening* small, with numerous small, brown papillæ. *Super-anal opening* rather large, slightly united below. Color of the mass light salmon.

Abbeville, South Carolina, Prof. Tuomey, and Macon, Georgia, J. C. Plant, Esq.

*Remarks.*—A single specimen only, a male, was received from Mr. Plant, with the soft parts. This species belongs to the *complanatus* group.

UNIO EMMONSI, Lea. Jour. Acad. Nat. Sci. (2), vol. v. p. 56, and Obs. vol. viii. p. 60.

*Branchial uterus* occupies the whole length of the outer branchiæ. Ova were found in the ovarium as well as in the branchial uterus. *Branchiæ* very long and narrow, inner one posteriorly the larger, united more than half the length of the abdominal sack. *Palpi* small, ovately transverse, united only at the upper posterior edges. *Mantle* very thin, thicker on the margin. *Branchial opening* rather large, with small brown papillæ. *Anal opening* very small, with very small, brown papillæ. *Super-anal opening* rather small, united below for a long distance. Color of the mass very light salmon.

Roanoke River, at Weldon, N. C., Prof. Emmons; and Macon, Geo., J. C. Plant, Esq.

*Remarks.*—This species belongs to the *nasutus* group. Two specimens were received in alcohol from Mr. Plant, a male and female. In the soft parts this species differs but little from *nasutus*.

## Genus MARGARITANA.

MARGARITANA RUGOSA = *Alasmodonta rugosa*, Bar. Amer. Journ. Sci., vol. vi. p. 278.

*Branchial uterus* occupies the whole length of the outer branchiæ, brownish, forming a large massive lobe which extends below the margin. *Branchiæ* very large, rounded below, the inner ones much the larger, free nearly the whole length of the abdominal sack. *Palpi* rather small, subtriangular, united nearly one-half way down the posterior edges. *Mantle* rather thin, much thickened at the margin, blackish on posterior basal edge. *Branchial opening* rather large, with small, brown papillæ. *Anal opening* rather large, without papillæ,\* brown on the inner edges. *Super-anal opening* very large, with a dark-brown line within, united below. Color of the mass salmon.

*Embryonic shell* triangular, brown, has hooks. See Journ. Acad. Nat. Sci., vol. iv. pl. 5. fig. 26. Obs. vol. vi. p. 48.

Mohawk, N. York, J. Lewis, M. D.

*Remarks.*—Prof. Agassiz says, that *A. rugosa*, Bar. = *Complanaria*, Swain., has “both syphonal openings fringed,” and the Professor makes it the type of the genus *Complanaria*; but none of the specimens which I have examined have the anal syphonal opening fringed!

MARGARITANA MARGINATA = *Alasmodonta marginata*, Say. Journ. Acad. Nat. Sci., vol. i. p. 459.

*Branchial uterus* occupies the whole length of the outer branchiæ. *Branchiæ* large, curved below, nearly semicircular, inner ones much the larger, some more or less free near the posterior end of the abdominal sack, others entirely closed. *Palpi* rather small, suboval, rather transverse, not united at the posterior edges. *Mantle* very thin, thickened at the posterior and basal margins, beautifully maculate with very dark-brown, subquadrate spots along the outer margin of the pallear border. These spots are more distinct along the anal and super-anal openings, but, on the basal margin, they are closer, and sometimes join so as to form a continuous line. *Branchial opening* very small, with delicate, brownish, small papillæ. *Anal opening* rather large, without papillæ. *Super-anal opening* large, united below. Color of the mass greenish, inclining to salmon.

*Embryonic shell* triangular, white, with hooks. See Journ. Acad. Nat. Sci., vol. iv. pl. 5, fig. 27, and Obs. vol. vi. p. 49.

Mohawk, N. York, J. Lewis, M. D.

\* Some specimens are crenulate.

MARGARITANA ARCUA, Lea. Trans. Amer. Phil. Soc., vol. vi. pl. 22, fig. 69. Obs. vol. ii. p. 71.

*Branchial uterus* probably occupying both the outer branchiæ.\* The ova in the ovarium were not mature. *Branchiæ* very large, almost semicircular, inner ones much the larger. The specimen with ova had the branchiæ united the whole length of the abdominal sack. The other (probably a male) has a small opening into the cavity above at the posterior part of the abdominal sack, which I thought at first might be accidentally torn in opening, but, on close examination, it does not appear to be the case. It would be singular if the female should be closed and the male free. *Palpi* rather small, subtriangular, united half way down the posterior edges. *Mantle* moderately thick and double at the margin. On the outer edge, more than half way round the posterior outer edge, maculate with beautiful dark-brown, quadrate spots. *Branchial opening* rather small, with reddish-brown, rather small, low, conical papillæ. *Anal opening* rather small, with very small papillæ along the inner edges, which edges are irregularly colored. *Super-anal opening* rather small, united below for a distance about equal to the opening. All this outer edge is beautifully maculate with dark-brown, quadrate spots. Color of the mass white. The large cavity of the beaks seems to be filled up by a puffy enlargement of the mantle.

Altamaha River, near Darien, Georgia. J. Hamilton Couper, Esq.

MARGARITANA HILDRETHIANA, Lea. Trans. Amer. Phil. Soc., vol. v. pl. 3, fig. 8 and Obs., vol. i. p. 148.

*Branchial uterus* occupies the whole length of the outer branchiæ. *Branchiæ* rather large, inner one slightly larger anteriorly, curved below, free about half the length of the abdominal sack. *Palpi* small, very thin, suboval, slightly united on the upper posterior edges. *Mantle* thin. *Branchial opening* large, with numerous rather small papillæ. *Anal opening* large, apparently without papillæ. *Super-anal opening* large, united below. Color of the mass whitish.

*Embryonic shell* subrotund, clear white, has no hooks. See Journ. Acad. Nat. Sci., vol. iv. pl. 5, fig. 31, and Obs. vol. vi. p. 49.

Columbus, Ohio, H. Moores.

*Remarks.*—This, like *rugosa* and *marginata*, seems to have no papillæ on the edges of the anal opening, while *arcua* has. If the absence of papillæ on the anal opening should characterize the genera *Anodonta*, *Margaritana*, *Alasmodonta* and *Strophitus*, as amended by Prof. Agassiz, some of these *Margaritance* would have to be placed in another group.

\* Two specimens only were received. In one there were a few ova in the outer branchiæ. These branchiæ, in both specimens, had a crimped appearance, which may have been caused by the alcohol; but this is not the case with the inner branchiæ, which are perfectly smooth. Therefore the crimpling may be natural.

MARGARITANA DELTOIDEA, Lea. Trans. Amer. Phil. Soc., (2,) vol. vi. pl. 13, fig. 38. Obs. vol. ii. p. 43.

*Branchial uterus* occupies the whole width of the outer branchiæ. *Branchiæ* rather large, inner ones slightly the larger, nearly straight below, free nearly half the length of the abdominal sack. *Palpi* small, subtriangular, not united on the posterior edges. *Mantle* whitish, thin, thickened on the margin, with numerous quadrate maculations on the outer edges. *Branchial opening* rather large, with numerous small papillæ. *Anal opening* small, with very minute papillæ. *Super-anal opening* long, colored on the inner edges and slightly united below. Color of the mass whitish.

*Embryonic shell* subtriangular, light-brown, has hooks. See Journ. Acad. Nat. Sci., (2,) vol. iv. pl. 5, fig. 30, and Obs. vol. vi. p. 49.

Columbus, Ohio, H. Moores.

*Remarks.*—This small species has the usual character of *Margaritana* in having brownish maculations on the outer posterior edges of the mantle. These maculations are not, however, confined to the genus *Margaritana*, as I have found them to exist in *Unio triangularis* and *Unio fabalis*.

MARGARITANA CONFRAGOSA = *Alasmodonta confragosa*, Say. Disseminator, 1829, and Amer. Conch., pl. 21.

A single specimen only, a male, was received.

*Branchiæ* very large, nearly semicircular, inner ones much the larger, free the whole length of the abdominal sack. *Palpi* very large, pendant, sublunate, united half way down the posterior edges. *Mantle* rather thin, with a thickened broad margin. *Branchial opening* rather large, with numerous small, brown papillæ. *Anal opening* very small, with very minute papillæ. *Super-anal opening* large and united below, with a dark line on the inner edges. Color of the mass whitish.

New Harmony, Indiana, James Sampson.

*Remarks.*—I have not had the advantage of examining the female of this remarkable and very beautiful species. There being a single male only received. It would be very important to know the character of the embryonic shell. The absence of maculations on the exterior edges of the mantle, so usually existing in this genus, is an observable character in this species.

MARGARITANA COMPLANATA, = *Alasmodonta complanata*, Barnes. Amer. Journ. Sci., vol. vi. p. 278.

*Branchial uterus* occupies the whole length of the outer branchiæ, enormously extended—width  $3\frac{3}{4}$  inches, length  $1\frac{1}{2}$ , thickness  $\frac{3}{8}$ , probably containing some millions of embryonic shells ready to be extruded. *Branchiæ* large in the male, rounded below—in the female with distended young, the outer branchiæ are so much enlarged as nearly to conceal the inner ones, being rounded posteriorly, gently curving to the anterior end, free nearly the whole length of the abdominal sack. *Palpi* large,

thick, oblique, subangular, united for a short distance down the posterior edges. *Mantle* rather thin, with a very broad border, thickened on the edges and having small crenulations on the edges below the branchial opening. *Branchial opening* very large, with very numerous small, brownish papillæ. *Anal opening* small, with numerous very small, brownish papillæ. *Super-anal opening* very long, colored on the edges and united for some distance below. Color of the mass dirty white. Adductor muscles enormously large and powerful.

*Embryonic shell* subtriangular, brownish, has hooks. See Jour. Acad. Nat. Sci. (2), vol. iv. pl. 5, fig. 29, and Obs. vol. vi. p. 49.

Cincinnati, Ohio, J. Clark.

*Remarks.*—This is our largest species of *Margaritana* and certainly one of the most, if not the most, prolific of our *Unionidæ*. The females now under examination are not the largest in the exterior hard parts which I have seen, but their enormous reproduction may be imagined by the facts stated above. In the four females examined, the edges of the *super-anal opening* are united in two places, thus making two openings above the anal opening; but the males had not this second attachment. This may, however, vary in other specimens.

#### Genus ANODONTA.

ANODONTA SUBCYLINDRACEA, Lea. Trans. Amer. Phil. Soc., vol. vi. pl. 24, fig. 117. Obs. vol. ii. p. 106.

*Branchial uterus* filled the whole length of the outer leaves, like *fluviatilis*. *Branchiæ* large, slightly curved below, inner ones rather the larger, free nearly the whole length of the abdominal sack. *Palpi* small, subtriangular, united on the posterior edges nearly the whole length. *Mantle* very thin, with rather a narrow margin. *Branchial opening* rather large, with closely set rows of papillæ on the inner edges. *Anal opening* rather small, with small papillæ on the inner edges. *Super-anal opening* rather small and united for some distance below. Color of the mass whitish.

*Embryonic shell* belongs to the subtriangular group, and is nearly the same in outline as that of *Margaritana rugosa*, Bar. The specimens are from Buffalo, New York, and kindly sent by Mr. A. T. Jackson.

ANODONTA IMBECILIS, Say. The Disseminator, 1829.

*Branchial uterus* occupies the whole length of the abdominal sack. *Branchiæ* large, slightly curved below, very nearly the same size, free nearly the whole length of the abdominal sack. *Palpi* rather small, wide, triangular, not united at the posterior edges. *Mantle* very thin, slightly thickened on the margin. *Branchial opening* rather large, with numerous brown papillæ. The eye spots were perceptible on

these papillæ, and were quite sensitive to light. *Anal opening* small, *without papillæ*, the inner edge being variegated with lighter and darker brown. *Super-anal opening* small, united for some distance below. Color of the mass salmon.

*Embryonic shell* subtriangular, light brown, furnished with hooks which have barbed points. See Jour. Acad. Nat. Sci. (2), vol. iv. pl. 5, fig. 36. Obs. vol. vi. p. 50.

Othcalooga Creek, Georgia, Bishop Elliott, and Ohio River, D. H. Shaffer.

ANODONTA UNDULATA, Say. Nicholson's Eney., Amer. Ed., pl. 3, fig. 6.

*Branchial uterus* occupies the whole of the outer branchiæ in *transverse* ovisacks, and the whole presents a brownish appearance. See description and figure in Trans. Am. Phil. Soc. (2), vol. vi. pl. 15, and Obs. vol. i. p. 52. *Branchiæ* rather large, curved below, inner ones the larger, united the whole length of the abdominal sack. *Pulpi* small, subtriangular, united nearly half way down the posterior edges. *Mantle* rather thin, very much thickened at the margin, which is dark salmon at the base and black posteriorly. *Branchial opening* rather large, with brown papillæ. *Anal opening* rather large, with a few imperfect papillæ on the inner edges.\* *Super-anal opening* moderately large, united below. Color of the mass salmon, more intense on the margin of the mantle and on the foot.

*Embryonic shell* brown, triangular, has hooks. See Jour. Acad. Nat. Sci. (2), vol. iv. pl. 5, fig. 38, and Obs. vol. vi. p. 50.

Schuykill, near Philadelphia, and Schuyler's Lake, New York, J. Lewis, M. D.

*Remarks.*—The very remarkable arrangement and position of the ovisacks in this species had my attention nearly thirty years since, and I described and figured them in the 6th vol. 2d ser. of the Trans. Am. Phil. Soc., and in Obs. vol. vi. p. 52. A more particular description and more correct figures were lately given in the Journal Acad. Nat. Sci. (2), vol. iv. pl. 5, and Obs. vol. vi. p. 50. These embraced microscopic views of the embryonic shell. More recently, having some living females, I closely observed them for the purpose of discovering the mode of parturition. This is effected by the extrusion of the whole sack, which is cylindrical with rounded ends, and in the specimen observed, about one and a half inch wide, these ovisacks varied in length from one-thirtieth to one-fourth of an inch long, containing from one to ten ova. The ovisack is extruded with the embryo still in the ovum, but they soon begin to appear at the surface of the ovisack, and are there fastened apparently by a filament at the dorsal line. Desirous of knowing with what rapidity these ovisacks were extruded by the parent, I observed closely the daily number. On the 14th of January, 1855, I observed five ovisacks in the water; on the morning of the 15th I

\* Agassiz's genus *Strophilus*, (Stimpson's Shells of New England, p. 15), of which *undulata* is the type, is stated *not* to be fringed at the anal opening, but I find it to be partially fringed. *Unio radiatus* is usually fringed, but in some cases is *not so*.



found fifteen more; 16th, there were forty-six additional; 17th, only three were found; 18th, only two; from the 18th to the 21st, fifteen; on the 22d and 23d eight more, four of them were in the act of passing out between the valves of the parent. They all had the young shell attached to the outside of the ovisack, with the valves open. One of them stood out distinctly, attached by a transparent filament nearly its own length. From the 23d to the 30th, over a hundred ovisacks were extruded; 31st, sixty ovisacks appeared, the young all looking healthy, but I could not observe the least motion in any of them, nor have I in any of this species. February 2d, ninety made their appearance; Feb. 3d, over ninety; on the 4th and 5th, about two hundred and sixty; on the 5th, one hundred and seventy; on the 6th and 7th, one hundred and four; from the 8th to the 13th, only thirty-five, and subsequently none were extruded. *Anodonta edentula* has also this singular construction of branchial uterus, and these two species are the only ones I have known to present this remarkable structure.

ANODONTA FERUSSACIANA, Lea. Trans. Amer. Phil. Soc. (2), vol. v. pl. 6, fig. 16. Obs. vol. i. p. 157.

*Branchial uterus* occupies apparently the outer leaves of the branchiæ, which are brownish. One specimen had half the anterior portion filled; evidently, the posterior portion had been discharged. *Branchiæ* large, the inner ones rather the larger, free nearly half the length of the abdominal sack. *Pulpi* very large, semilunar, rather thin, united only a small distance down the posterior edges. *Mantle* rather thick, double along the lower edge, which has papillæ below the branchial opening. *Branchial opening* large, with numerous small, brownish papillæ. *Anal opening* small, with numerous very small papillæ.\* *Super-anal opening* rather long, colored on the outer edges with black pigment and united for some distance below. Color of the mass light salmon.

*Embryonic shell* triangular, brown, no apparent hooks in the specimens examined. See Journ. Acad. Nat. Sci., (2), vol. iv. pl. 5, fig. 35. Obs. vol. vi. p. 50.

Scioto River, near Columbus, Ohio, H. Moores. Common in the Ohio basin.

ANODONTA COUPERIANA, Lea. Trans. Am. Phil. Soc. (2), vol. viii. pl. 20, fig. 46. Obs. vol. iii. p. 65.

*Branchial uterus* occupies the whole of the outer branchiæ, like *fluviatilis*, giving a reddish appearance to the whole leaf and extending slightly below the inferior edge. *Branchiæ* large, nearly semicircular, inner one rather the larger, free rather more than the half of the length of the abdominal sack. *Pulpi* rather small, sub-triangular, united for a short distance down the posterior edges. *Mantle* thin, thick-

\* This species has perfectly formed papillæ on the edges of the anal opening, and therefore cannot belong to the genus *Anodonta* as described by Agassiz, who says, "anal opening not fringed." It is nevertheless a true *Anodonta* according to, I believe, all other authors.

ened at the basal margin. *Branchial opening* small, blackish, with numerous small, flesh-colored papillæ. *Anal opening* small, reddish-brown, without papillæ. *Super-anal opening* very small, united for some distance below. Color of the mass whitish.

*Embryonic shell* triangular, brown, with hooks, very like *Anodonta Lewisii*. See Journ. Acad. Nat. Sci., (2), vol. iv. pl. 5, fig. 32. Obs. vol. vi. p. 49.

Near Darien, Georgia, J. Hamilton Couper, Esq., and Major T. C. Downie.

ANODONTA PLANA, Lea. Trans. Amer. Phil. Soc., (2), vol. vii. pl. 7, fig. 18. Obs. vol. i. p. 160.

*Branchial uterus* occupies the whole length of the outer branchiæ. *Branchiæ* very large, rounded below, inner ones somewhat the larger, thickened along the edges, free half the length of the abdominal sack. *Palpi* very large, subtriangular, united half way down the posterior edges. *Mantle* thick, much thickened at the margin, black on the outer posterior basal portion of the edges, and brownish along the fringes. *Branchial opening* large, with numerous rather large papillæ. *Anal opening* rather large, without papillæ on the edges. *Super-anal opening* large, blackish on the edges, united for some distance below. Color of the mass light salmon, more intense on the foot.

*Embryonic shell* triangular, brown, has hooks, nearly the same with *ovata*. See Journ. Acad. Nat. Sci., (2), vol. iv. pl. 5, fig. 33 and Obs. vol. vi. p. 49.

Columbus, Ohio, H. Moores.

ANODONTA DECORA, Lea. Trans. Amer. Phil. Soc., (2), vol. vi. pl. 20, fig. 63. Obs. vol. ii. p. 64.

*Branchial uterus* occupies the whole length of the outer branchiæ, the young giving the whole mass a brown color. *Branchiæ* very large, rounded below, inner ones rather the larger, free two-thirds the length of the abdominal sack. *Palpi* rather large, very thin, rather oblique, subfalcate, united one-third way down the posterior edges. *Mantle* very thin, much thickened on the margin. *Branchial opening* rather large, with numerous, delicate, light-brown papillæ, somewhat branched. *Anal opening* small, without papillæ. *Super-anal opening* small, colored on the edges, united for some distance below. Color of the mass salmon.

*Embryonic shell* subtriangular, brown, has hooks. See Journ. Acad. Nat. Sci., (2), vol. iv. pl. 5, fig. 34, and Obs. vol. vi. p. 49.

Columbus, Ohio, H. Moores; and Cincinnati, D. H. Shaffer.

ANODONTA OVATA, Lea. Trans. Amer. Phil. Soc. (2), vol. x. pl. 2, fig. 2. Obs. vol. ii. p. 2.

*Branchial uterus* occupies the whole length of the outer branchiæ, which are enormously extended, the young giving the whole mass a brown color. *Branchiæ* very large, much rounded below, inner ones rather the larger, free more than half the length of the abdominal sack. *Palpi* very large, rather thin, subtriangular, darker

within, united more than half way down the posterior edges. *Mantle* rather thick, very much thickened on the margin, colored on the posterior parts. *Branchial opening* very large, with numerous small papillæ, blackish inside and out. *Anal opening* very large, blackish, mottled within. *Super-anal opening* small, edges black, united for some distance below. Color of the mass whitish.

*Embryonic shell* subtriangular, brown, has no hooks. Journ. Acad. Nat. Sci., (2) vol. iv. pl. 5, fig. 33, and Obs. vol. vi. p. 49.

Columbus, Ohio, H. Moores.

*Remarks.*—This species is closely allied to *plana* and *decora*, in the outward parts, as well as the soft parts. It seems to differ more in its habits. In a letter from Mr. Moores, he tells me that the specimens he sent me differ from *plana*,—the habits of the species being peculiar to itself. That “it is found only in stony bottoms with mud and sediment, and that it is more erect, more projecting out of the mud and gaping wider when at rest than *plana*.”

ANODONTA EDENTULA = *Alasmonta*, Say. Disseminator, 1829.

*Branchial uterus* occupies the whole length of the outer branchiæ, having the ovisacks placed *transversely* as described in *undulata*. *Branchiæ* nearly semicircular, very large, free almost half the length of the abdominal sack; in the male the inner ones are rather the larger. *Palpi* large, light-salmon color, transverse, subelliptical, united one-third down the posterior edges. *Mantle* thin, thickened at the edges where it is salmon color, and spotted black on the exterior up to the top of the anal opening. *Branchial opening* large, blackish-brown, with numerous rather small papillæ. *Anal opening* rather large, with minute, colored papillæ along the whole of the inner edge. *Super-anal opening* large, colored on the inner edges and maculate on the outer, united below. Color of the mass light-salmon, but darker on the foot and the margin of the mantle.

*Embryonic shell* subtriangular, brown, has hooks. See Jour. Acad. Nat. Sci. (2) vol. iv. pl. 5, fig. 37, and Obs. vol. vi. p. 50.

Columbus, Ohio, H. Moores; and Fox River, Illinois, H. C. Grosvenor.

*Remarks.*—This species has the same very remarkable transverse ovisacks as *undulata*. (See *ante*.) It also has the super-anal opening fringed with minute papillæ, but it differs in having the branchiæ free. So that it cannot belong to either of Prof. Agassiz's genera which he has made of the genus *Anodonta*.

ANODONTA WAHLAMATENSIS, Lea. Trans. Am. Phil. Soc. (2), vol. vi. pl. 20, fig. 64, and Obs. vol. ii. p. 78.

*Branchial uterus* occupies the whole length of the outer branchiæ. *Branchiæ* rather large, nearly semicircular, inner ones much the larger, free nearly the whole length of the abdominal sack. *Palpi* very wide and transverse, surrounding the mouth en-

tirely, acutely angular at the posterior end, not united on the edges even above the junction with the mantle. *Mantle* white, large, rather thick, thicker on the inferior margin, greatly extended on the posterior dorsal margin. *Branchial opening* rather large, with numerous rather small papillæ, brownish inside and out. *Anal opening* very small, brownish inside and out, crenulate on the edges. *Super-anal opening* very long and very far removed from the anal opening, slightly colored on the edges. Color of the mass white. Form of the whole mass subtriangular.

*Embryonic shell* subtriangular, has hooks, very nearly the same with *A. Lewisii*. See Journ. Acad. Nat. Sci., (2) vol. iv. pl. 5, fig. 32, and Obs. vol. vi. p. 49.

Scott River, California, Dr. Trask.

*Remarks.*—This is a winged species of *Anodonta*, and the mantle is extended into the interspace, forming an elevated angle. The palpi are very remarkable for their form and size, and their envelopment of the mantle. Their width is about four times their length.

ANODONTA GIGANTEA, Lea. Trans. Amer. Phil. Soc., (2), vol. vi. pl. 1, fig. 1, and Obs. vol. ii. p. 1.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. *Branchiæ* very large, thick, gently curved below, posteriorly very oblique, inner ones somewhat the larger, free two-thirds the length of the abdominal sack. *Palpi* very large, obliquely long and angular, united two-thirds down the posterior edges. *Mantle* rather thick, with a broad and very much thickened margin. *Branchial opening* rather small, with numerous small, brownish papillæ. *Anal opening* rather small, without any papillæ or crenulations. *Super-anal opening* slightly colored, united below for some distance. Color of the mass whitish.

Columbus, Mississippi, Dr. Spillman.

ANODONTA OREGONENSIS, Lea. Trans. Amer. Phil. Soc., (2), vol. vi. pl. 21, fig. 67, and Obs. vol. ii. p. 80.

