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ART. XIV.—*Descriptions of New Species of American Tertiary and Cretaceous Fossils.*

BY WM. M. GABB.

*MIOCENE SPECIES.**CANTHARUS, Bolton.*

*C. CUMBERLANDIANA.* Pl. 67, fig. 6. Fusiform; whorls five, prominent; spire not as long as the mouth; outer lip thick, with about eight teeth on its inner margin, inner lip smooth and thin, a large plate of enamel on the columella and a rudimentary tooth on the upper end near the suture; umbilicus distinct but imperforate; canal moderate and slightly curved; surface marked by about ten rounded, prominent, longitudinal ribs, crossed by 18 or 20 revolving lines between some of which exist traces of finer lines, the latter visible only on well preserved specimens. There are also visible the usual lines of growth.

*Dimensions.*—Length 1 inch, width of body whorl  $\frac{11}{20}$  inch, length of mouth .6 inch.

*Locality and position.*—Miocene marl, near Shiloh, Cumberland Co., N. J.

Collection of the Academy and my collection.

*FASCIOLARIA, Lam.*

*F. WOODII.* Pl. 67, fig. 7. Fusiform; whorls four or five, flattened so as to make the sides of the spire nearly straight; outer lip plain; columella with one prominent fold; canal moderate, umbilicus nearly obsolete; surface marked by numerous revolving ribs which exhibit a slight tendency to alternate in size.

*Dimensions.*—Length 1·3 in., width of body whorl .8, length of aperture .8.

*Locality and position.*—With the above.

Collection of the Academy.

*NATICA, Adanson.*

*N. HEMICRYPTA.* Pl. 67, fig. 5. Globose; whorls four, rounded; spire elevated, suture faint; mouth rounded; callosity small, partly covers the umbilicus, which is deep, surface smooth.

*Dimensions.*—Length .3 in., width of body whorl  $\frac{5}{20}$  inch.

*Locality and position.*—With the above.

Collection of the Academy and my collection.

*MERCENARIA, Schum.*

*M. CANCELLATA.* Pl. 67, fig. 25. Convex, beaks inclined anteriorly; umbones prominent and rounded; cardinal margin slightly curved, anterior extremity and basal margin rounded, posterior extremity subangular at its junction, both with the basal and cardinal margin; surface marked by numerous small angular ribs crossed by fine, radiating, impressed lines; anterior muscular impression semi-lunar, posterior larger and irregular; pallial sinus small and angular.

*Dimensions.*—Length  $1\frac{3}{4}$  in., width  $2\frac{3}{4}$  in., depth of valve .7 in.

*Locality and position.*—With the above.

Collection of the Academy. One valve.

*OSTREA, Linn.*

*O. MAURICENSIS.* Pl. 67, fig. 26. Elongate, subquadrate, narrower at the dorsal than at the ventral or basal end, widest just below the muscular scar, slightly squamose on the surface; muscular scar placed nearly midway between the hinge and basal margin, somewhat crescentic, but widest at its internal end; ligament area wide and undulating.

*Dimensions.*—Length  $1\frac{1}{2}$  inches, greatest width  $1\frac{1}{2}$  inches.

*Locality and position.*—Miocene marl, Maurice River, N. J.

My collection.

I have seen but two lower valves of this species. It was presented to me by my friend Mr. C. C. Abbott.

*EOCENE SPECIES.*

The following species are all from Texas. Many of them were sent by Mr. Kellogg, from Wheelock, Texas, to the Smithsonian Institution and to the Academy; the rest were given me by my friend Dr. Francis Moore, and are from Caldwell Co., Texas. They are all from a deposit apparently synchronous with that at Claiborne, Ala.; one-third of the species found in the Texan beds, being identical, specifically, with those found in Alabama.

*SEPIA, Arist. Molina 1782.*

✓ *S. (BELOSEPIA) UNGULA.* Pl. 67, figs. 1, 2, 3, 4.

*S. (Belosepia) ungula*, Gabb. Proc. Acad. 1860, p. 324.

Shell laterally compressed, especially posteriorly; beak robust, acute, arcuate, and with a very faint ridge on the dorsal surface; ventral plate smaller in proportion than in the other species of this subgenus, slightly undulate and radiate, edge smooth and sharp; dorsal callus straight, deeply rugose, marked on the edge, by about three irregular rugæ and covered on the face and sides with pits or cavities, which extend

on the sides almost to the base of the ventral plate, becoming gradually fainter until they disappear; cavity shallow, ventral edge sharp, interior marked by numerous compound concentric ribs crossed by very faint longitudinal lines.

*Dimensions.*—Length  $1\frac{1}{2}$  inch, length of rostrum  $\frac{3}{4}$  in., width of the ventral plate  $\frac{3}{4}$  inch, just above the base of the cavity.

The specimen figured is in the Academy's collection, and is somewhat smaller than the above measurements which were taken from a specimen now in the Smithsonian collection.

*Locality.*—Whealock, Texas.

This species resembles more nearly *Sepia Cuvieri*, Desh., of the Paris basin than any other, but can readily be distinguished from it by the dorsal callosity, which in our species is not so prominent, and is comparatively sharp, especially towards the extremity nearest the rostrum. The roughening of the surface of the same portion is, in the Paris species, transverse, while in ours it is longitudinal. The ventral plate is one third smaller, in the present species, than in *S. Cuvieri*.