*Branchial uterus* occupies the whole length of the outer branchiæ. *Branchiæ* large, inner ones rather the larger, free nearly the whole length of the abdominal sack. *Palpi* large, suboval, united at the upper part of the posterior edges. *Mantle* thin, thicker towards the margin. *Branchial opening* large, with numerous small, brownish papillæ. *Anal opening* very small, with brownish crenulated edges. *Super-anal opening* large, united for some distance below. Color of the mass dirty white.

*Embryonic shell* triangular, light-brown, has hooks, almost exactly the same with *A. Lewisii*. See Journ. Acad. Nat. Sci., (2), vol. iv. pl. 5, fig. 32. Obs. vol. vi. p. 49.

Oregon, Dr. C. B. R. Kennerly of the Northwestern Boundary Survey. From the Smithsonian Institution.

*Remarks.*—I am indebted to Prof. Henry, Secretary of the Smithsonian Institution, for the advantage of examining the soft parts of this species. The difficulty of get-

ting preserved specimens from such distant habitats is extreme, and Dr. Kennerly and other gentlemen attached to these national expeditions, render great service to science in having made collections of the natural history in the regions they passed through.

ANODONTA FRAGILIS, Lam. An. sans Vert., vol. vi. p. 85.

*Branchial uterus* ——. No ova were found here, but they were in the ovarium. *Branchiæ* large, inner ones larger anteriorly, free nearly the whole length of the abdominal sack. *Palpi* rather large, subtriangular, united nearly the whole length on the posterior edges. *Mantle* very thin. *Branchial opening* large, with numerous small, brown papillæ. *Anal opening* rather large, with crenulate edges. *Super-anal opening* rather large, colored on the inner edges, united for some distance below. Color of the mass dirty white.

Punch Bowl, near Grand Rapids, Michigan, J. A. McNeil, per Dr. Lewis, of Mohawk, New York.

*Remarks.*—This remarkably delicate and fragile species is so nearly like to a specimen which I obtained from Baron Ferussac, in Paris, as the *fragilis*, Lam., from Newfoundland, many years since, that I cannot consider it more than a variety. Mr. Anthony has distributed it under the name *pallida*. I received quite a number of specimens in alcohol, every one of which were females, having ova in the ovarium, but none had ova in the branchial uterus. The outer hard parts of this species is remarkably thin and diaphanous. With a moderately good microscope, the angular compartments of the base membrane may easily be distinguished. The epidermis is so delicate and smooth that the minute granules or knobs which have been described and figured in my paper as to exist on the embryonic shells, (Journ. Acad. Nat. Sci., (2,) vol. iv. and Obs. vol. vi.), may be easily seen to exist on the epidermis of the mature shell, within the area of the base membrane compartments. I have observed the same character to exist on delicate specimens of *Anodonta fluviatilis* and *Unio ochraceus*. These compartments may be of four, five, or six sides; but usually of six.

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*Supplement to "Descriptions of Soft Parts and Embryonic Forms of one hundred and forty-three species of Unionidæ of the United States." By ISAAC LEA.*

UNIO OCHRACEUS, Say. Nicholson's Ency., Am., Ed. Art. Am. Conch. and Trans. Amer. Phil. Soc., (2) vol. vi. and Obs. vol. ii. p. 49.

*Branchial uterus* ——. *Branchiæ* large, inner ones much the larger, very thin, nearly semicircular, united the whole length of the abdominal sack. *Palpi* small, ovate, united on the upper part of the posterior edges. *Mantle* very thin, white.

thicker on the border. *Branchial opening* small, salmon color, interspersed with black and having a few rather small papillæ. *Anal opening* small, salmon colored, interspersed with black and having slightly crenulated edges. *Super-anal opening* rather large, slightly united below. Color of the mass whitish, and inclining to salmon.

Potomac, at Fort Washington, Prof. Baird.

*Remarks.*—In the Trans. Amer. Phil. Soc., 1836, vol. vi. pl. 15, fig. 44, I made some observations on the soft parts of the *Unionidæ* and gave a drawing of the branchial uterus of this species.

UNIO FISHERIANUS, Lea. Trans. Amer. Phil. Soc., (2) vol. vi. and Obs. vol. ii. p. 8, pl. 4, fig. 8.

*Branchial uterus* occupies nearly the whole length of the outer branchiæ. *Branchiæ* very long and narrow, the inner ones somewhat the larger, free nearly the whole length of abdominal sack. *Palpi* very large, nearly elliptical, united only at the upper posterior edges. *Mantle* very thin, thickened at the edges, nearly black along the posterior edges. *Branchial opening* rather large, with numerous very small, light colored papillæ. *Super-anal opening* long, united for some distance below. Color of the mass whitish, inclining to salmon color.

Canal, near the Chain Bridge, District of Columbia, Prof. Baird.

*Remarks.*—I have had the advantage of examining quite a number of specimens kindly sent to me in a living state by Prof. Baird, of the Smithsonian Institution. The color of the nacre of all the specimens were purple, except one, which was white, with a tint of salmon in the cavity of the beaks. In the character of the branchiæ being *free* nearly the whole length of the abdominal sack, it is very different from *nasutus*, Say, to which it is so nearly allied in the exterior or hard parts. In that species the branchiæ are only free at the posterior point of the foot, and Prof. Agassiz is quite mistaken in assigning *nasutus* as well as *Fisherianus* to the genus *Eurymea*, proposed by Mr. Rafinesque and adopted and amended by the Professor, which the latter describes as having “the gills united the whole length of the foot”!! *Fisherianus* is *free* nearly the whole length of the foot or abdominal sack, while Prof. Agassiz quotes it among the division proposed, under the name of *Eurymea*! See “Archiv fur Naturgeschichte,” 1852, and “Shells of New England,” by Wm. Stimpson, 1851.

ART. X.—*Descriptions of new and little known species of Birds of the family Picidæ in the Museum of the Academy of Natural Sciences of Philadelphia.*

By JOHN CASSIN.

Genus POLIPICUS, Cassin.

1. POLIPICUS, Cassin, Proc. Acad., Philada., 1863, p. 196.

Belonging to the group *Gecinince*, G. R. Gray, and allied to the genus *Gecinus*, Boie, especially to a subgroup, of which *Gecinus puniceus*, (Horsf.) is the type. Small, bill nearly straight and rather wide at base, wing rather long, first quill very short, fourth, fifth and sixth longest, tail rather long and wide, feet short, outer hind toe longest, inner hind toe short.

The present species is unusually small for a bird of the group to which I regard it as belonging.

2. POLIPICUS ELLIOTII, Cassin.

*Polipicus Elliotii*, Cassin, Proc. Acad., Philada., 1863, p. 197.

PLATE LI. Fig. 1.

Wing rather long, first quill spurious, fifth slightly longest, tail long and wide. Female? Head above black, entire upper parts of body and wings of yellowish olive-green, with a golden tinge on the exposed surface of shorter quills and with a reddish tinge on the upper tail coverts. Primaries brownish black, slightly edged with green on their outer webs and having large spots of yellowish white on their inner webs, shafts of quills on their under surface yellowish white. Tail brownish black, outer feathers with dull brownish white spots on their inner webs; under surface of tail tinged with pale greenish yellow.

Superciliary line and cheeks dull buff, throat and under parts of body greenish or yellowish white, paler and nearly pure white on the throat and darker on the breast, and the entire under parts with longitudinal stripes of brownish black, very narrow on the throat and wider on the breast. Flanks and under tail coverts with a few irregular bands, and saggitate spots of the same brownish black. Bill light

brownish, lower mandible and tip of upper, nearly white, feet probably light colored. Under wing coverts light yellowish white, with black spots.

Total length about 7 inches, wing  $3\frac{3}{4}$ , tail 3 inches.

*Hab.*—River Muni, Western Africa. One specimen in Acad. Mus. from Mr. DuChaillu's collection.

This is a very curious little woodpecker, having the general form of and even a larger tail than usual in *Gecinus*, and in its group is quite remarkable for its small size. The present specimen is very probably a female, and I regret that no other of the species is in the collection of Mr. DuChaillu, from whom it was purchased.

This bird is named in honor of my friend, Mr. Daniel Giraud Elliot, of New York, one of the most talented and enterprising of the young naturalists of the United States, who, in his "Monograph of the Pittidæ," has just completed one of the most important as well as beautiful contributions to ornithology ever made in this country.

### 3. *CAMPETHERA VESTITA*, Cassin.

*Campethera vestita*, Cassin, Proc. Acad., Philada., 1863, p. 197.

PLATE LI. Fig. 2.

Allied to *C. brachyrhyncha*, (Swains.,) and *C. nivosa*, (Swains.,) and resembling the former, but larger, with the tail clear black, and the entire upper plumage darker golden green.

Female? Head above brownish black, with numerous small spots of pale brownish white, entire upper parts of body and wings golden green, quills brownish black, with a few small spots of dull white on their outer webs. Tail black, with the middle feathers slightly edged with green, under surface with a greenish tinge, and with the shafts of the feathers yellow. Throat light reddish brown, with numerous small spots of black, entire under parts of body with transverse narrow bands of black and dull greenish yellow, paler on the abdomen, and with a rufous tinge on the breast. Under wing coverts and inner edges of quills pale buff or fawn color, (without spots,) the latter having some irregular bands of the brownish black of the outer webs. Shafts of quills on their under surface yellow. Bill and feet bluish black.

Total length about  $7\frac{1}{2}$  inches, wing 4, tail  $2\frac{1}{2}$ .

*Hab.*—St. Paul's River, Western Africa. One specimen in the Academy Museum from Dr. Robert MacDowell's collection.

The description is that very probably of a female specimen, of which I have never seen a male, and which was received at the Academy in a very interesting collection from Dr. MacDowell, in 1841. This bird seems to be most nearly allied to



*C. brachyrhyncha*. (Swains.,) also a West African species, of which several specimens are in the Academy Museum, from Mr. DuChailu's collection, but it differs not only in having the upper plumage a darker and golden green, and the tail clear lustrous black, but the under wing coverts are pale buff or fawn color, without spots, instead of nearly white and spotted with black, as in *C. brachyrhyncha*. It is also larger than that species.

In colors and general appearance, this bird bears a greater resemblance to the American woodpeckers of the genus *Chloronerpes*, Swainson, especially to *C. rubiginosus*, Swains., than any other African species with which I am acquainted.

4. CHRYSOPICUS MALHERBEL, Cassin.

*Chrysopicus Malherbei*, Cassin, Proc. Acad., Philada., 1863, p. 198.

PLATE LI. Fig. 3.

Resembling *C. notatus*, (Licht.,) and *C. athiopicus*, (Hemp. et Ehrenb.,) but much smaller than the former and otherwise different from both. Head above from base of bill to occiput, scarlet, back and upper wing coverts and rump, yellowish green, lighter on the back, with numerous nearly circular and oblong spots of greenish white, exposed surface of shorter quills yellowish olive green, tipped with yellowish white, (but without transverse bands,) primaries dark brown, with small spots of yellowish white on their outer webs, and with large spots of the same color on their inner webs. Sides of head and neck and entire under parts of body pale yellowish white, with nearly circular and oblong spots of black, larger on the breast and sides, smaller on the middle of the abdomen and under tail coverts. Tail yellowish brown, with the shafts and tips of the feathers yellow, obscure transverse bands of a darker shade of brown on the outer feathers, under surface of tail, greenish yellow. Under wing coverts pale yellowish white, with a few spots of black. Bill and feet dark plumbeous. Male?

Total length about  $6\frac{1}{2}$  inches, wing  $3\frac{3}{4}$ , tail  $2\frac{1}{2}$  inches.

*Hab.*—Zanzibar. Specimen in Academy Museum, Philada.

A single specimen of this species is from the Massena collection, and is labelled, "Zanzibar" in the same hand-writing as some other specimens from the same locality. In general appearance this bird resembles the much larger *C. notatus*, (Licht.,) Malh. Mon., pl. 95, figs. 4, 5, 6, from which it differs, not only greatly in size, but in the color of the upper parts of the body, and in having the clearly defined white circular spots of the back and coverts as described above. From *C. nubicus*, (Gm.,) Malh. Mon., pl. 93, figs. 2, 3, 4, 5, 6, this bird differs also in size and in the colors of the upper parts. It appears to be smaller also than *C. athiopicus*, (Hempr. and Ehrenb.) Mahl. Mon., pl. 94, figs. 1, 2, 3. Rupp., Syst. Ueb., pl. 36. but differs in the color

and circular spots of the upper parts, and has no transverse bands on the shorter quills nor tail as represented in the figures of that species. In the present and only specimen, though the top of head and occiput are bright scarlet, there is no stripe from the base of the under mandible or *moustache* of that color.

Although the specimen now described does bear a considerable resemblance to *Picus notatus*, Licht., which is expressly stated by Messrs. Hemprich and Ehrenberg, in their description of *Picus æthiopicus*, to be the case also in that species (*Symbolæ Physicæ, Aves*, pt. 1,) it is clearly not the bird described by them nor that figured by M. Ruppell, *Syst. Uebers*, pl. 36. *P. æthiopicus* is regarded by M. Malherbe as identical with *P. nubicus*, Boddaert, very probably correctly, to which the present bird bears some resemblance also, but not in so great a degree as to *P. notatus*.

This species I have taken the liberty of dedicating to the distinguished author of the "Monographie des Picidées."

##### 5. PICUS VAGATUS, Cassin.

*Picus vagatus*, Cassin, *Proc. Academy, Philada.*, 1863, p. 196.

PLATE LIII. Fig. 1.

Belonging to the same group as *Picus scalaris*, Wagler, and resembling it in colors, but much smaller than that or any allied species.

Male. Head above scarlet, all the feathers being black at base, with small white spots, which are more numerous on the front and vertex, stripes from the base of the lower mandible and behind the eye black, from the base of the upper mandible and another over and behind the eye sordid or brownish white. Back and exposed surface of quills banded transversely with black and white, *which on the back are about equal in width*. Wing coverts black, with circular and oblong spots of white, upper tail coverts black. Under parts brownish white, with circular and irregular spots of black more numerous on the breast and sides and forming transverse bands on the flanks. Tail feathers black, two outer feathers on each side with white bands. Quills brownish black, with quadrangular or irregular spots of white on their outer webs, and large circular spots of white on their inner webs. Bill and feet dark, short feathers on the nares fuliginous.

Total length about  $5\frac{1}{2}$  inches, wing  $2\frac{1}{2}$ , tail  $2\frac{1}{4}$  inches.

*Hab.*—Mexico? Specimen in Academy Museum, Philada.

Two specimens of this little species are in the Academy Museum from the Massena collection, but are, unfortunately, without labels indicating locality. They are, however, strictly of the same form and generic character as the birds above mentioned, and are probably from Mexico or Central America. This species is easily distinguished from all others of its intimate allies by its much smaller size as above described. It is not larger than *Picus minor*.

## 6. CELEUS MENTALIS, Cassin.

*Celeus mentalis*, Cassin, Proc. Acad., Philada., 1860, p. 13

*Celeus squamatus*, Lawrence, Selater's Ibis, 1863, p. 184.

PLATE LII. Figs. 2, 3.

About the size of *Celeus rufus*, (Gm.) Third quill longest, bill rather short, occipital feathers somewhat lengthened. Male with a large space on the throat bright scarlet. This space begins nearly on a line with the commissure of the bill on each side, covering the chin and throat, without being divided in the middle. Head and upper parts of body dark cinnamon color, rather lighter on the rump and upper coverts of the tail, and many feathers on the back and wings having circular and crescent-shaped spots of black. Quills brownish black, barred with dark cinnamon; tail brownish black, all the feathers barred with dull yellowish cinnamon color. Under parts of body same color as the back, but lighter and with a yellowish shade, and having the black spots more numerous, every feather having semicircular and crescent-shaped bands of black. Under wing coverts uniform dark cinnamon, not spotted, axillaries dark cinnamon, with a few imperfect bands of deep black. Bill bluish horn-color, under mandible lighter. Female similar to the male, but having no red space on the throat and the black spots on the under parts not so numerous.

Total length about 8 inches, wing  $4\frac{3}{4}$ , tail  $1\frac{3}{4}$  inches.

*Hab.*—Near Turbo and on the Atrato River, New Granada. Discovered by Messrs. William S. Wood, Jr. and Charles J. Wood, while attached to the expedition commanded by Lieut. N. Michler, U. S. Top. Eng., which surveyed a route for a ship-canal across the Isthmus of Darien. Specimen in National Museum, Washington, Museum Academy, Philada., and collection of Mr. Geo. N. Lawrence, New York.

Of this species I have seen only three specimens, which were brought from the Atrato River by Lieut. Michler's Surveying Expedition, and one specimen received by my friend Mr. Geo. N. Lawrence, of New York, from Panama. The male is easily recognized by the scarlet patch on the throat, which is of the same shape, and generally resembling the same character in *Sphyrapicus varius* and *nuchalis* of the United States.

This bird does not intimately resemble any other species, unless it is *C. Fraseri*, Malh., which I have not seen. It belongs strictly to the same subgeneric group as *C. rufus*. The female of this species is described by Mr. Lawrence as above cited, and he points out with his usual great accuracy the distinguishing characters of this species.



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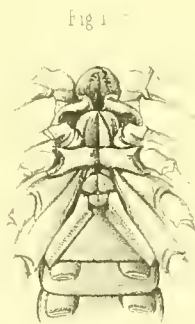
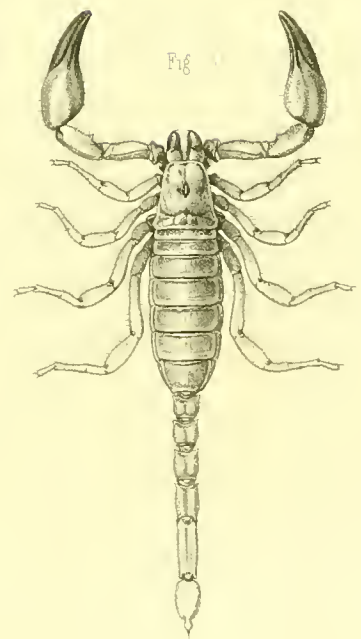
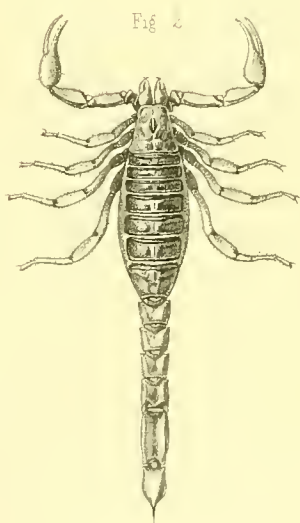
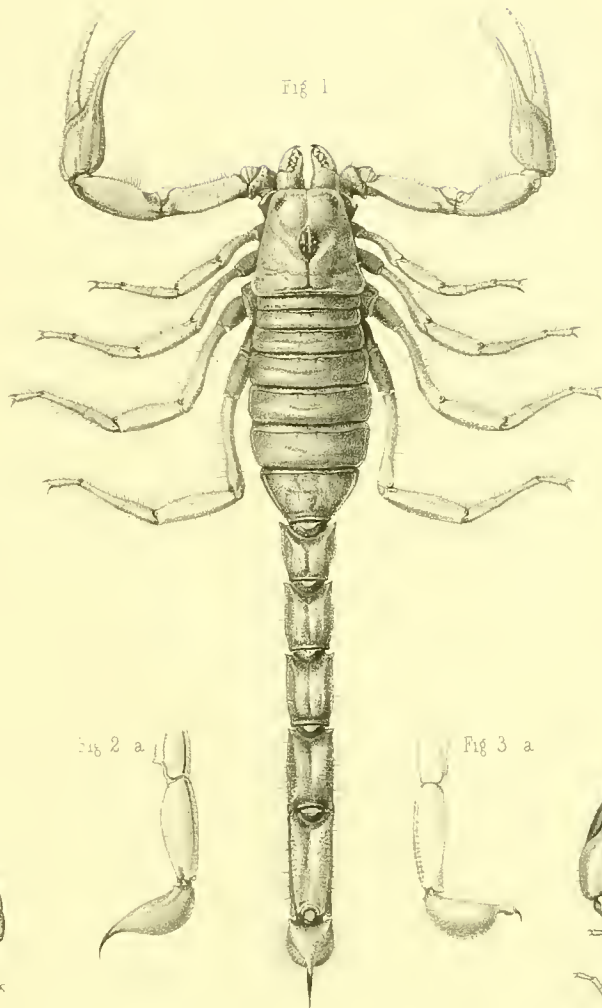
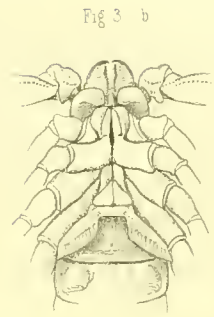
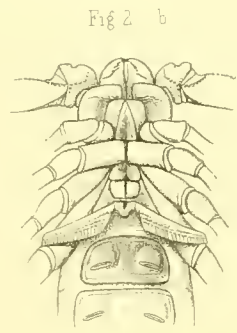
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ERRATA.

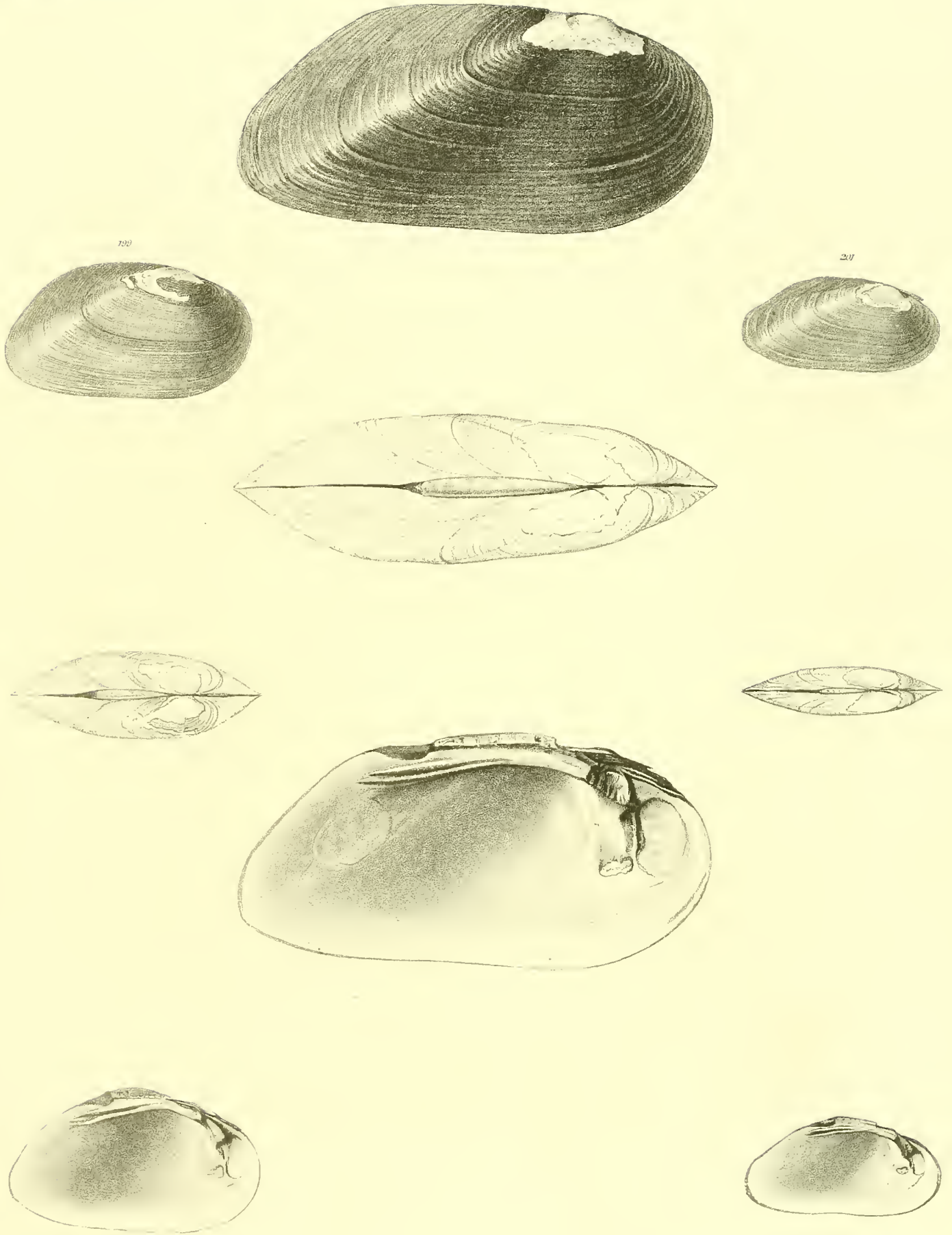
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- Page 219, line 29, for 1·4 read 1·04.  
“ 232, “ 6, for 1·2 “ 1·02.  
“ 234, “ 30, for 1·2 “ 1·02.  
“ 236, “ 10, for 1·1 “ 1·01.  
“ 248, “ 20, for “ about ” read “ above.”  
“ 260, “ 2, for “ semigranulata ” read “ semigranulosa.”  
“ “ “ 13, for “ semigranata ” read “ semigranulosa.”  
“ 273, “ 21, for 1·8 read 1·08.  
“ 294, “ 20, for “ elèvata ” read “ elevata.”  
“ 325, “ 3, and 20, for “ plicata ” read “ plicatis.”  
Plate 12, fig. 235, for “ trinaeris ” read “ trinacrus.”  
“ 35, fig. 79, for “ crenatula ” read “ crenatella.”  
“ 36, fig. 112, for “ Florencese ” read “ Florencense.”  
“ 37, fig. 147, for “ Spartenbergensis ” read “ Spartanbergensis.”



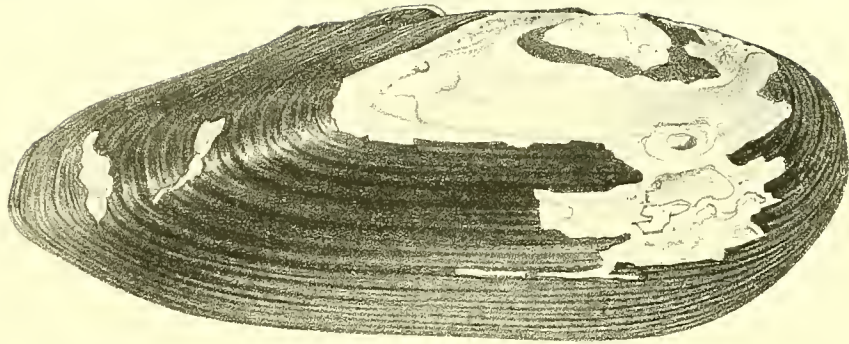




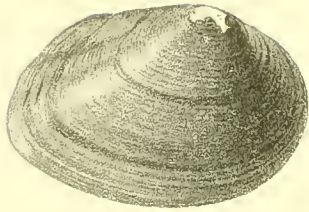


199 *Umo insulsus*.  
200 *Umo Catawbensis*  
201 *Umo spadicus*

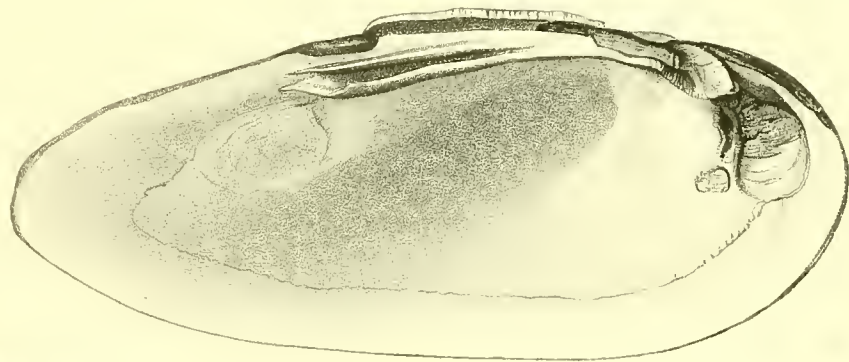
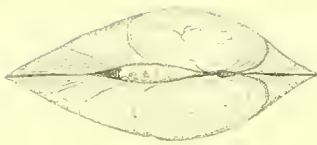
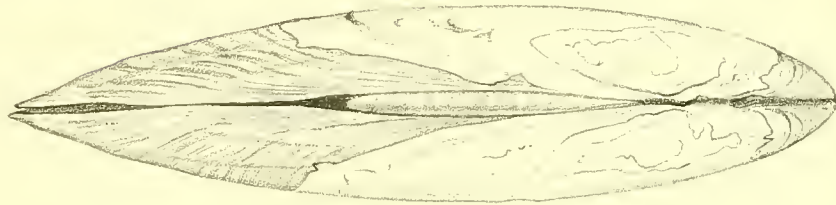
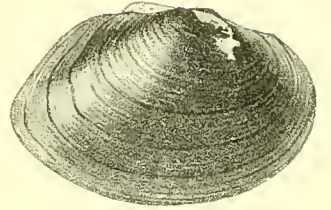




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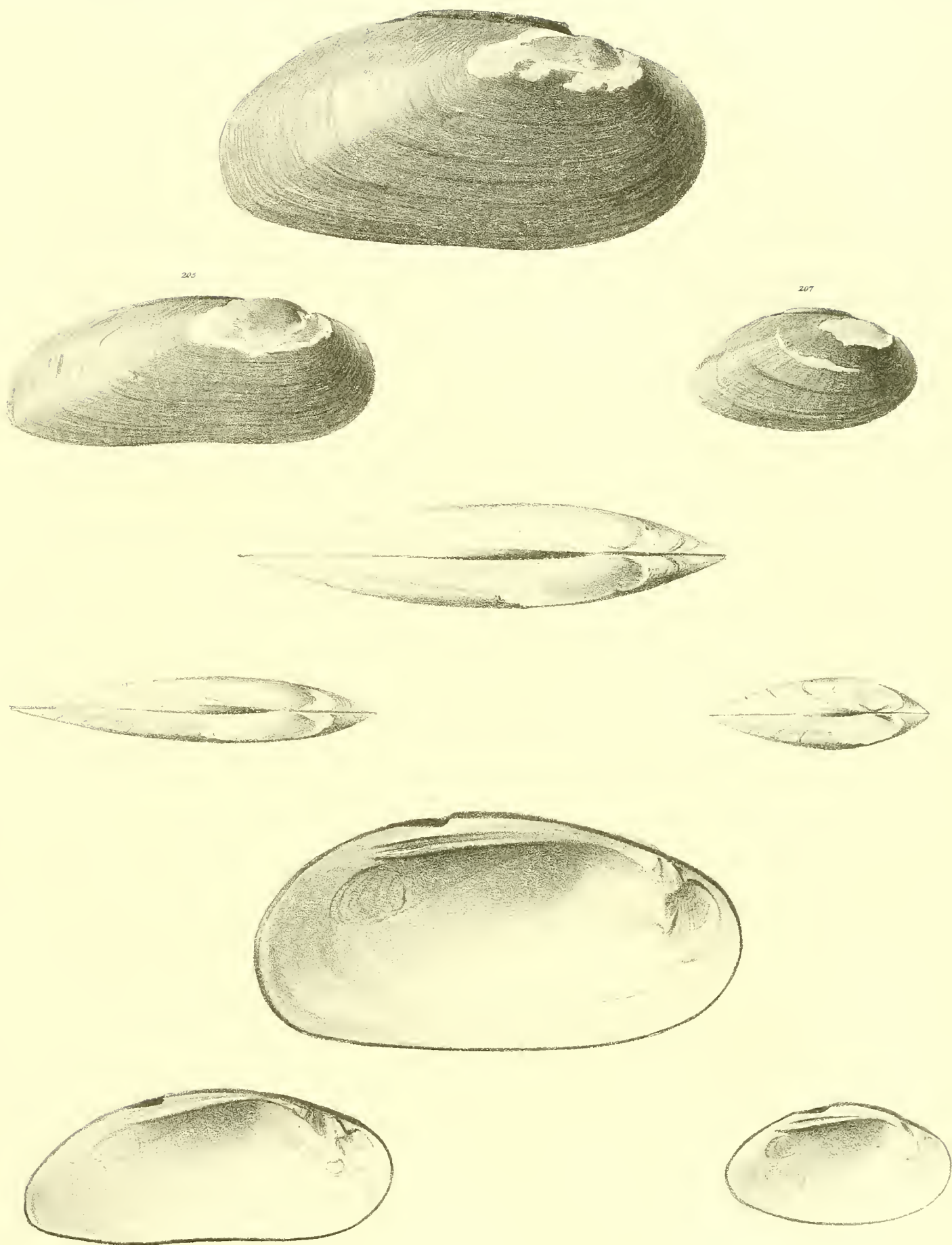


204



202 *Unio struatus*.  
203 *Unio Eminensis*.  
204 *Unio Gentius*.



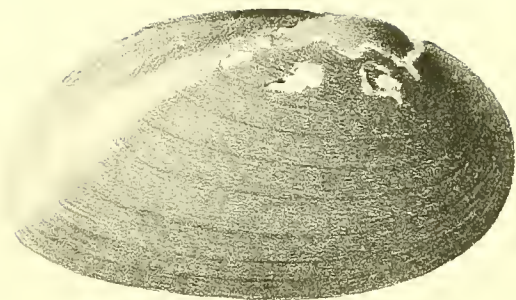


205 *Uvula gracilentus*  
206 *Uvula percoarctatus*  
207 *Uvula micans*

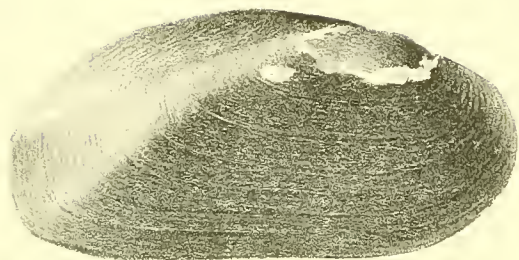




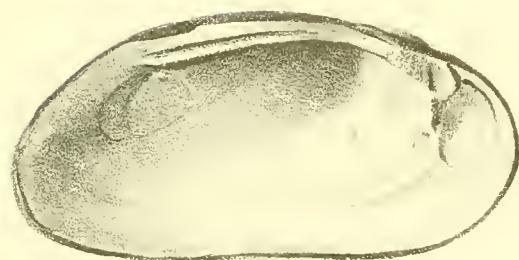
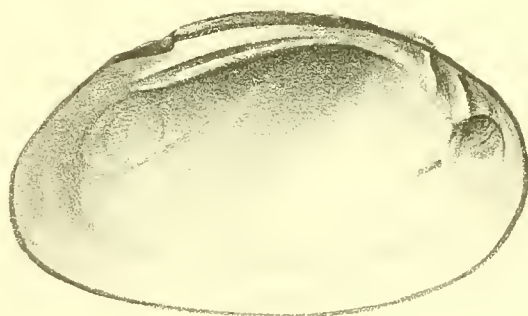
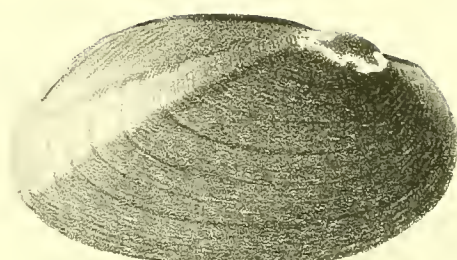
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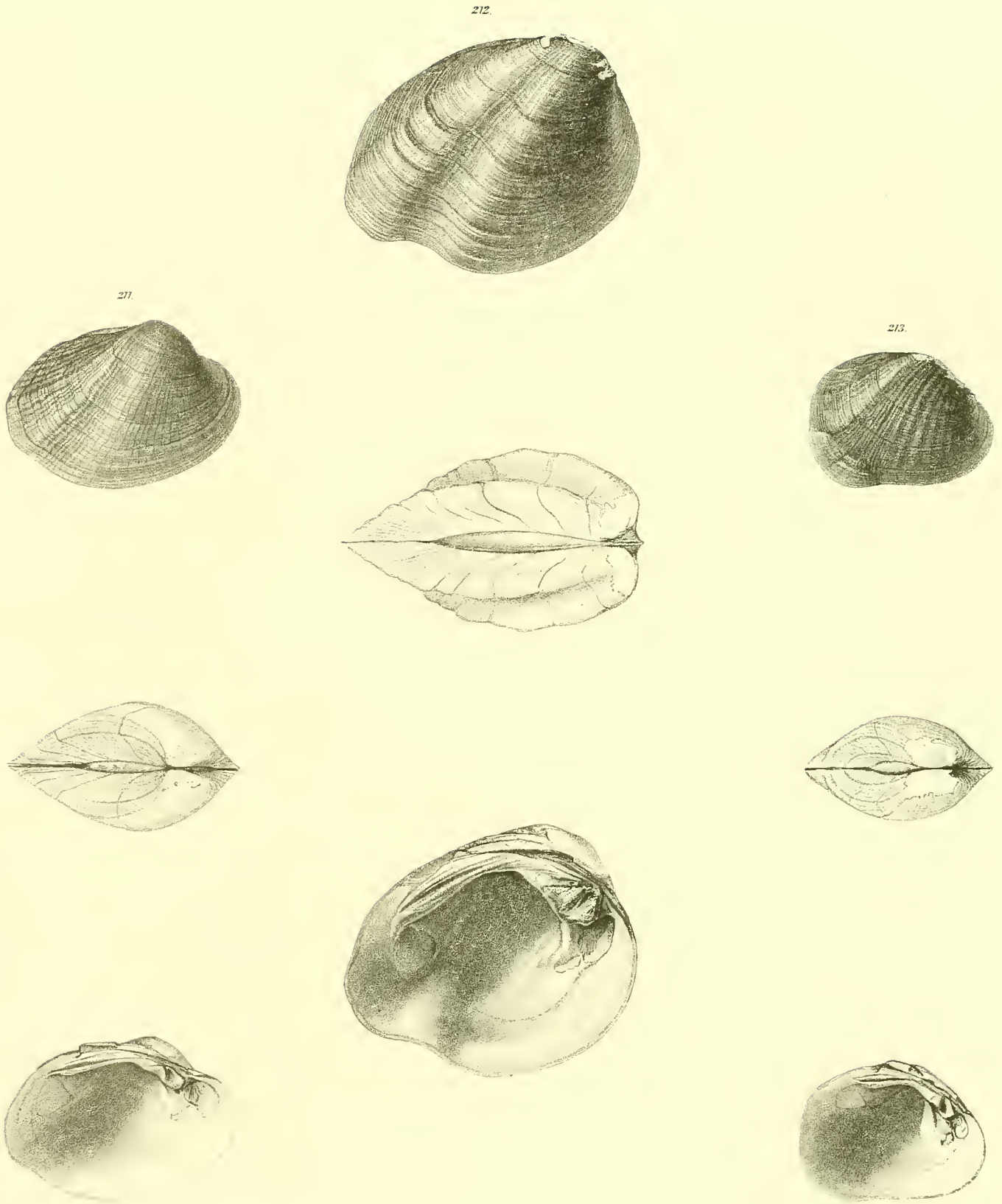


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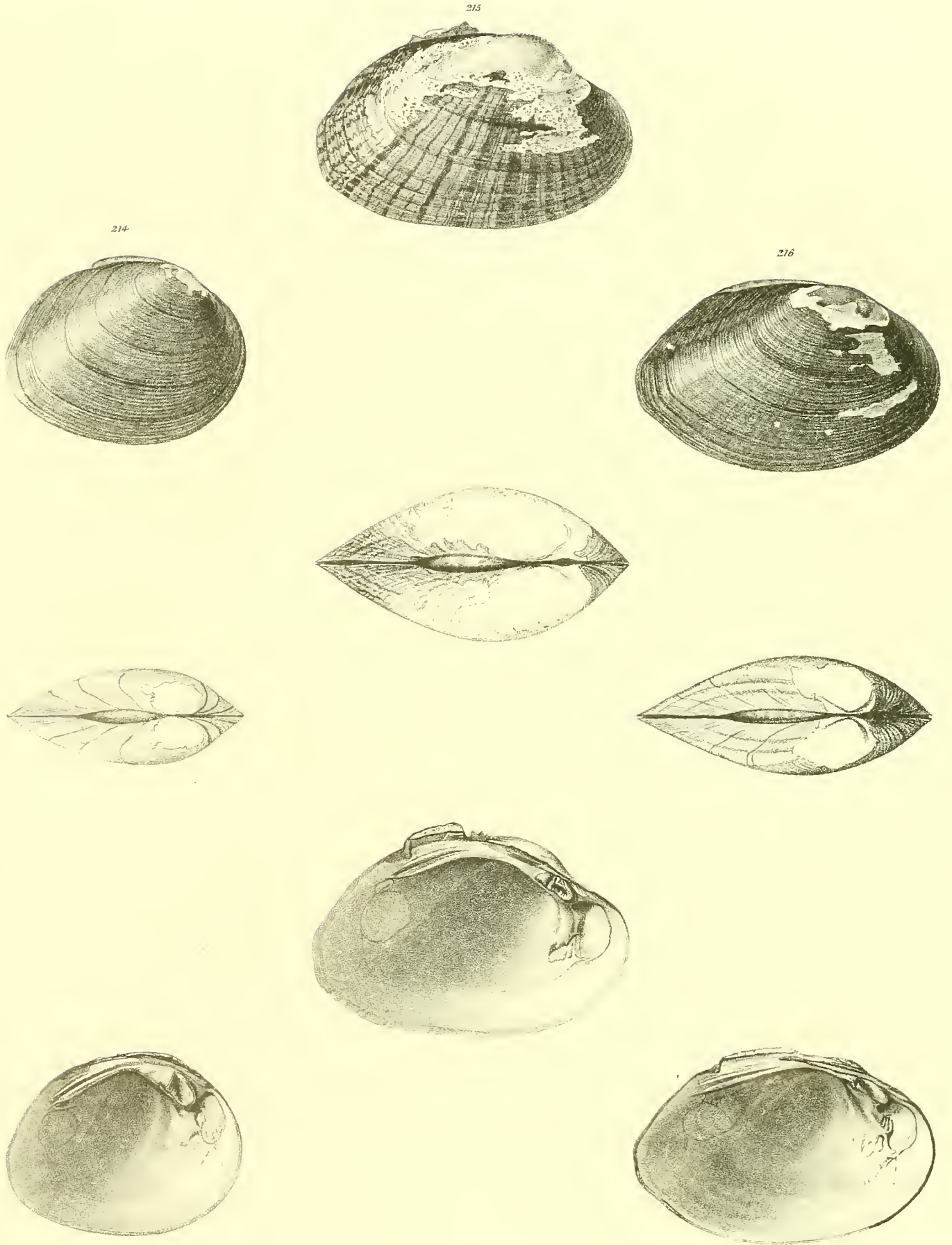
208 *Unio neusensis*  
209 *Unio purus*  
210 *Unio exactus*





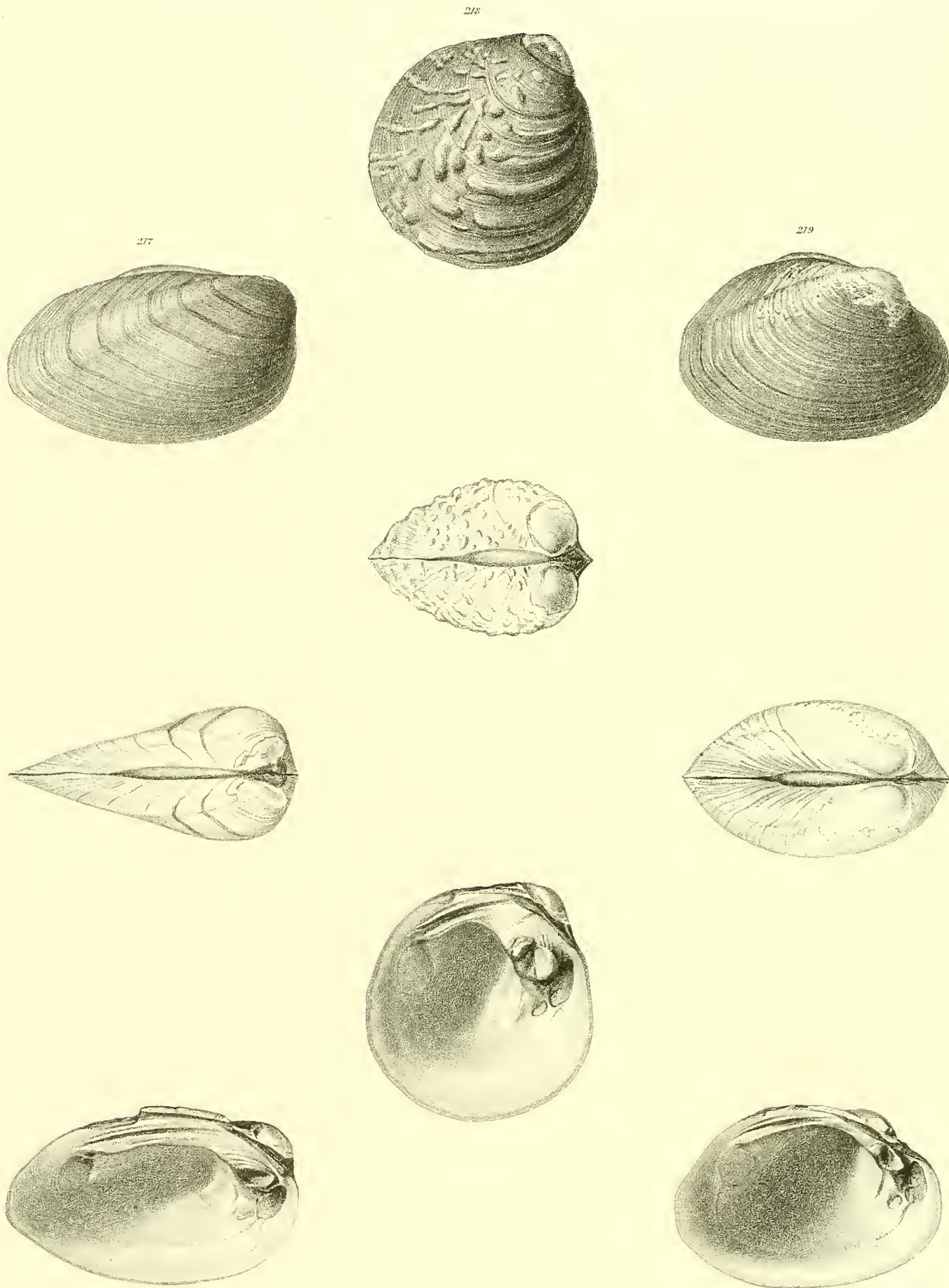
211. *Unio turgidulus*  
212. *Unio propinquus*  
213. *Unio Florentinus*





214 *Unio Meredithi*  
215 *Unio perradiatus*  
216 *Unio Pybusii*

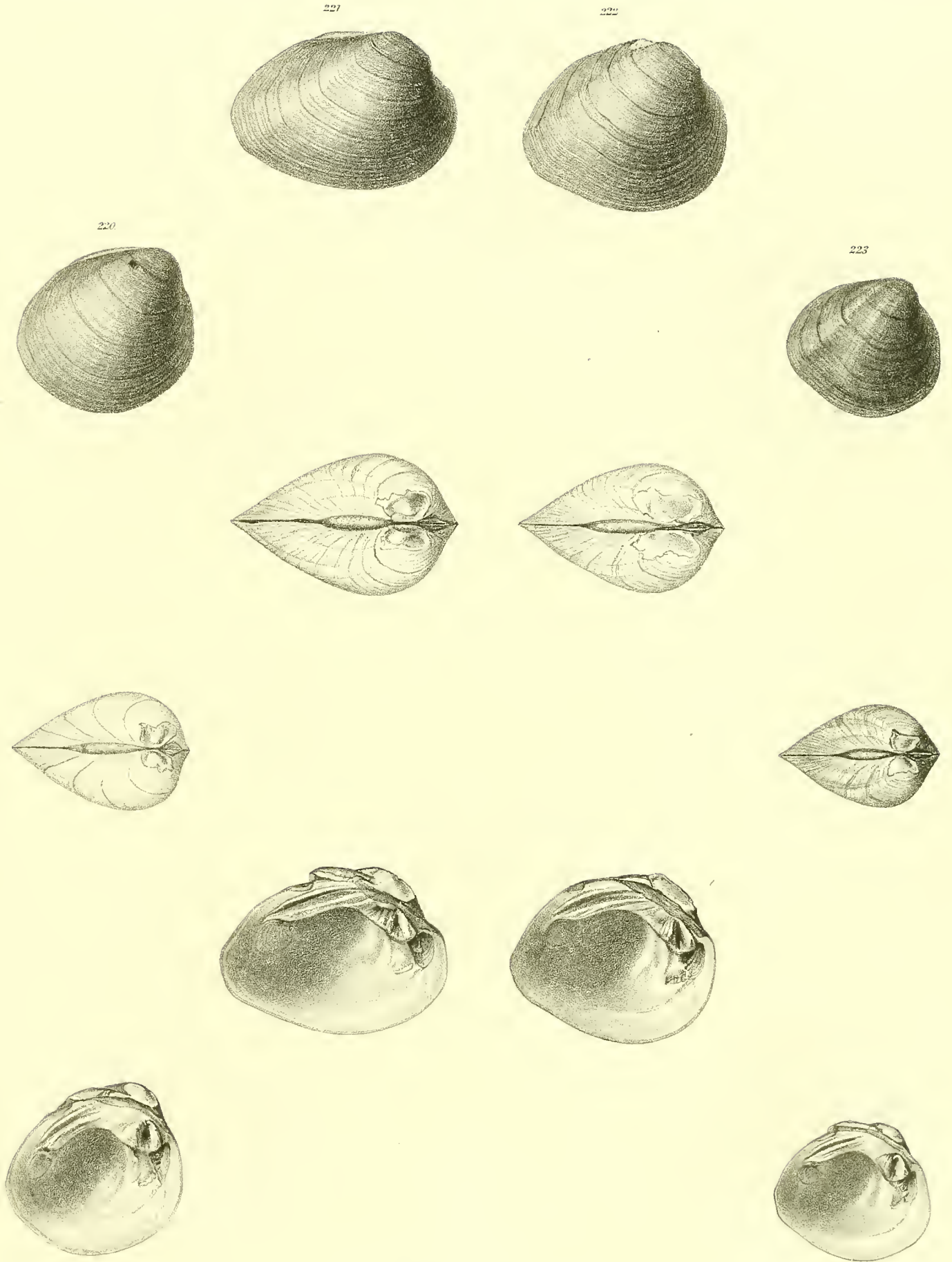




217. *Unio consanguineus*  
218. *Unio asperatus*  
219. *Unio perpastus*

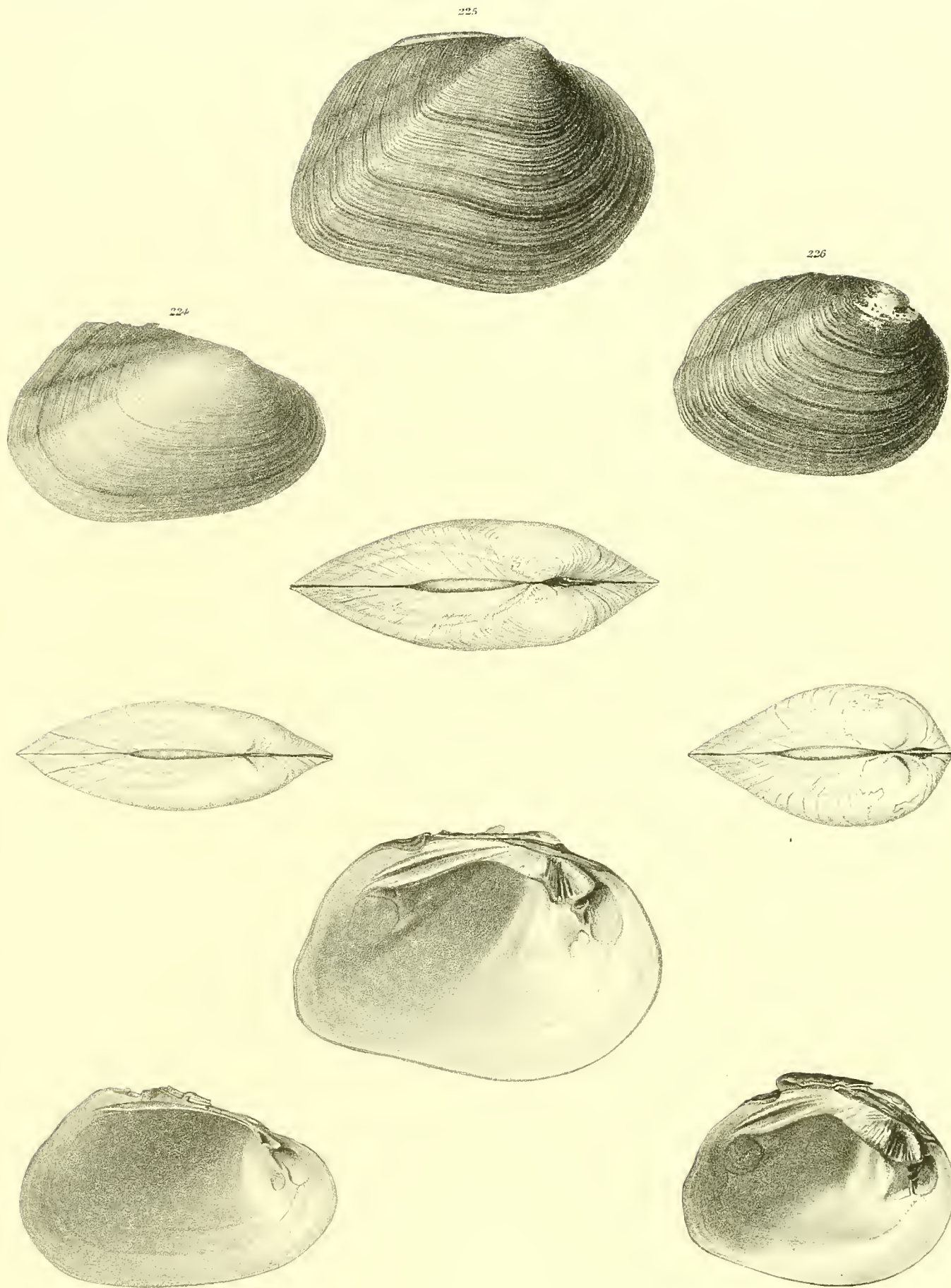






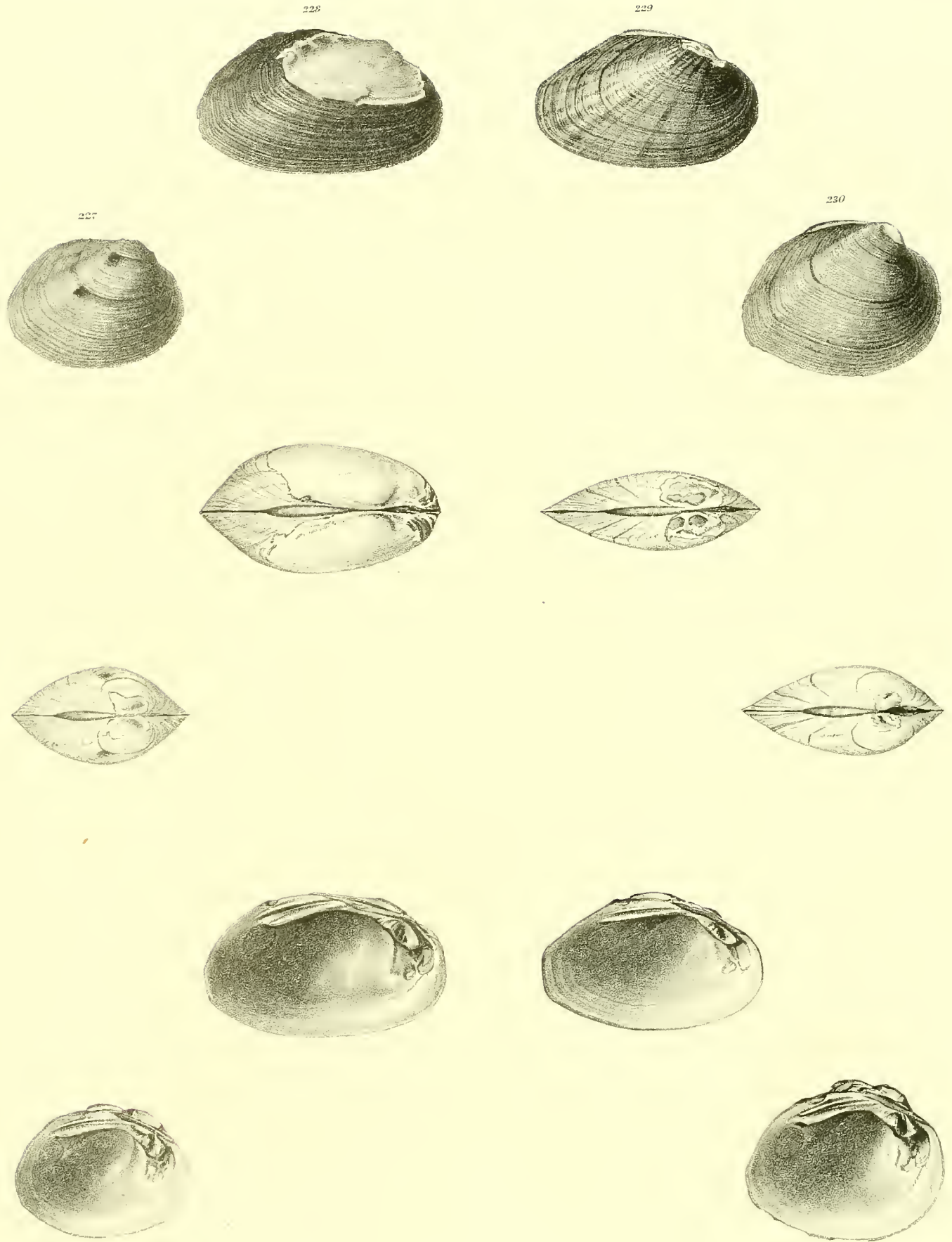
220 *Unio Lewisii*  
221 *Unio stabilis*  
222 *Unio Hartmanianus*  
223 *Unio Showalteri*





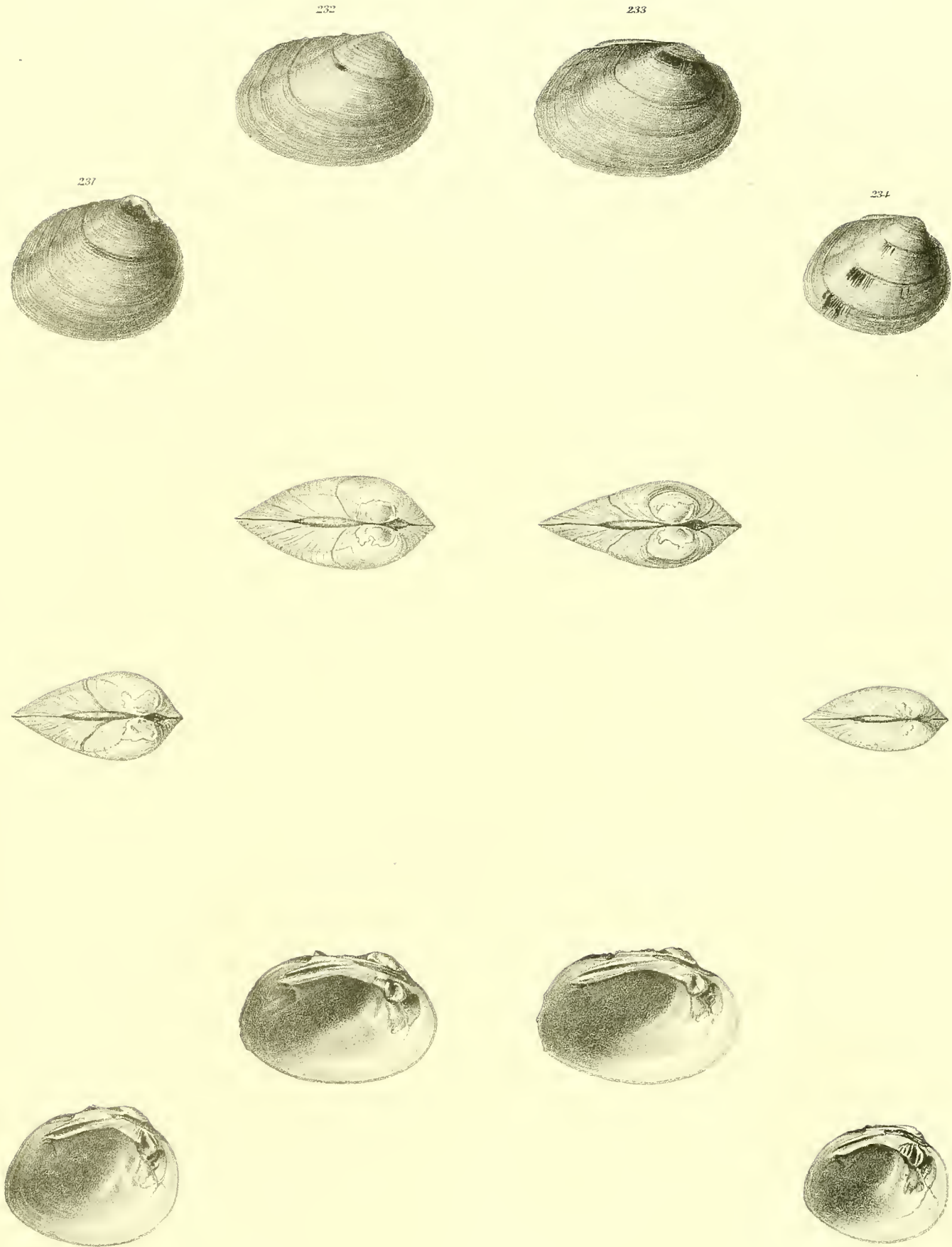
224 *Unio dolosus*  
225 *Unio negatus*  
226 *Unio glandaceus*





227 *Unio medius*  
228 *Unio porphyreus*  
229 *Unio planicus*  
230 *Unio instructus*



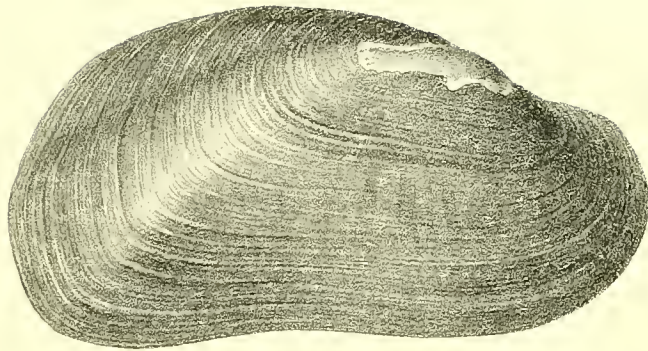


231 *Unio verus*  
232 *Unio pallidofidius*  
233 *Unio interventus*  
234 *Unio ornatus*

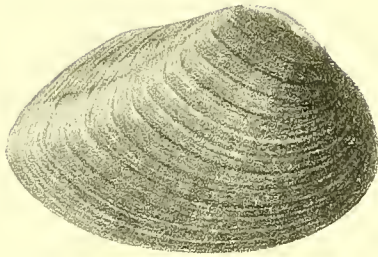




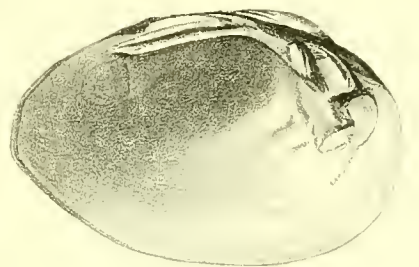
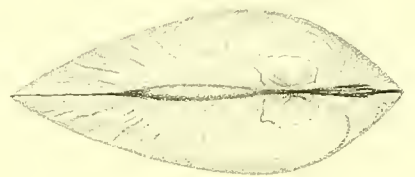
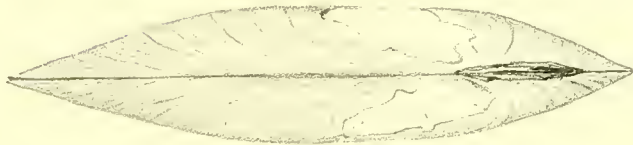
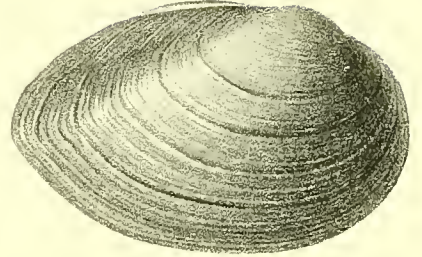
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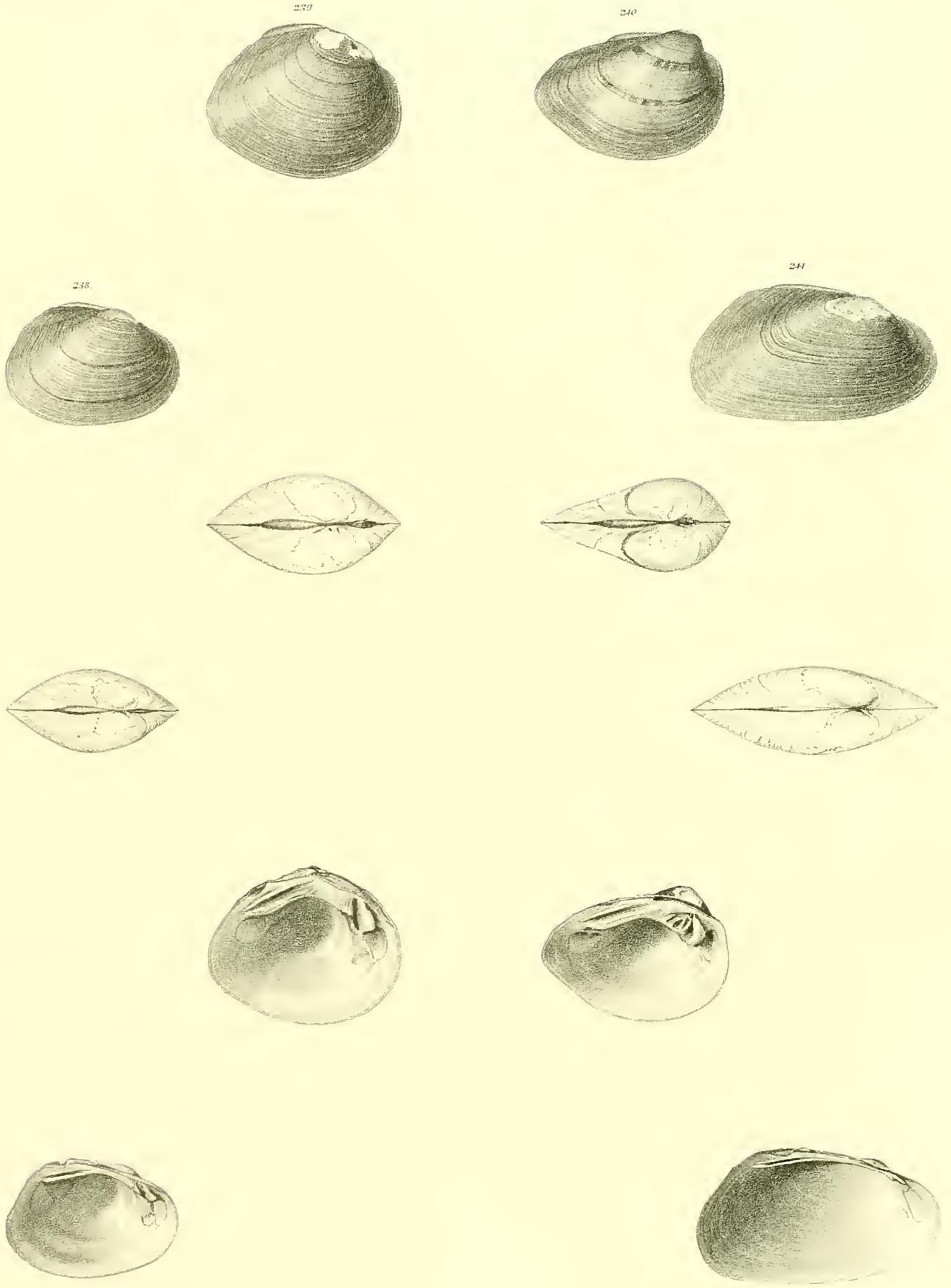


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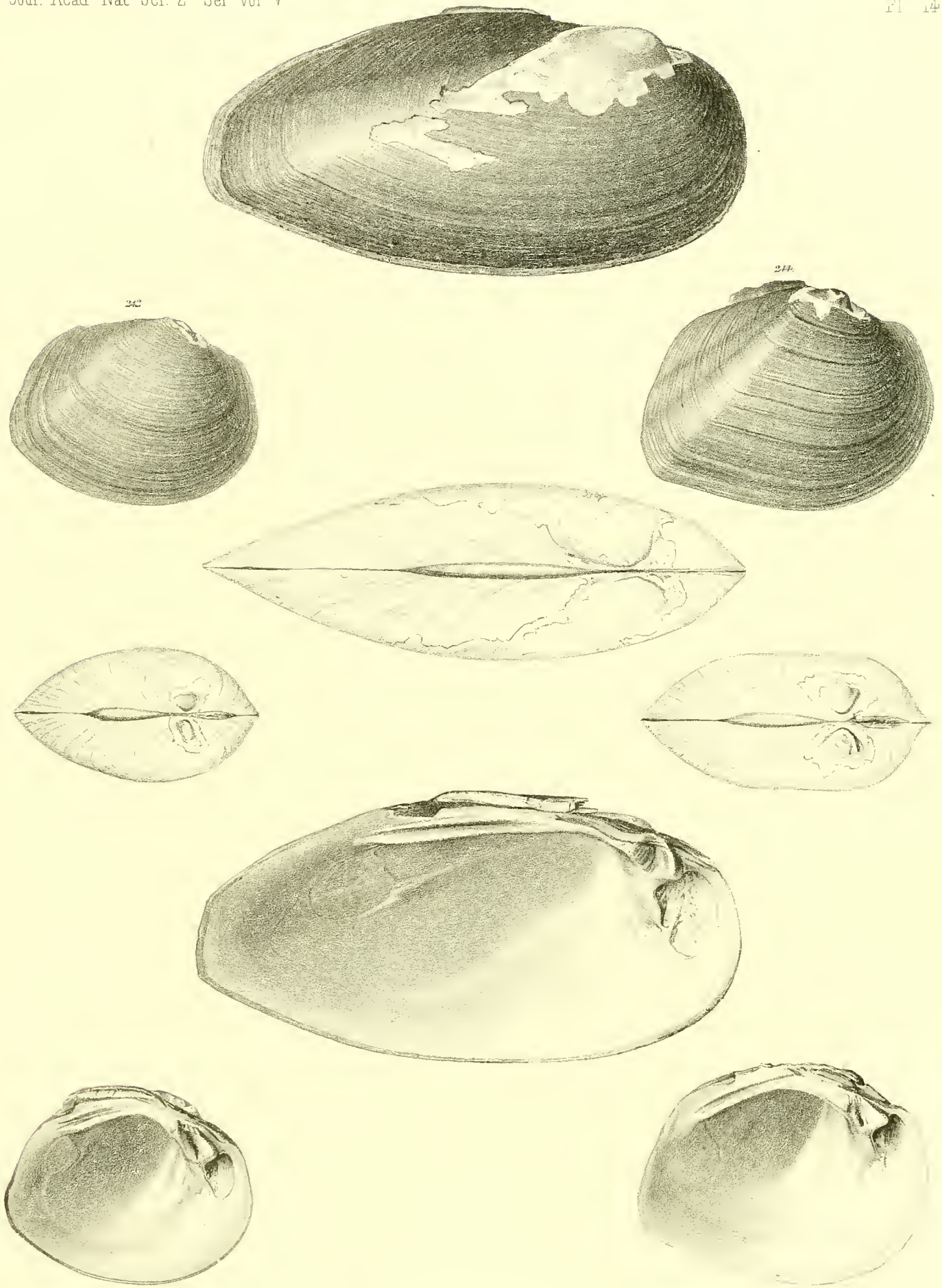
- 235 *Uno truncaris*
- 236 *Uno decumbens*
- 237 *Uno concolor*





238 *Unio fabaceus*  
239 *Unio irrasus*  
240 *Unio anaticulus*  
241 *Unio cucur*





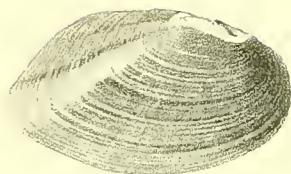
212 *Unio Beadletanus*  
213 *Unio Ochmulgœnsis*  
214 *Unio rubulus*



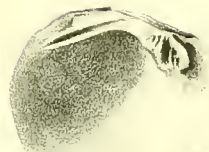
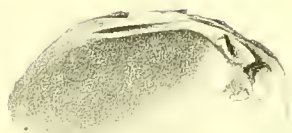
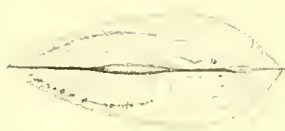
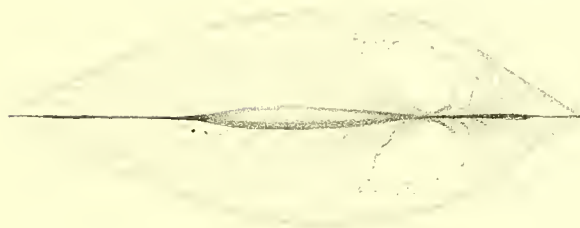
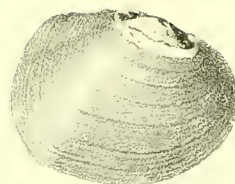
246.



245



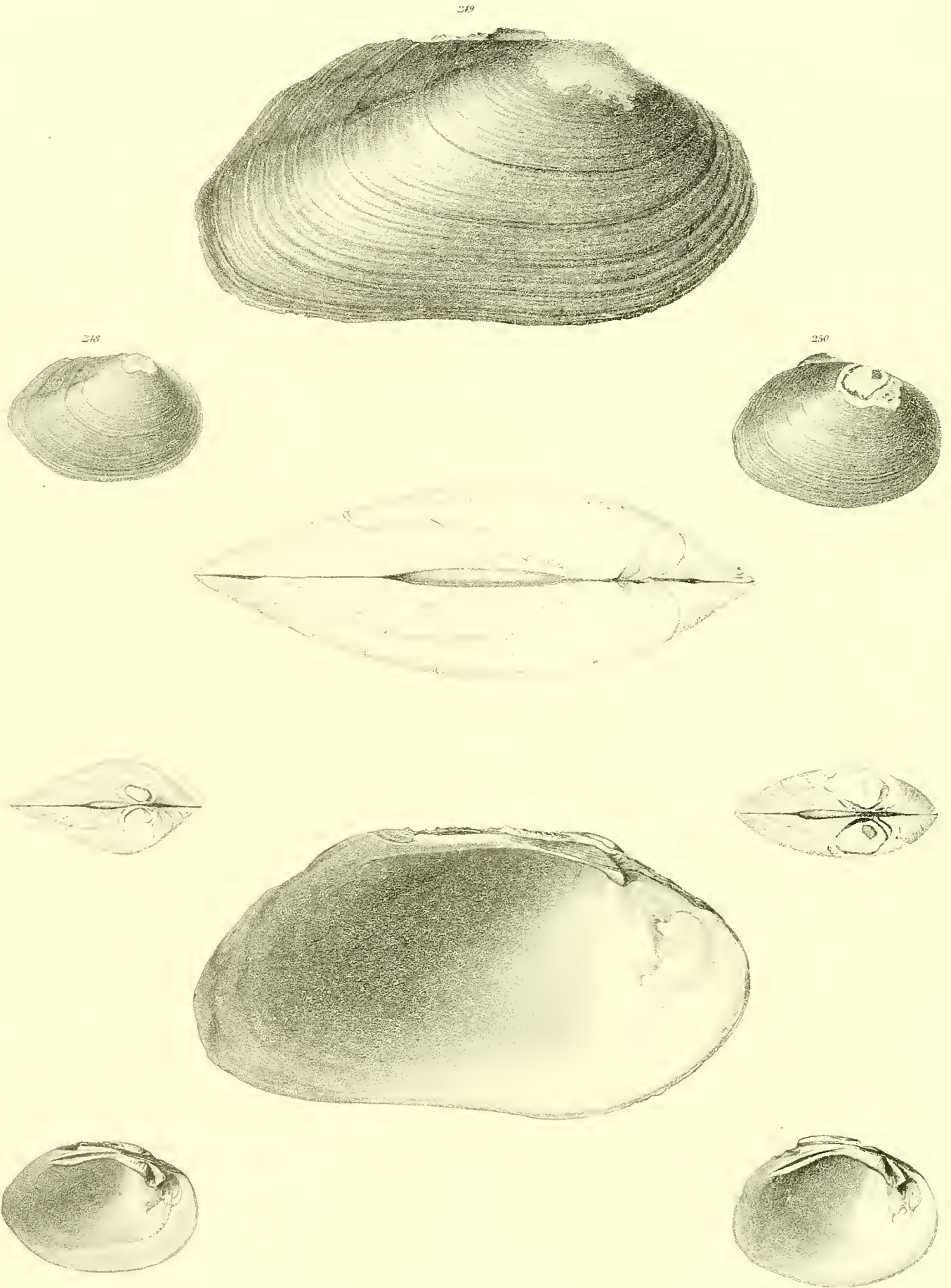
247



245 *Unio Navidulus*  
246 *Unio Spillmanni*  
247 *Unio pauperculus*.

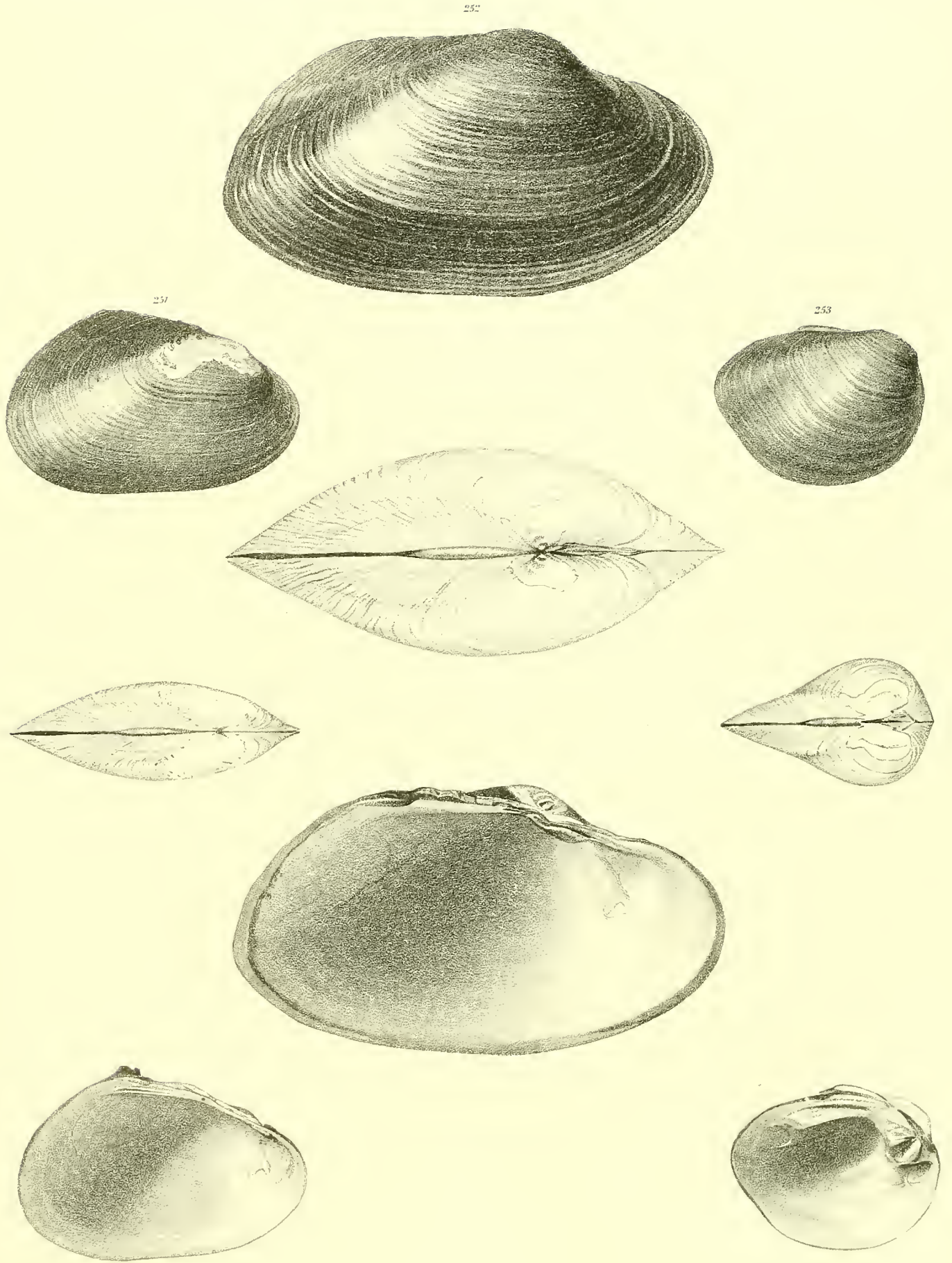






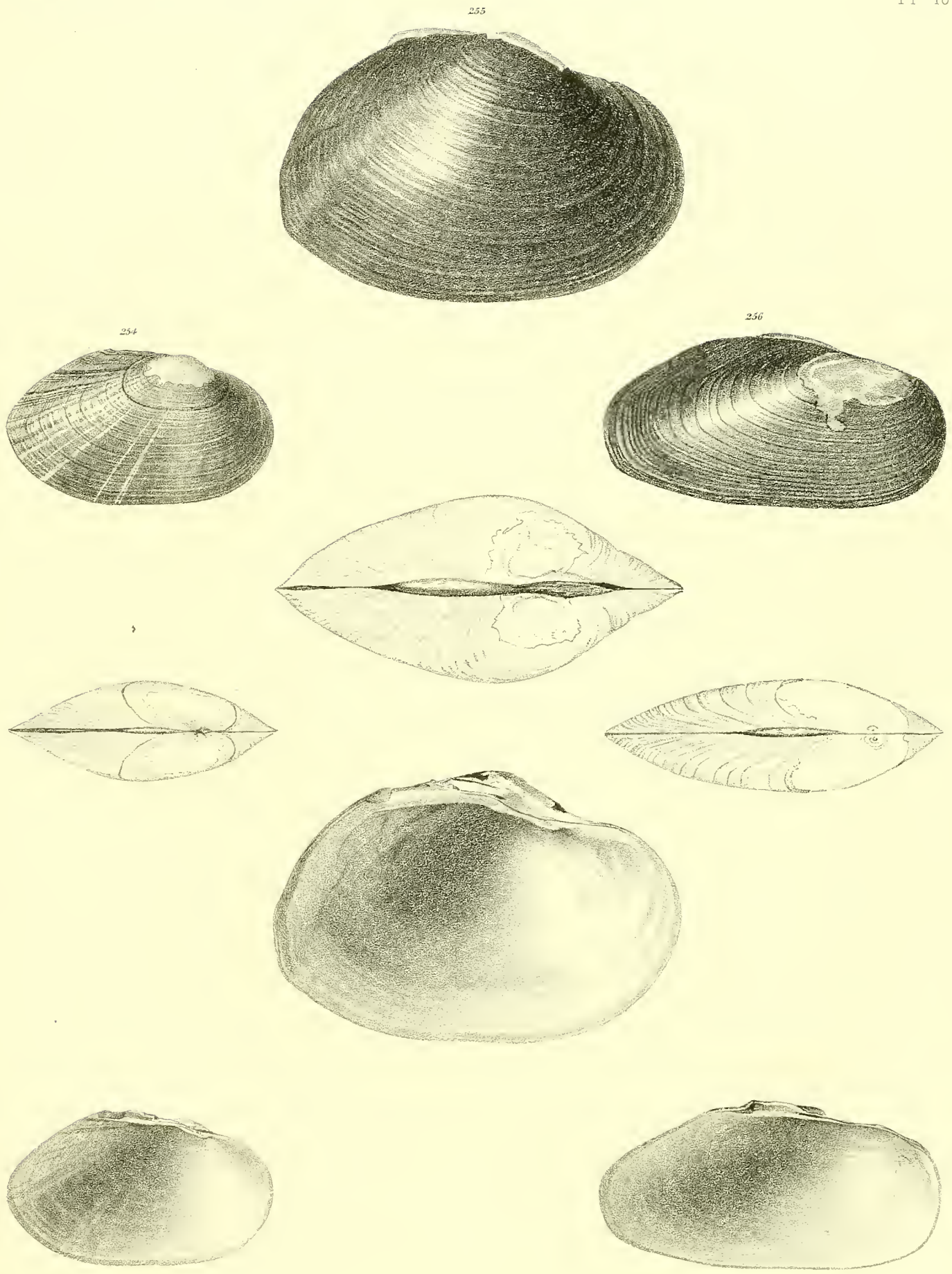
248 *Unio cinnamomicus*  
249 *Margaritana Alabamensis*  
250 *Unio Chickasawhensis*





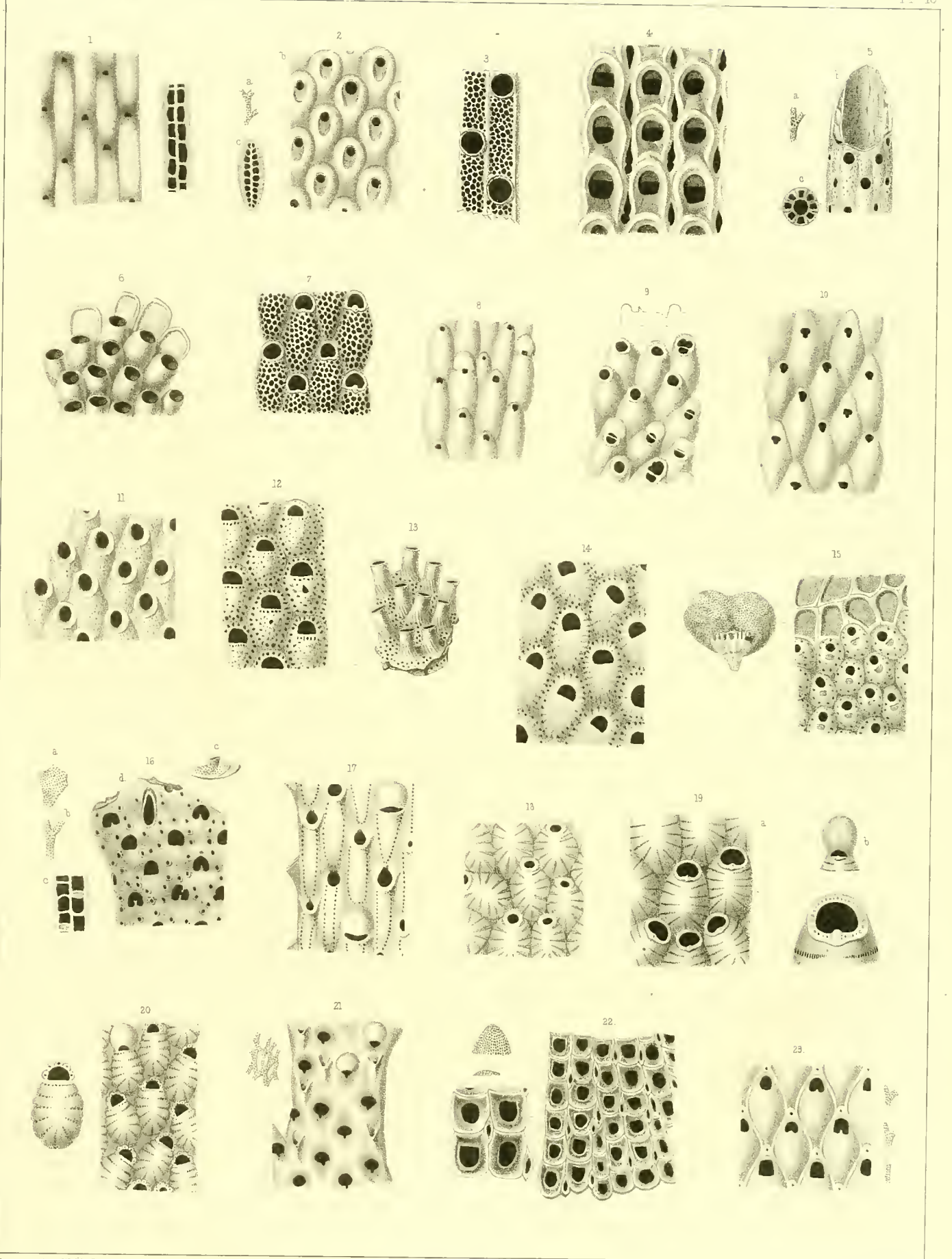
251 *Unio permiscens*.  
252 *Margaritana Spillmani*.  
253 *Unio curtus*





254 *Margaritana elliptica*  
255 *Margaritana Tombigheensis*  
256 *Anodonta Kennerlyi*





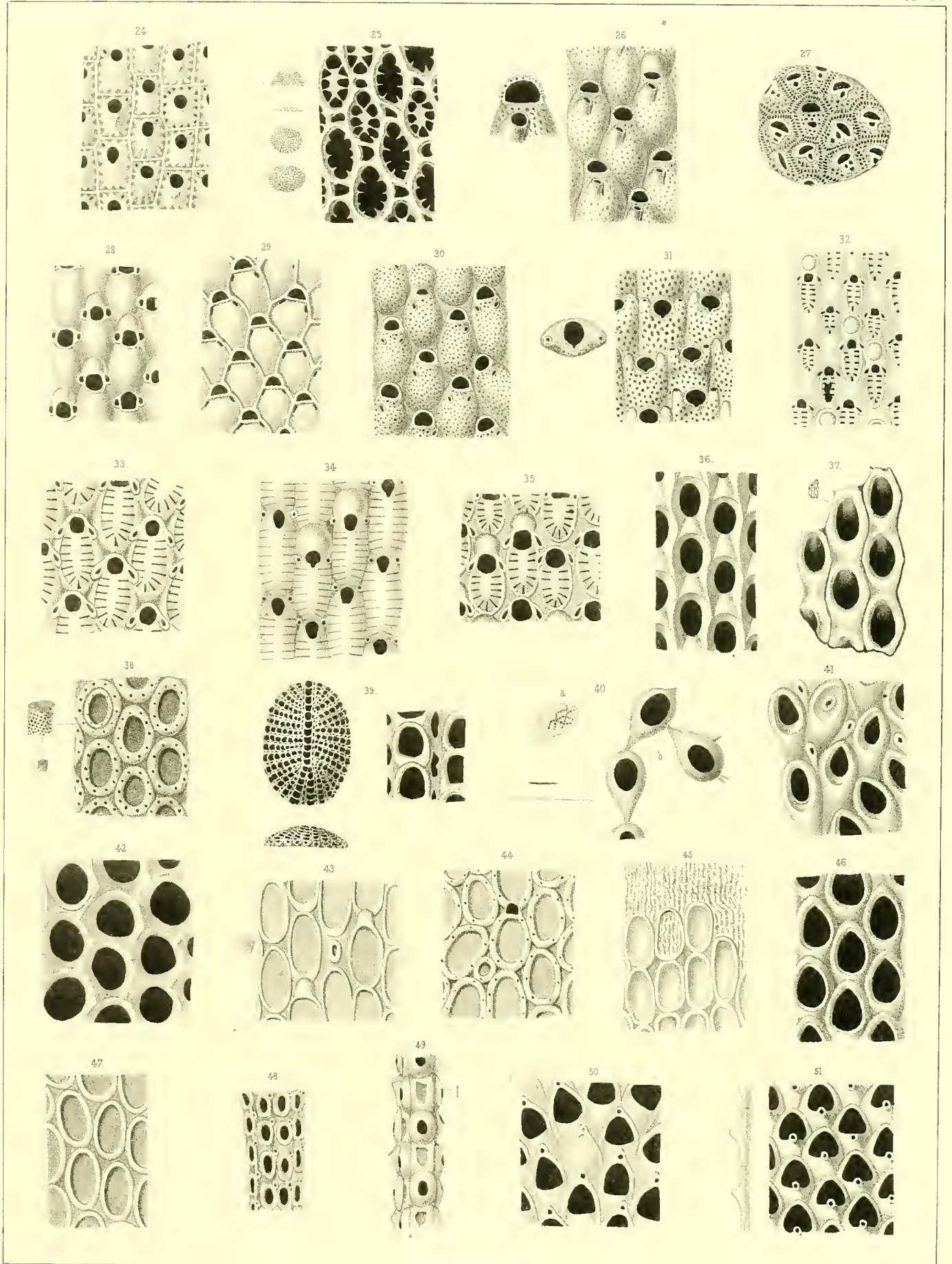
From nat. by W. M. Gabb

On Stone by A. J. Ibbotson

T. Sinclair's lith. Philada.





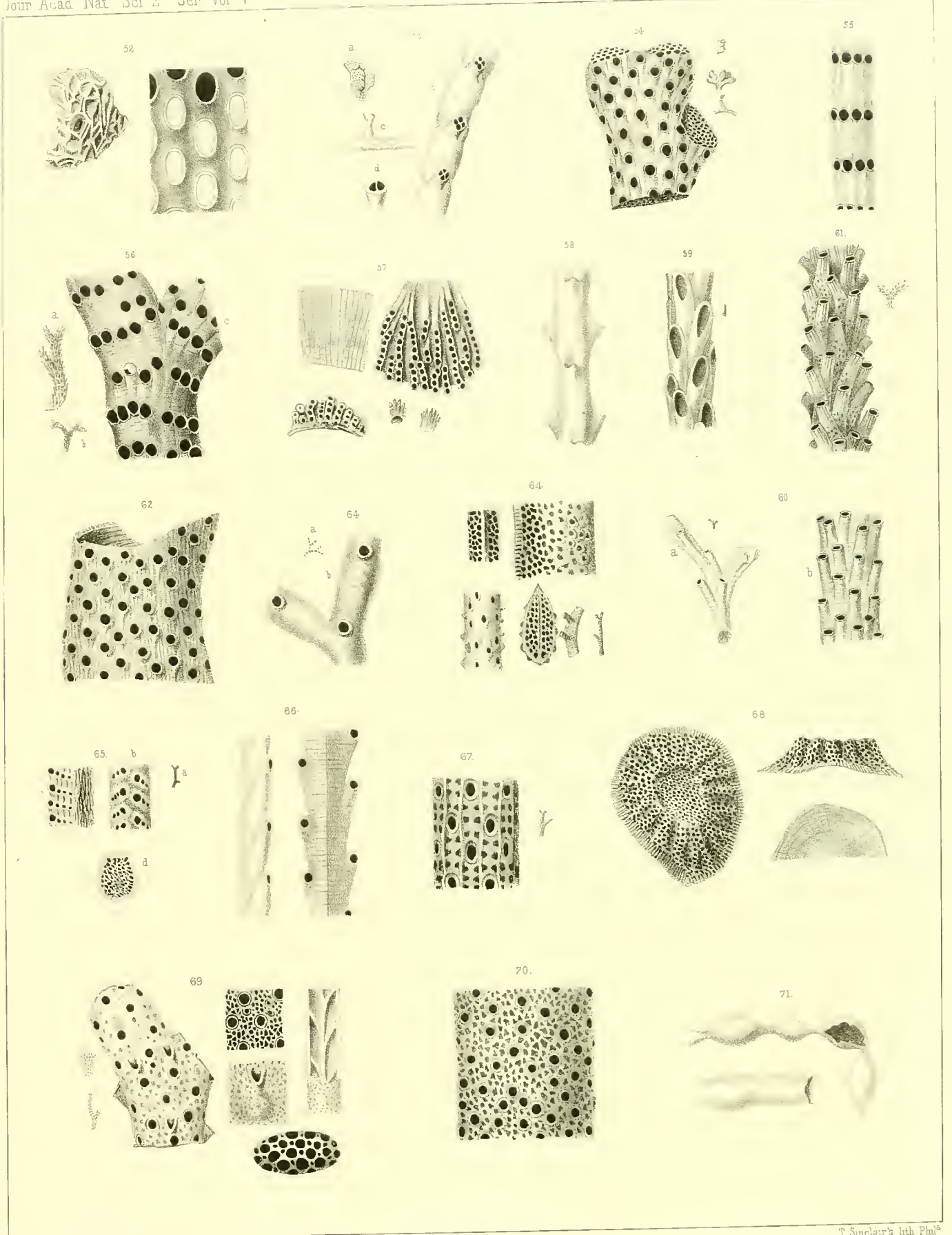


From nat by W M Gabb

On Stone by A J Ibbotson.

T Sinclair's hth, Philad<sup>a</sup>





From nat by W. M. Gabb

On Stone by A. J. Tbbotson

T. Sinclair's lith, Phil<sup>a</sup>





Bowen & Co. lith. col. Philad.

1. *Trichophorus chloronotus*. — 2. *Xenocichla notata*. — 3. *Trichophorus calurus*.





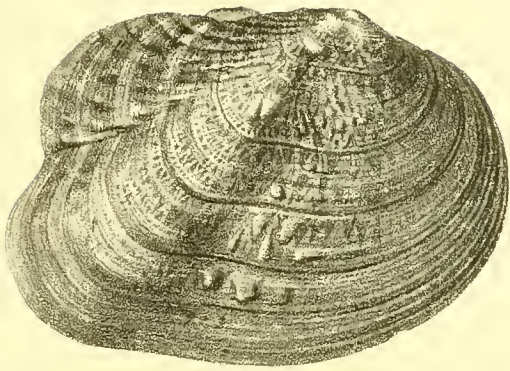
Bowen & Co. lith. & col. Phil

1 *Alethe castanea*. — 2. *Hyphantornis cinctus*. — 3. *Sycobius Racheliae*.

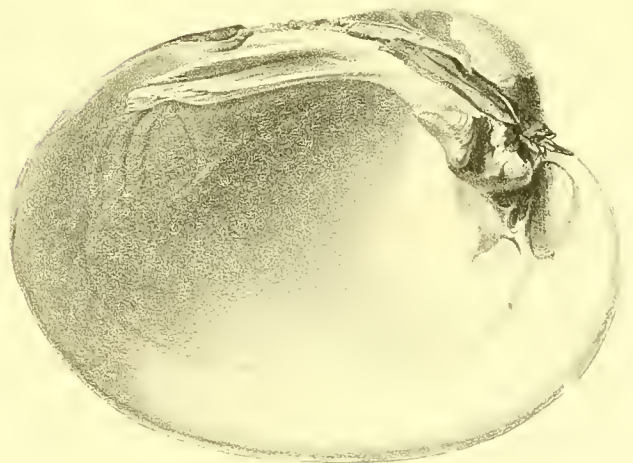
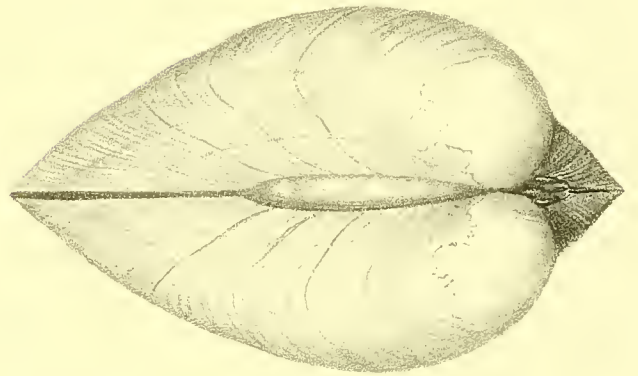
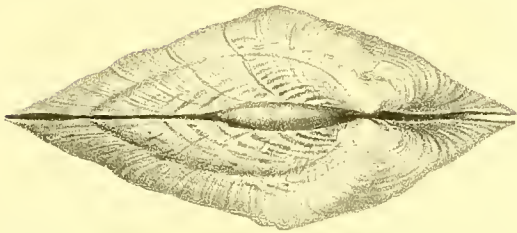
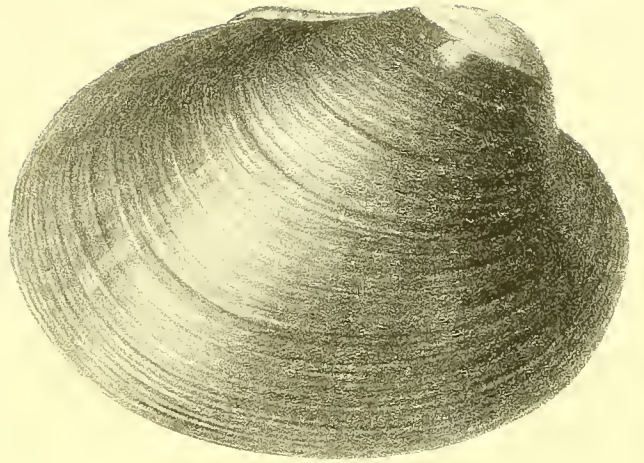




257



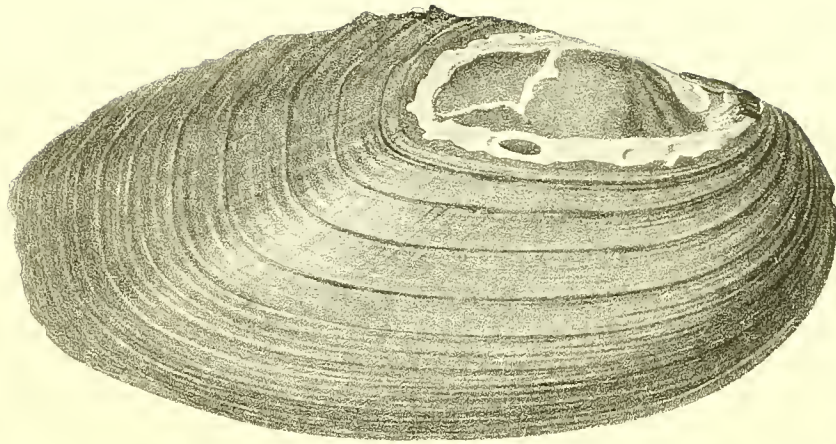
258



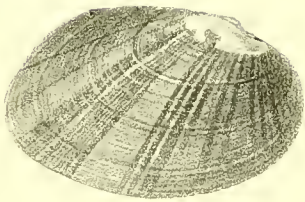
257 *Uro Wardi*  
258 *Uro Higginsu*



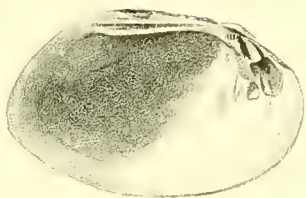
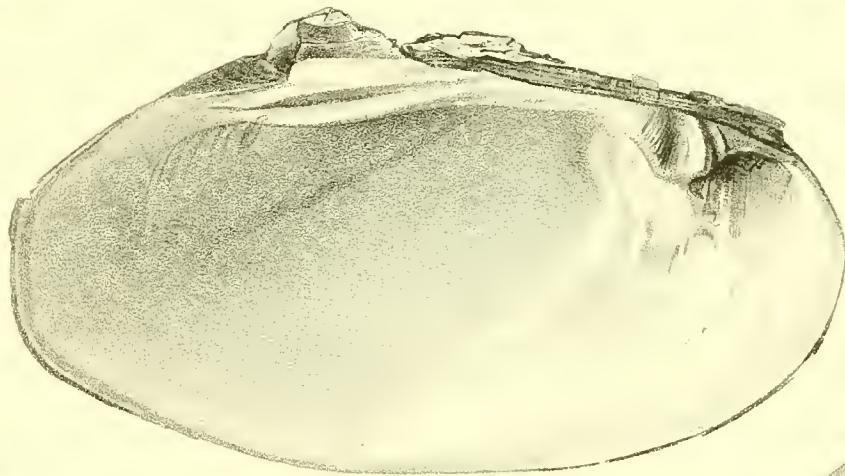
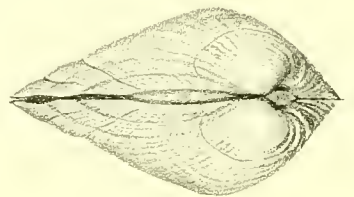
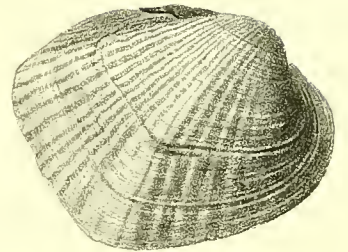
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259

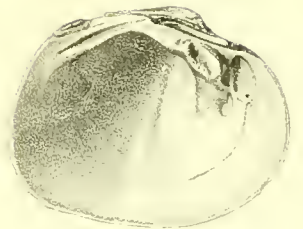
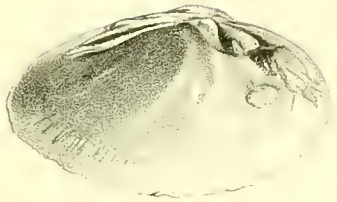
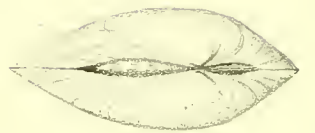
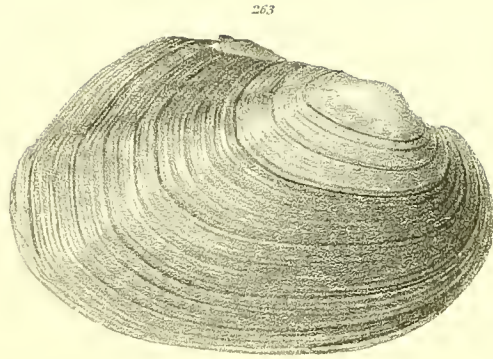


261



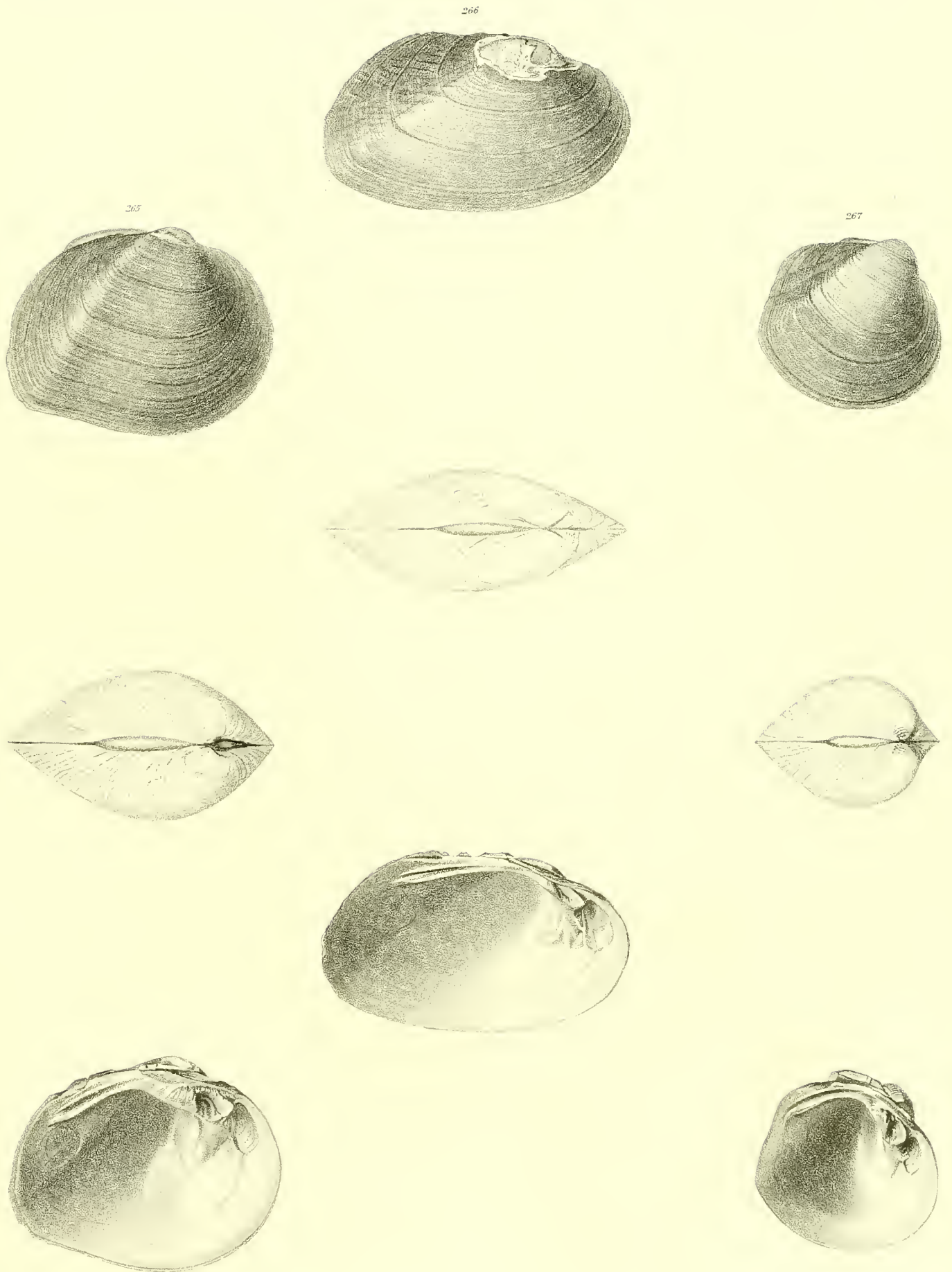
259 *Uneo vestitus*  
260 *Uneo Northamptonensis*  
261 *Uneo Simpsonii*





262 *Unio macredon*  
263 *Unio Hermann*  
264 *Unio aureus*



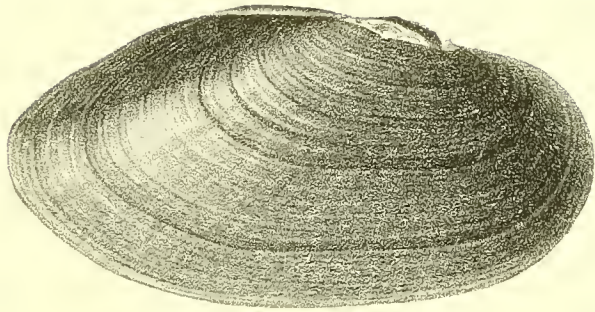


265 *Uvula Chama*  
266 *Uvula Anthonya*  
267 *Uvula Ruddelli*

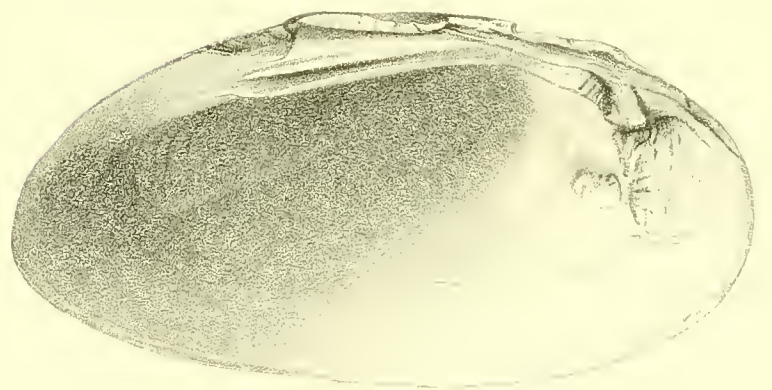
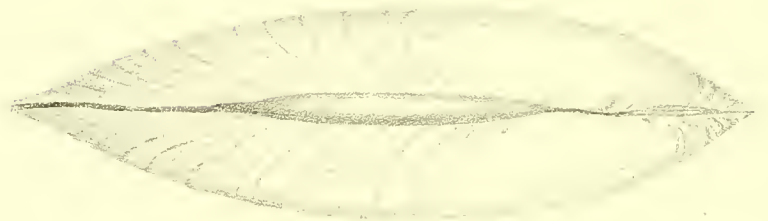
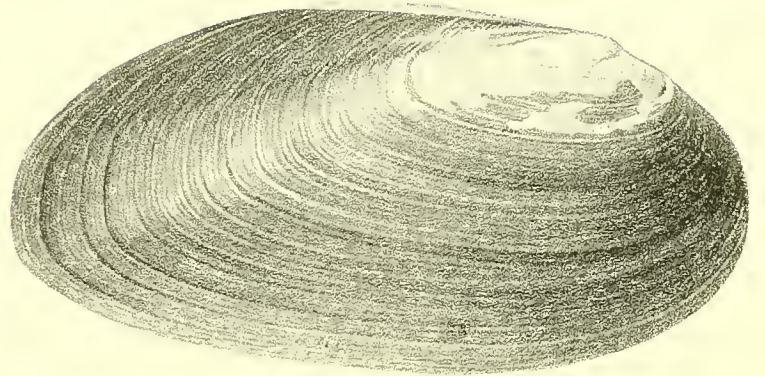




268

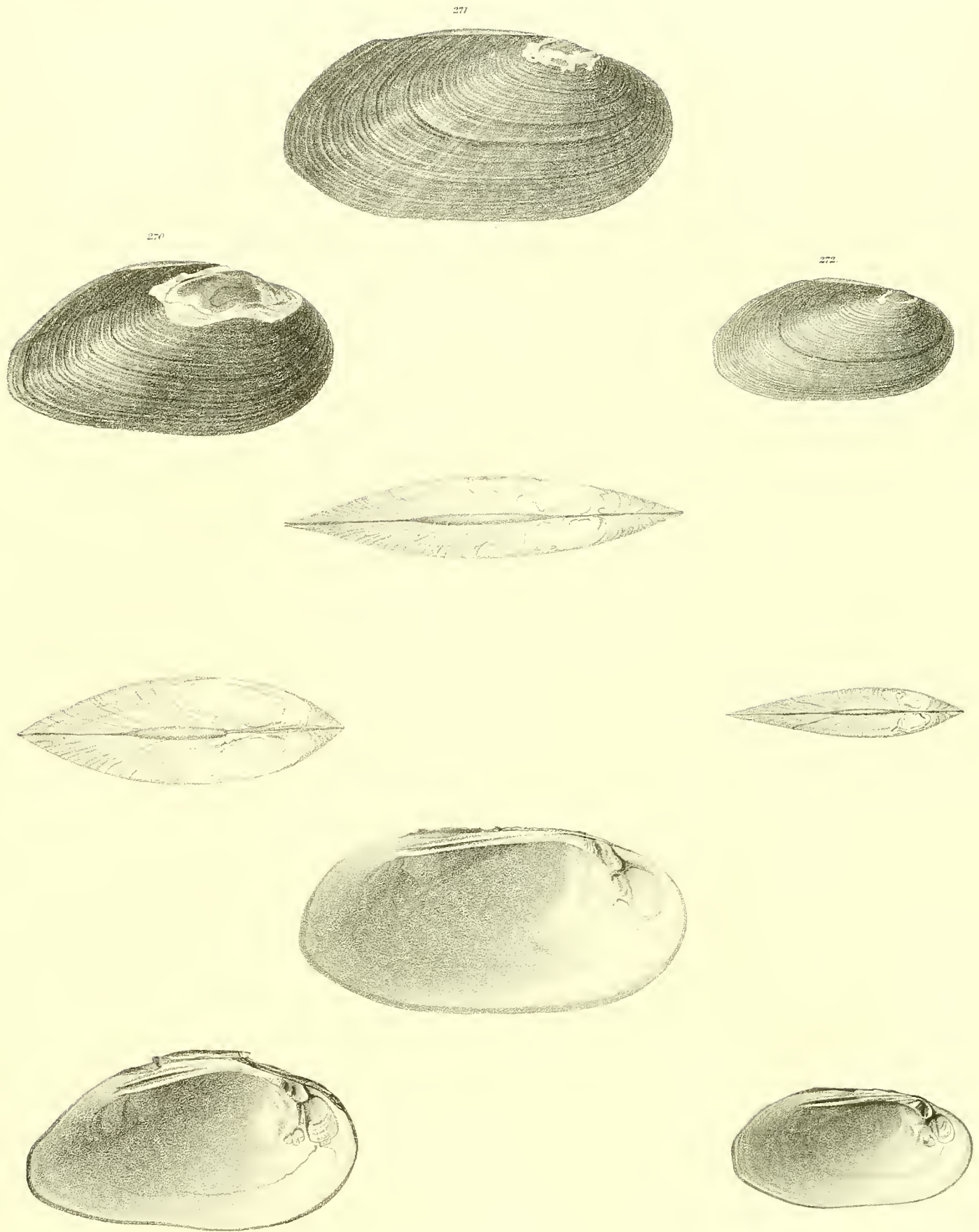


269



268 *Uta contigua*  
269 *Uta squameus*

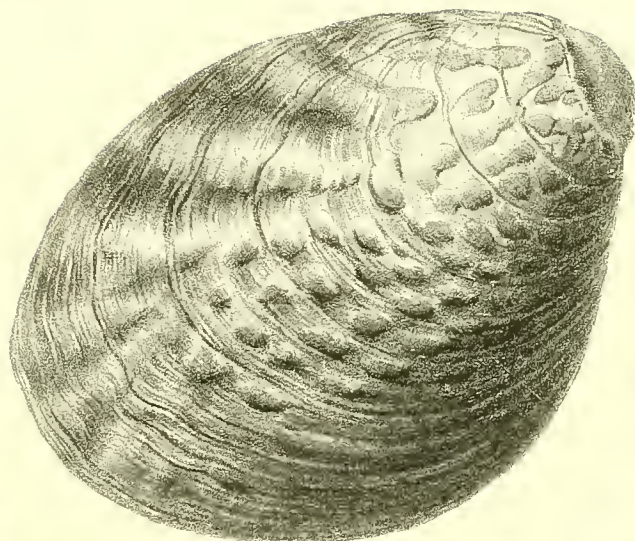




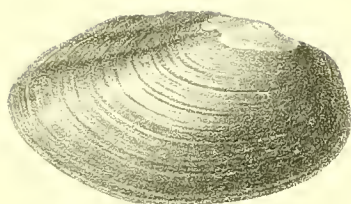
270 *Urio rostrum*  
271 *Urio macer*  
272 *Urio contractus*



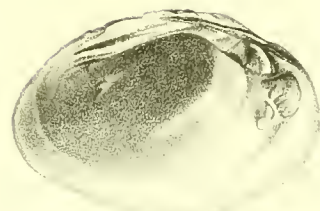
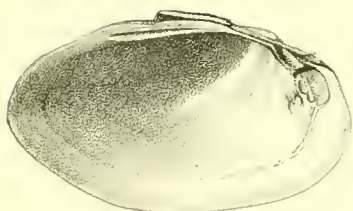
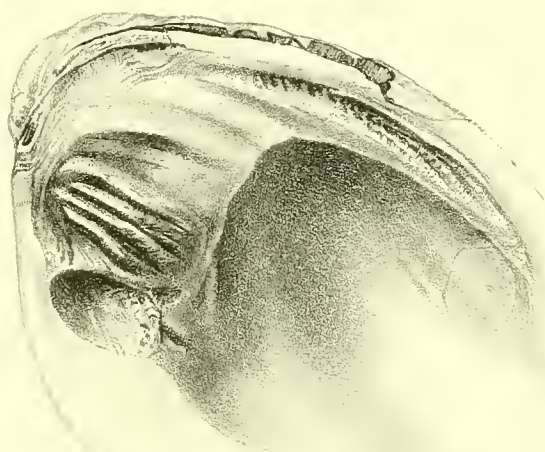
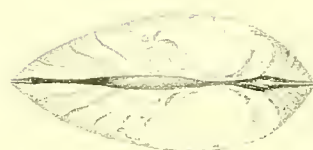
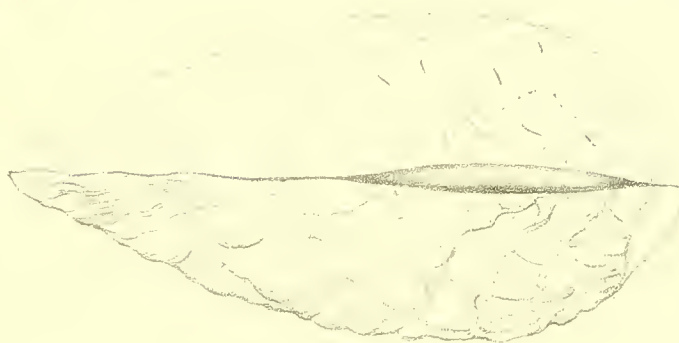
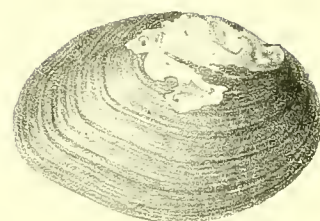
274



273

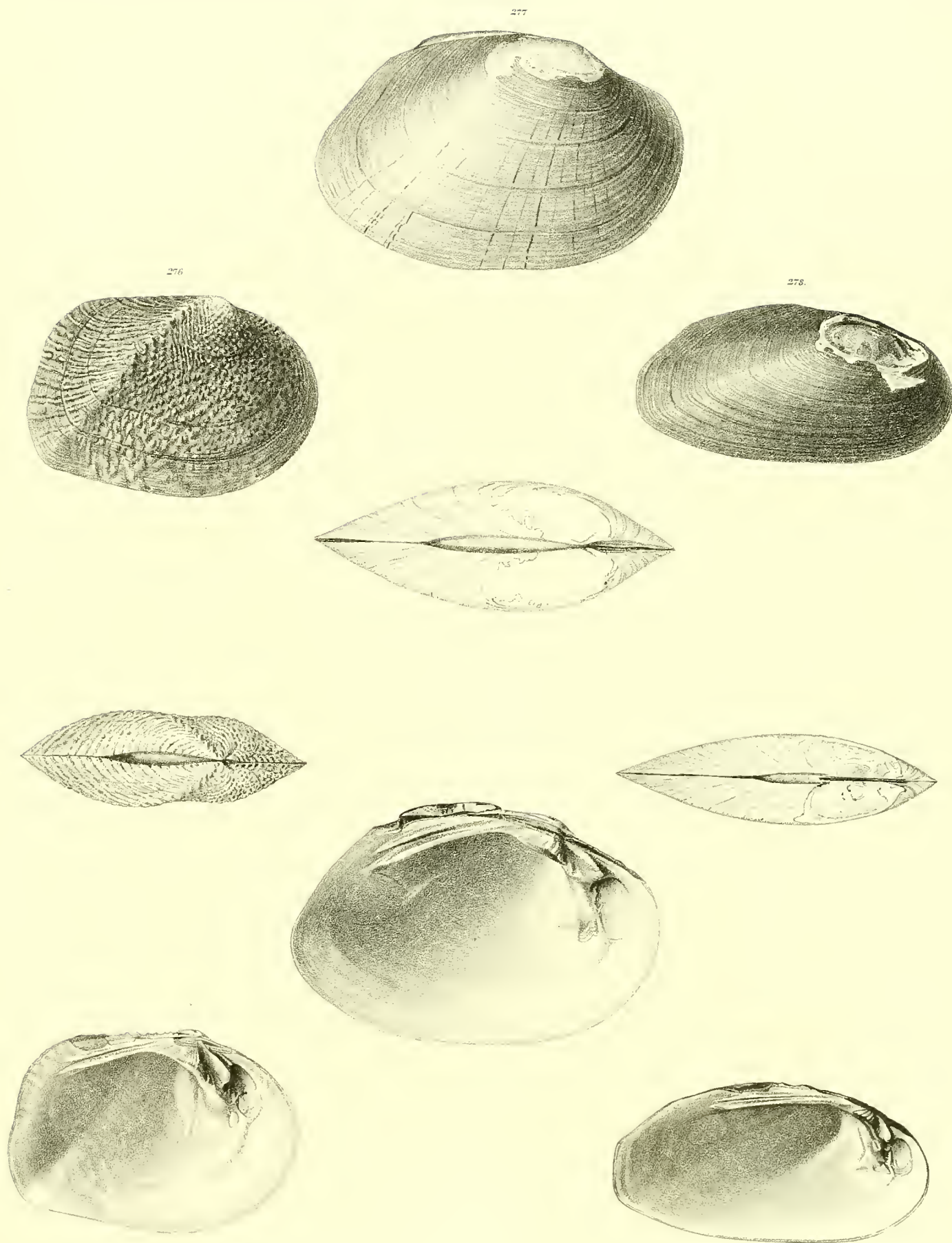


275



273 *Unio Bolet*  
274 *Unio grandidens*.  
275 *Unio Arkansensis*



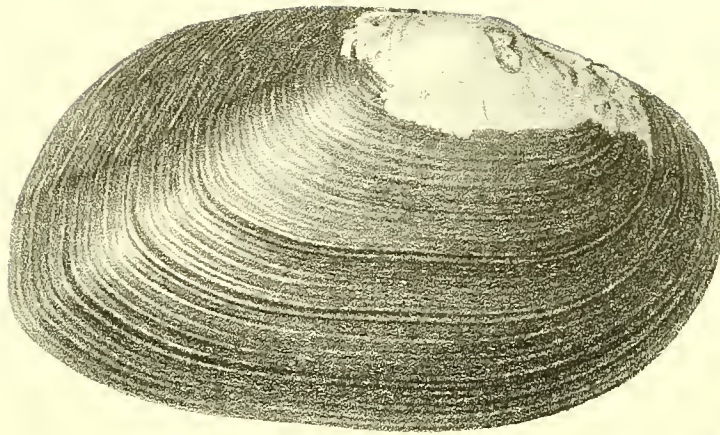


276 *Unio speciosus*  
277 *Unio Gerhardtii*  
278 *Unio Merceri*

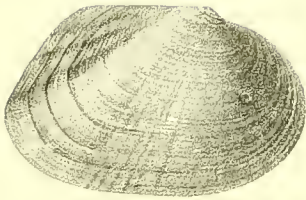




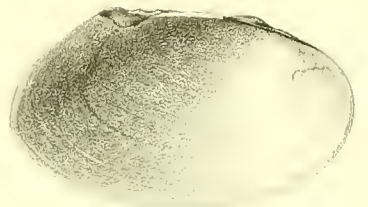
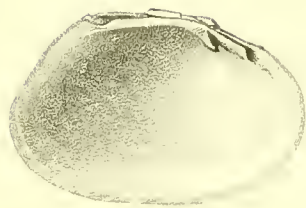
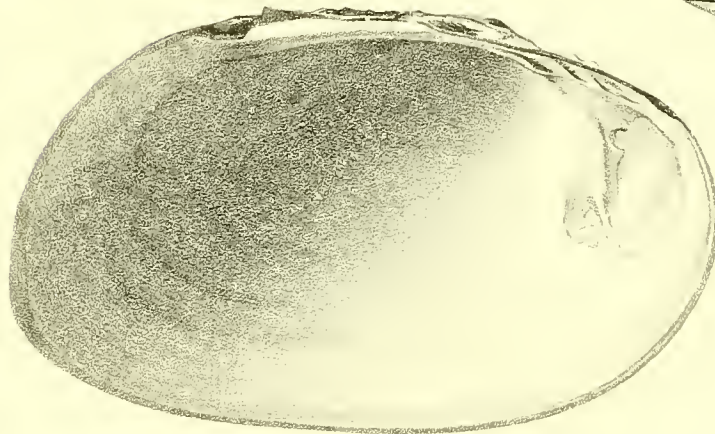
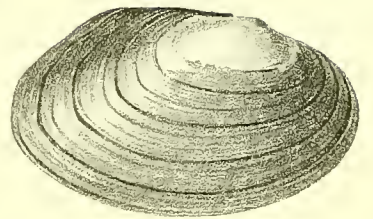
280



279

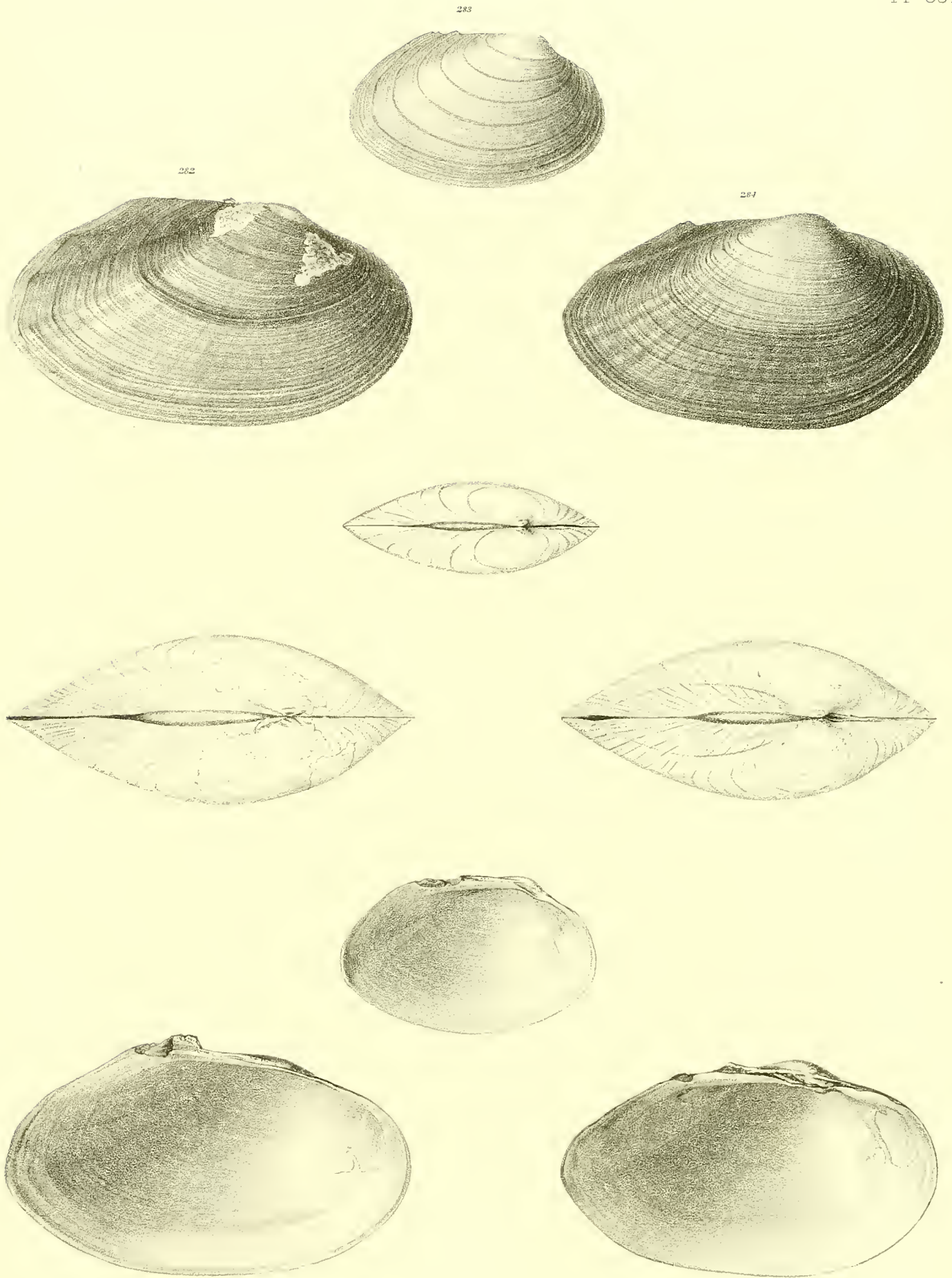


281



- 279. *Margaritana quadrata*
- 280. *Margaritana gesnerii*
- 281. *Anodonta simpsoniana*





282 *Anodonta virgulata*  
283 *Anodonta fiennicottii*  
284 *Anodonta Showalterii*







GONIOBASIS. SCHIZOSTOMA, ANCULOSA, LITHASIA, STREPHOBASIS, NERITINA



43 *G. gratiosa.*  
 44 *G. blanda*  
 45 *G. vesicula*  
 46 *G. Lewisii*  
 47 *G. pergrata*  
 48 *G. paula*  
 49 *Sc. Showalterii.*

50 *Sc. castaneum.*  
 51 *Sc. Hartmanii*  
 52 *Sc. glans*  
 53 *Sc. glandata*  
 54 *Sc. Alabamense.*  
 55 *Sc. Spillmanni*  
 56 *Sc. Wetumpkaense.*

57 *Sc. pumilum*  
 58 *Sc. globosum*  
 59 *Sc. rufens*  
 60 *A. turbinata*  
 61 *A. formosa*  
 62 *A. Showalterii*  
 63 *A. vittata*

64 *A. Lewisii*  
 65 *A. Coosacensis*  
 66 *A. contorta*  
 67 *L. imperialis*  
 68 *L. Tuomeri*  
 69 *L. dilatata*  
 70 *L. suglobosa.*  
 71 *L. hesiformis*

72 *L. Showalterii*  
 73 *L. nuclea*  
 74 *St. Spillmanni*  
 75 *St. cornea*  
 76 *St. Clarkii*  
 77 *St. solida*  
 78 78<sup>a</sup> *N. Showalterii*  
 79 *G. crenatula*





TRYPANOSTOMA



80 *T. Hartmani*  
 81 *T. Jayi*  
 82 *T. Spillmani*  
 83 *T. Christyi*  
 84 *T. labiatum*  
 85 *T. Whitei*  
 86 *T. Estabrookii*  
 87 *T. Knoxvilleense*  
 88 *T. attenuatum*

89 *T. lortum*  
 90 *T. pallidum*  
 91 *T. parvum*  
 92 *T. modestum*  
 93 *T. mucronatum*  
 94 *T. simplex*  
 95 *T. minor*  
 96 *T. pumilum*  
 97 *T. bivitatum*

98 *T. Vanuxemi*  
 99 *T. Chakasaense*  
 100 *T. Tennesseeense*  
 101 *T. Knoxvilleense*  
 102 *T. trivittatum*  
 103 *T. trochulus*  
 104 *T. Sycamoreense*  
 105 *T. idur*  
 106 *T. Thorntonii*

107 *T. Troostii*  
 108 *T. Clarkii*  
 109 *T. incrivum*  
 110 *T. Postellii*  
 111 *T. Hoomeyi*  
 112 *T. Florenceense*  
 113 *T. Alabamaense*  
 114 *T. legatum*  
 115 *T. Pybasii*

116 *T. subulaforme*  
 117 *T. olivaceum*  
 118 *T. moriforme*  
 119 *T. viride*  
 120 *T. Lewisii*  
 121 *T. canaliculatum*  
 122 *T. Showalterii*  
 123 *T. Anthonyi*  
 124 *T. stratum*  
 125 *T. moniliferum*



GONIOBASIS



- |     |                       |     |                          |     |                            |     |                     |     |                       |
|-----|-----------------------|-----|--------------------------|-----|----------------------------|-----|---------------------|-----|-----------------------|
| 126 | <i>G. osculata</i>    | 134 | <i>G. Draytoni.</i>      | 142 | <i>G. Bridgesiana</i>      | 150 | <i>G. Vauxiana</i>  | 159 | <i>G. Doolyensis.</i> |
| 127 | <i>G. Brunbyi</i>     | 135 | <i>G. Newberryi.</i>     | 143 | <i>G. intercedens</i>      | 151 | <i>G. Whitei</i>    | 160 | <i>G. Viennaensis</i> |
| 128 | <i>G. Grosvenorii</i> | 136 | <i>G. leuebrovittata</i> | 144 | <i>G. Ohioensis</i>        | 152 | <i>G. Bunneyana</i> | 161 | <i>G. strenua</i>     |
| 129 | <i>G. parva</i>       | 137 | <i>G. nigra</i>          | 145 | <i>G. cinerea</i>          | 153 | <i>G. Tuomeyi</i>   | 162 | <i>G. sparus</i>      |
| 130 | <i>G. spinella</i>    | 138 | <i>G. Spillmanu.</i>     | 146 | <i>G. Vauxenii</i>         | 154 | <i>G. fabalis</i>   | 163 | <i>G. difficilis.</i> |
| 131 | <i>G. Estabrookii</i> | 139 | <i>G. flava</i>          | 147 | <i>G. Spartenbergensis</i> | 155 | <i>G. gibberosa</i> | 164 | <i>G. Bardiana</i>    |
| 132 | <i>G. Prariensis</i>  | 140 | <i>G. Anthonyi</i>       | 148 | <i>G. auricoma.</i>        | 156 | <i>G. Lyoni.</i>    | 165 | <i>G. inclinans</i>   |
| 133 | <i>G. Etowahensis</i> | 141 | <i>G. Gabbiana.</i>      | 149 | <i>G. Georgiana</i>        | 157 | <i>G. Pybasii</i>   | 166 | <i>G. induta</i>      |
|     |                       |     |                          |     |                            | 158 | <i>G. Duttonii</i>  | 167 | <i>G. Lindsleyi</i>   |





- |     |                        |     |                      |     |                      |     |                       |     |                          |
|-----|------------------------|-----|----------------------|-----|----------------------|-----|-----------------------|-----|--------------------------|
| 168 | <i>G. Thorntonii</i>   | 176 | <i>G. paupercula</i> | 185 | <i>G. Christyi</i>   | 194 | <i>G. Tchensis.</i>   | 203 | <i>G. Hallenbeckii</i>   |
| 169 | <i>G. udreniensis</i>  | 177 | <i>G. proletaria</i> | 186 | <i>G. instabilis</i> | 195 | <i>G. inosculata</i>  | 204 | <i>G. Canbyi</i>         |
| 170 | <i>G. contineis</i>    | 178 | <i>G. inconstans</i> | 187 | <i>G. Gerhardtii</i> | 196 | <i>G. Barratti</i>    | 205 | <i>G. Couperii</i>       |
| 171 | <i>G. cerea</i>        | 179 | <i>G. medioeris</i>  | 188 | <i>G. uliaseata</i>  | 197 | <i>G. rubricata</i>   | 206 | <i>G. Downiana</i>       |
| 172 | <i>G. viridicata</i>   | 180 | <i>G. crassa</i>     | 189 | <i>G. mutabilis</i>  | 198 | <i>G. Bentonensis</i> | 207 | <i>G. Tryoniana</i>      |
| 173 | <i>G. Leidyana</i>     | 181 | <i>G. ornata.</i>    | 190 | <i>G. cruda</i>      | 199 | <i>G. Shastaensis</i> | 208 | <i>G. Postelli</i>       |
| 174 | <i>G. Abbevilleris</i> | 182 | <i>G. olivella</i>   | 191 | <i>G. rubella</i>    | 200 | <i>G. negata</i>      | 209 | <i>G. granata</i>        |
| 175 | <i>G. amana</i>        | 183 | <i>G. purpurella</i> | 192 | <i>G. macella</i>    | 201 | <i>G. Elliotti</i>    | 210 | <i>G. Stewardsoniana</i> |
|     |                        | 184 | <i>G. cinerella</i>  | 193 | <i>G. rubiginosa</i> | 202 | <i>G. flavescens</i>  | 211 | <i>G. cadus.</i>         |



IO, TRYPANOSTOMA, LITHASIA, STREPHOBASIS.



212. *I. nodosa*  
 213. *I. robusta*  
 214. *I. variabilis*  
 215. *I. Spillmanni*

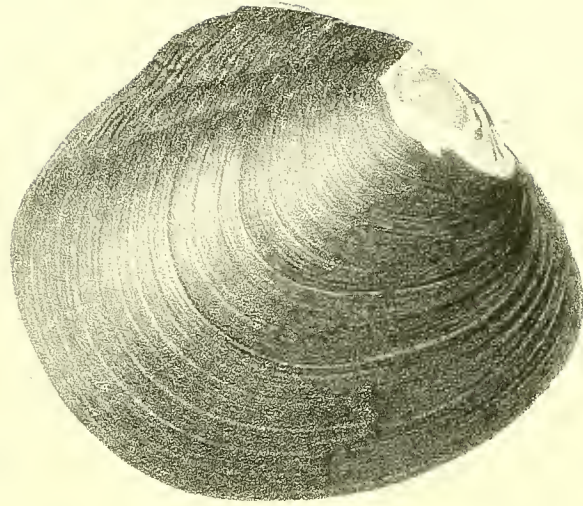
216. *I. modesta*  
 217. *I. gracilis*  
 218. *I. viridula*  
 219. *T. dignum*  
 220. *T. tudeum*

221. *T. Carolinense*  
 222. *T. Henryanum*  
 223. *T. lativittatum*  
 224. *T. strictum*  
 225. *T. costellatum*

226. *L. vittata*  
 227. *L. Downsi*  
 228. *S. carinata*  
 229. *S. olivaria*



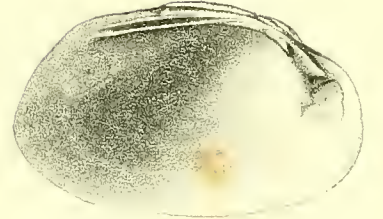
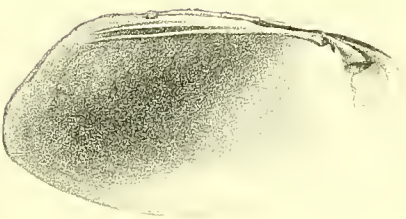
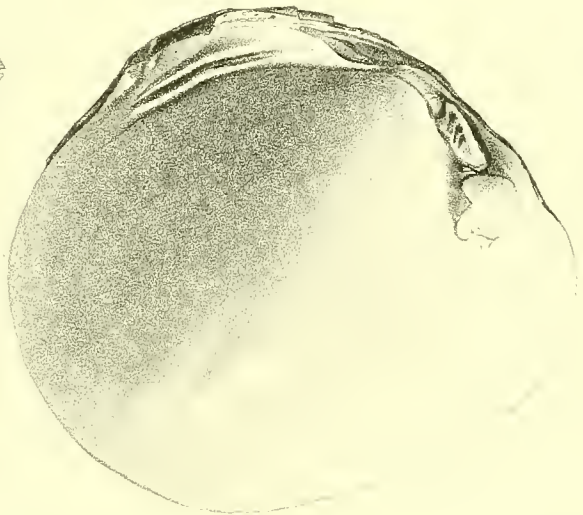
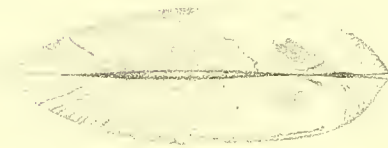
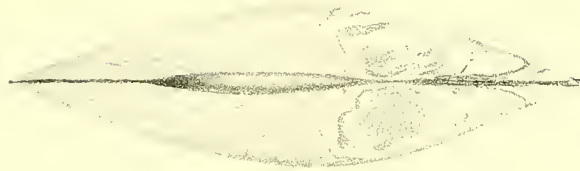
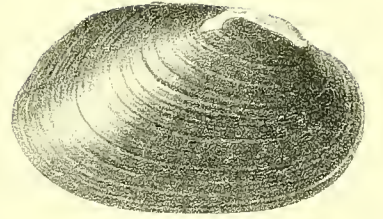




285

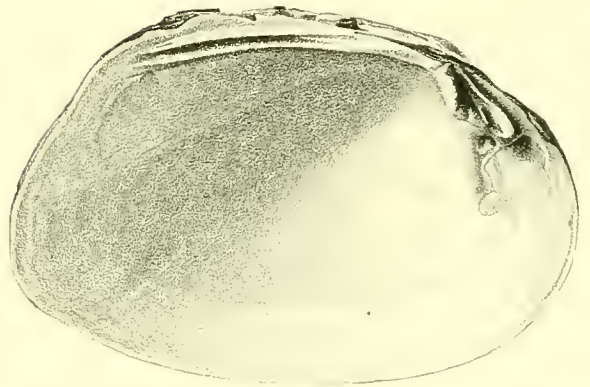
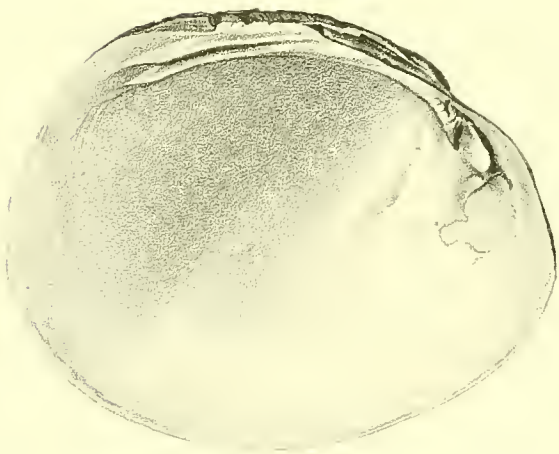
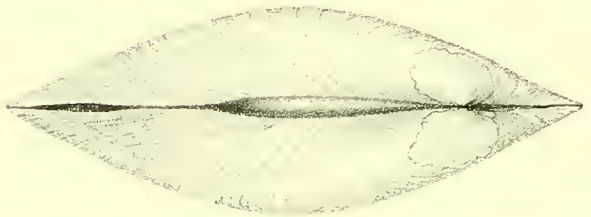
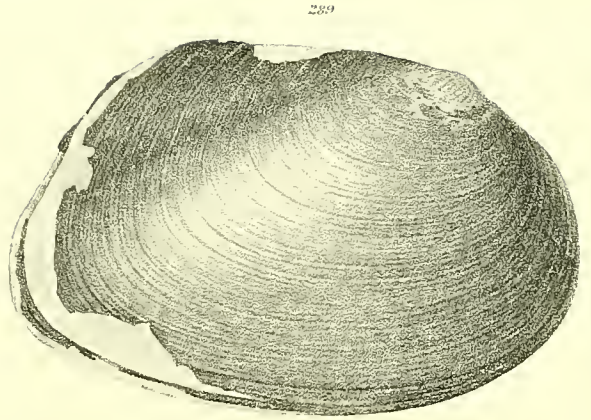
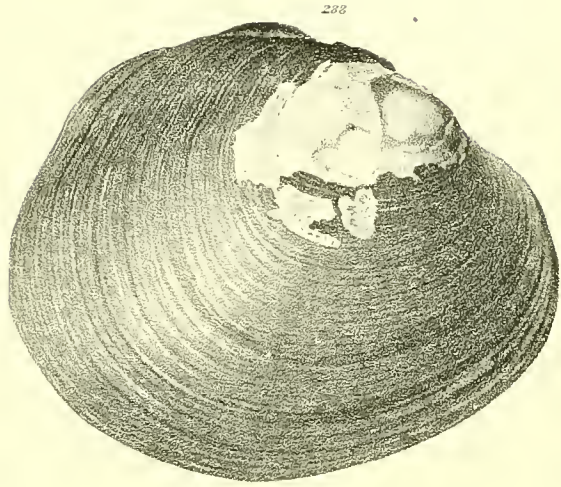


287



285 *Unio ethiops*  
286 *Unio sinuatus*  
287 *Unio pectus*

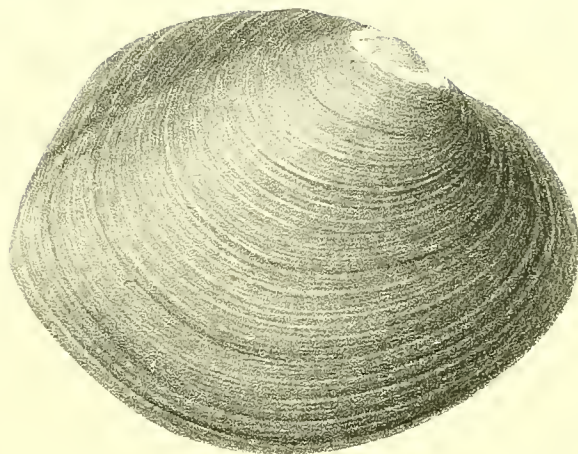




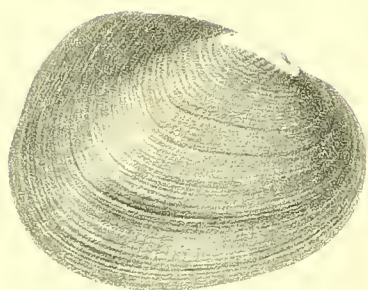
288 *Uta nocturnus*  
289 *Uta Wymanii*



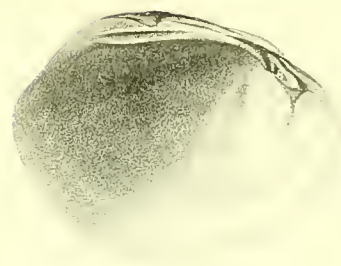
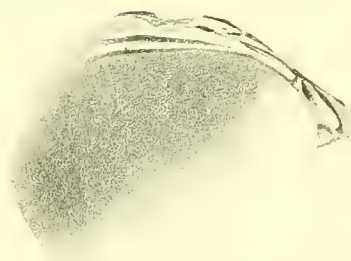
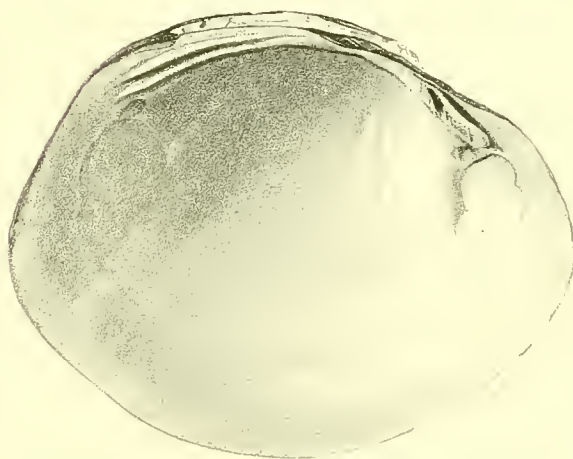
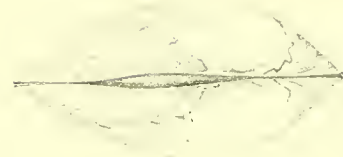
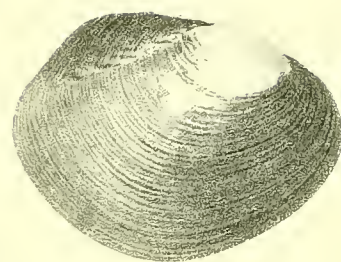
291



290

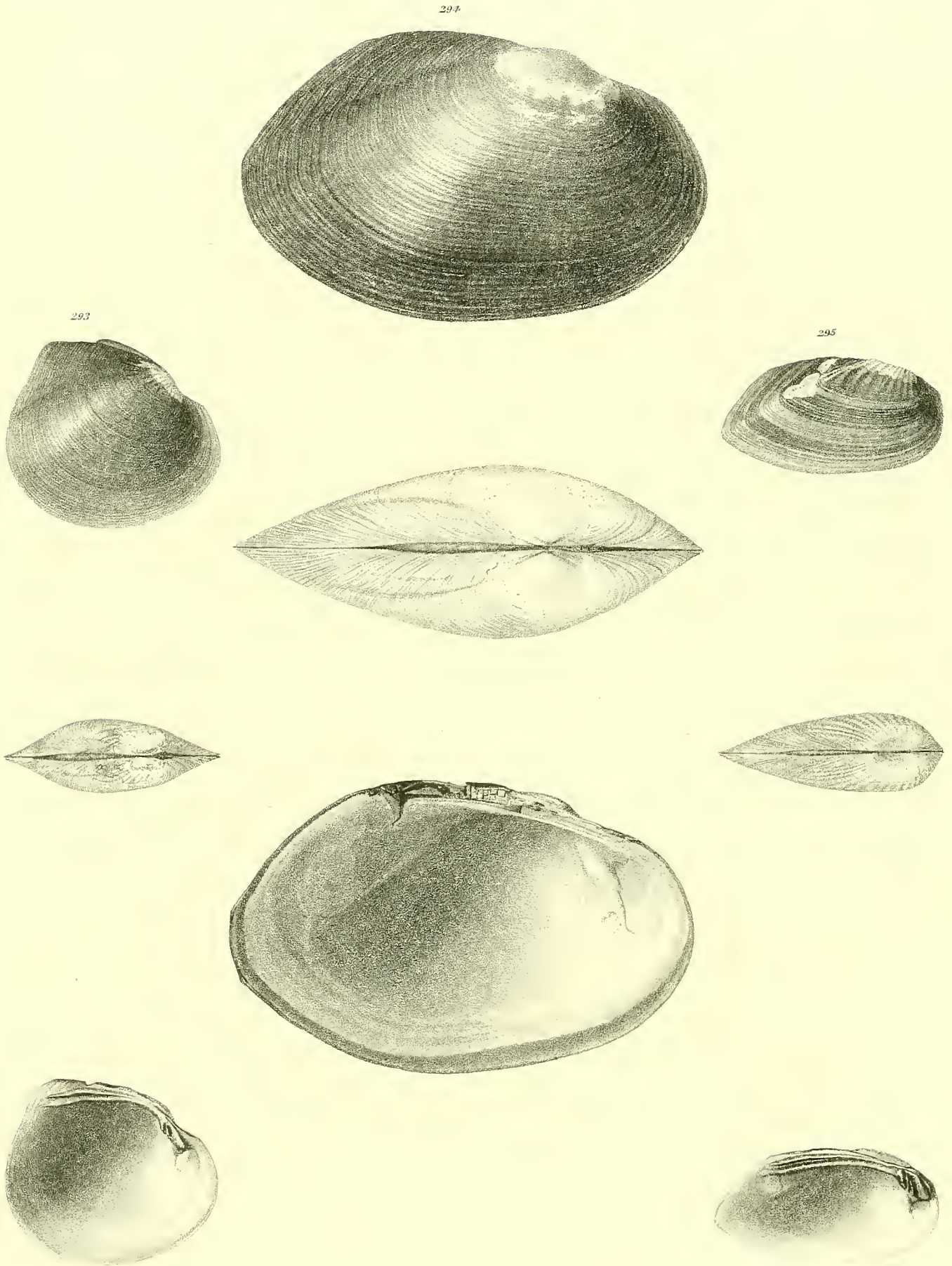


292



- 290 *Uta gratus*
- 291 *Uta patchoides*
- 292 *Uta peniformis*

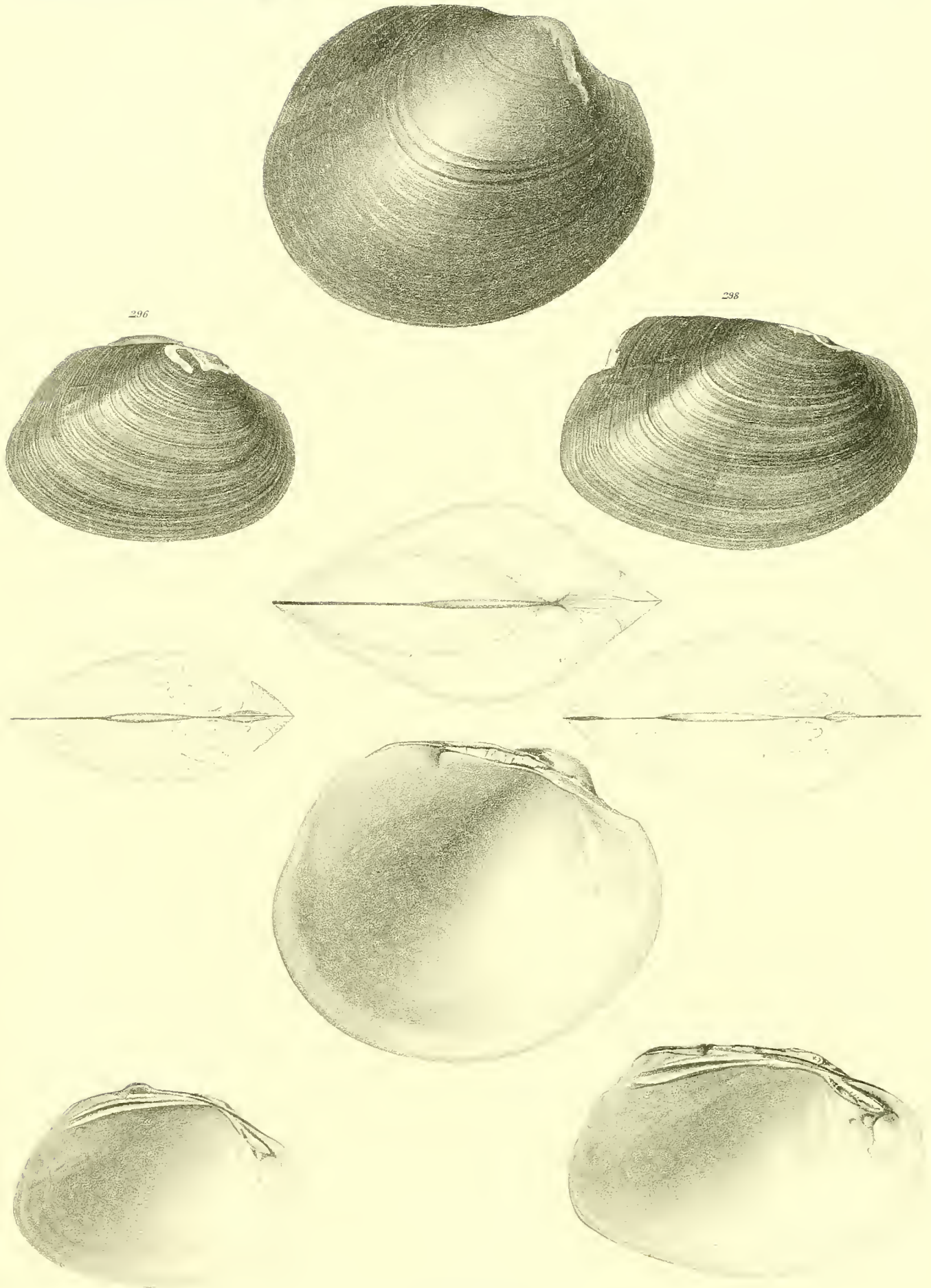




293. *Unio disculus*  
294. *Anodonta Wymanni*  
295. *Unio trifidus*



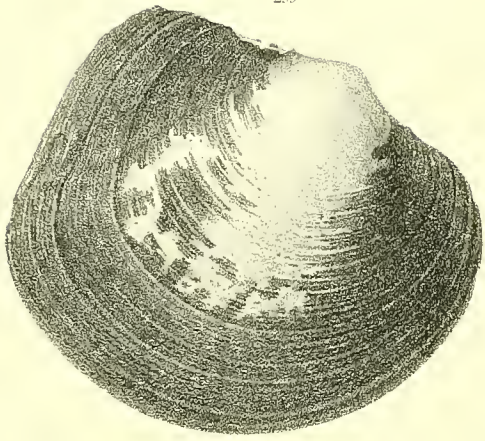




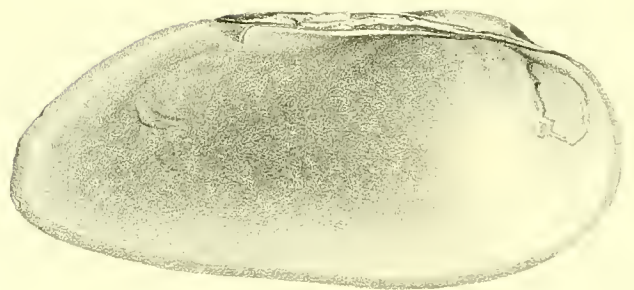
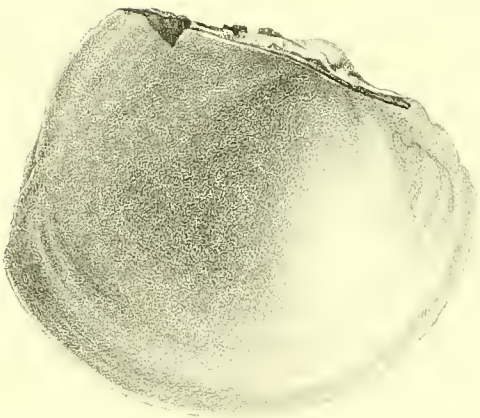
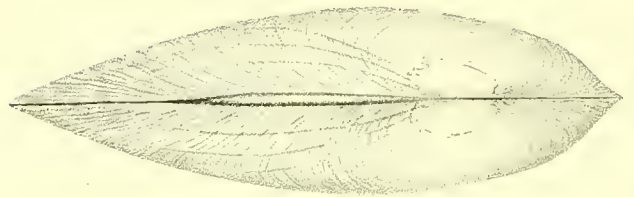
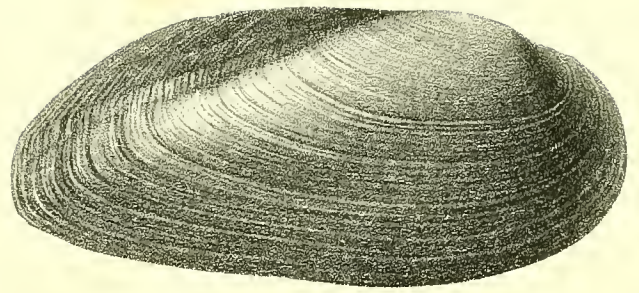
296 *Unio pycer*  
297 *Anodonta caithauda*  
298 *Unio Uruguayensis*



299



300

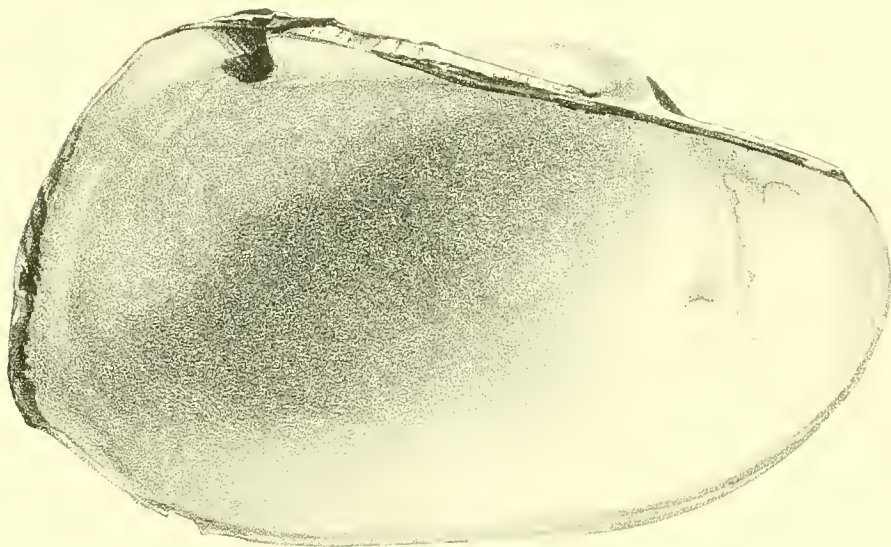
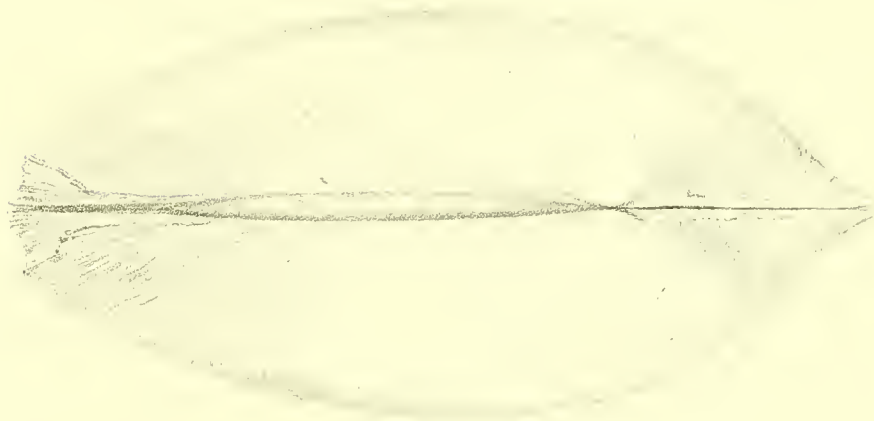
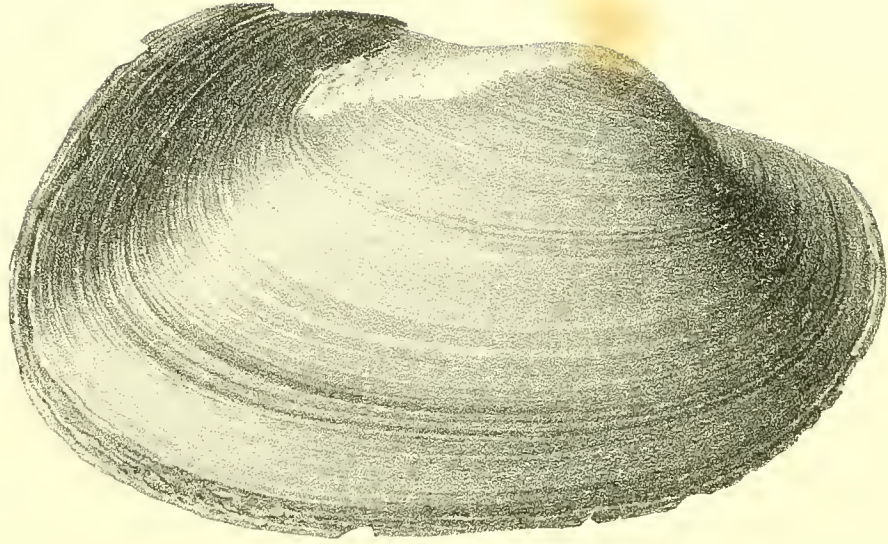


299 *Anodonta rubicunda*  
300 *Anodonta Arizonensis*

T Sinclair's lith. Phil<sup>a</sup>



301

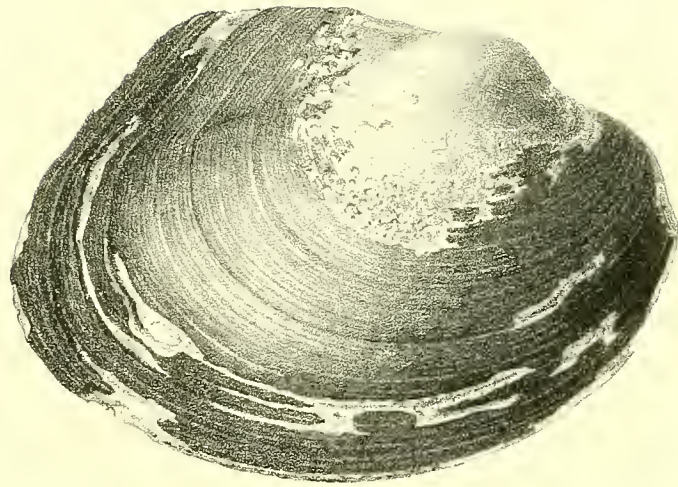


301 *Anadonta Forbesiana*

T. Sinclair's lith. Phila.



302



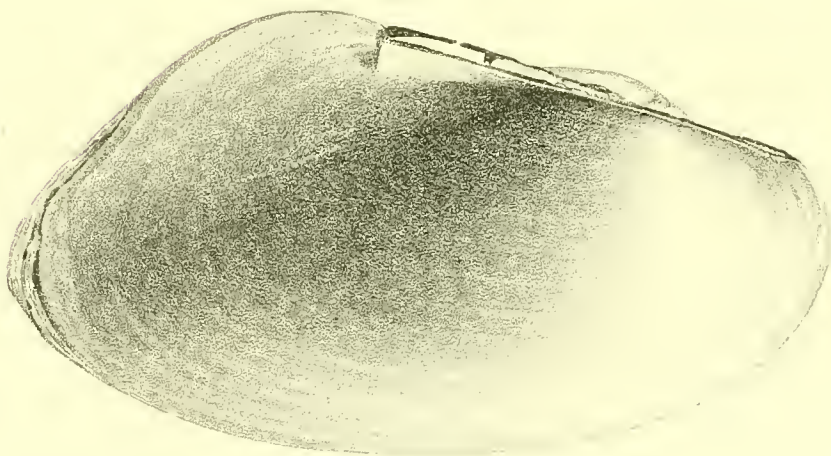
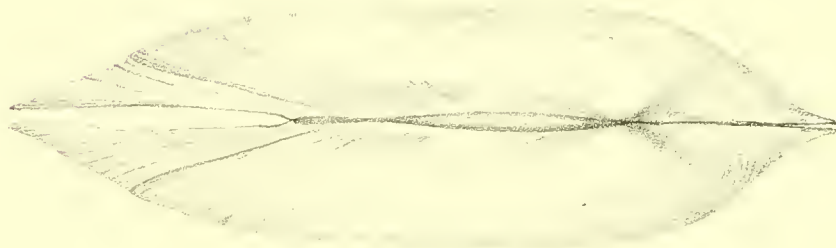
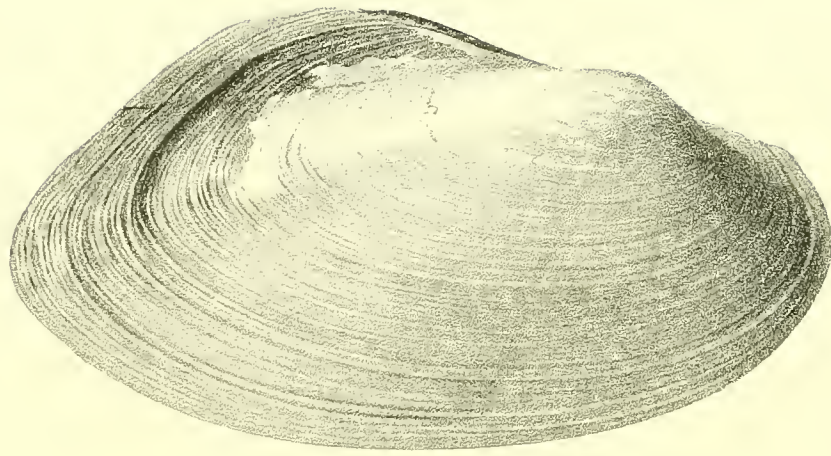
302 *Anodonta Uruguayensis*.

T Sinclair's lith, Phil<sup>a</sup>





303



303 *An Moricandia*

T. Sinclair's lith. Phil<sup>a</sup>



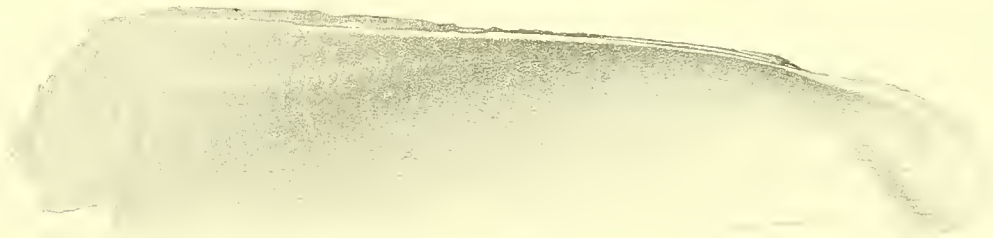
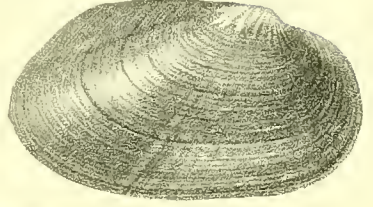
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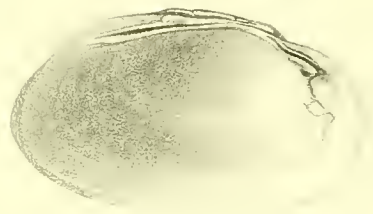
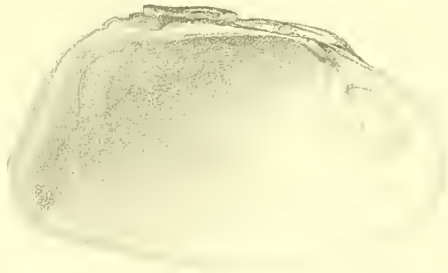
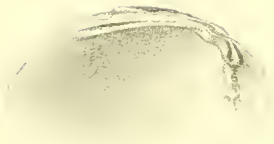
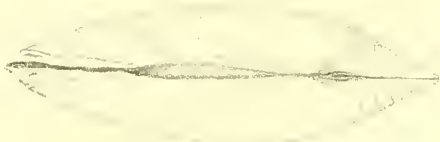
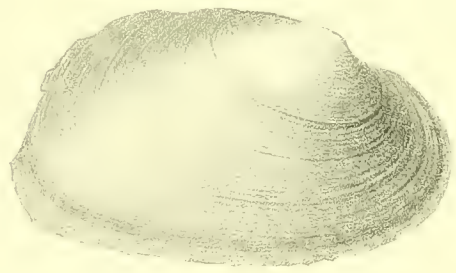
304



306



307



304 *Unio ocellus*  
305 *Mycetopus emarginatus*.

306 *Unio lepidus*  
307 *Monocodylea Wheatleyi*





1. *Polipicus Elliotii*. — 2. *Campethera vestita*. — 3. *Chrysopicus Malherbei*.





1. *Picus ragatus*, — 2. *Celeus mentalis*, ♂, — 3. ♀.

↳ 0 993.①













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