#### MUREX.

Subgenus ODONTOPOLYS, Gabb.

✓ M. (ODONTOPOLYS) COMPSORHYTIS. Pl. 67, fig. 16. Shell triangular; whorls six; three squamose varices; on the body whorl between the two varices which enclose the aperture are two elongated nodes, on the angle of the whorl, between the next two to the left there are three of these nodes, and in the remaining space there are four, which in this last case extends on the top of the whorl to the suture, and to the anterior extremity of the shell as distinct ribs; these are crossed by a few delicate revolving lines, spire acuminate, canal moderately long and nearly straight; aperture narrow; two plates or folds on the columella, a small rudimentary tooth at the posterior extremity of the mouth, on the inner lip; outer lip thickened and with seven or eight prominent heavy teeth.

*Dimensions.*—Length .75 in., length of aperture .5 in., width of body whorl .45.

*Locality.*—Whealock, Texas. Collection of the Smithsonian Institution.

This shell differs so materially from all the other Murices, that I propose to make it the type of a new subgenus, as above. It resembles the subgenus *Pteronotus* in the arrangement of the varices, but the folds on the columella and the crenulations of the outer lip will serve to distinguish it.

#### FUSUS, Klein.

✓ F. MORTONIOPSIS. Pl. 67, fig. 15. Scalariform; whorls eight, angular and prominent; spire nearly as long as the aperture; aperture elongated angular above,

canal long, straight, narrow; surface marked by about seven or eight prominent longitudinal ribs, crossed on the shoulder of the whorl by three fine revolving lines, and on the rest of the whorl by six or seven larger lines, with occasional finer ones alternating; on the canal, the alternation of one or two fine lines with a larger one appears to be constant.

*Dimensions*.—Length 1·4 in., width of body whorl ·65 in., length of aperture including canal ·8.

*Locality*.—Wheclock and Caldwell Co., Texas. Collections of the Smithsonian Institution and the Academy and my collection.

This species resembles *F. Mortoni*, Lea, but differs in the alternation of finer lines with the larger ones and in being proportionally more slender.

#### NEPTUNEA, *Bolton*.

✓ *N. ENTEROGRAMMA*. Pl. 67, fig. 14. Fusiform, smooth; whorls six, those of the spire rounded or obscurely angulated above the middle; suture deep; outer lip striate internally.

*Dimensions*.—Length ·9 in., width of body whorl ·5 in., length of aperture ·6 in.

*Locality*.—Wheclock, Texas. Smithsonian collection.

The striæ on the inner side of the outer lip of the only specimen I have seen consist of four prominent lines above the middle, and a few obsolete ones below. There are traces of a few impressed lines on the beak.

#### TURRIS, *Humph.*

(*PLEUROTONA*, Montf.)

⊕ *T. CRISTATA*. Pl. 67, fig. 8.

*Pleurotomia cristata*, Con., Jour. Acad. 1st ser. vol. i. pl. 11.

Shell scalariform, whorls ten, carinated on the angle; mouth moderately wide, inner lip covered with a thin coat of enamel, outer lip simple; superior sinus wide, rounded, one-twentieth of an inch deep, canal long, straight; surface marked by distinct lines of growth, crossed by numerous very fine revolving striæ.

*Dimensions*.—Length 1·3 in., length of mouth ·6 in., width of body whorl ·5 in.

⊕ *T. MOOREI*. Pl. 67, fig. 9. Shell elongated fusiform, whorls nine or ten, strongly carinate; mouth narrow, long, half the length of the shell, inner lip covered with a very delicate coat of enamel, so thin as to be visible only on a very well preserved specimen, outer lip thin, showing internally the marks of the larger ribs; surface marked by about twenty-five revolving lines, smaller on the shoulder of the whorl (except one large one at the upper edge, below the suture) than elsewhere; in the largest specimens, two or three of the principal ribs are compound, the rest are simple, near the apex; on the upper two of the principal revolving lines are small tubercles which disappear in the succeeding whorls.

*Dimensions*.—Length 1·1 in., length of mouth .55 in., width of body whorl .3 in.

The fine specimen figured, is in my collection from Caldwell Co., Texas. It is nearly twice as large as any other specimen I have seen, of the same species.

† *T. KELLOGII*. Pl. 67, fig. 10. Elongated fusiform, whorls eight; mouth narrow, about two-fifths the length of shell, inner lip slightly thickened, outer lip simple, posterior sinus wide, rounded, canal straight; surface marked by six or seven large longitudinal ribs crossed by very numerous fine, revolving striae; suture deep.

*Dimensions*.—Length .5 in. length of mouth .2 in. width of body whorls .15 in.

*Locality*.—Wheelock, Texas.

This species resembles Lea's figure of *P. Lonsdalei* in its markings, but it is smaller and is both proportionally more narrow and has a larger mouth.

† *T. TEXANA*. Pl. 67, fig. 11. Narrow fusiform, whorls eleven or twelve; mouth narrow, canal short, straight, outer lip simple, inner lip slightly thickened; surface marked by about twenty revolving lines, two small ones on the shoulder of the whorl and the remainder larger and decreasing from the shoulder towards the end of the canal; traces of longitudinal ribs exist obscurely on the first half dozen whorls.

*Dimensions*.—Length .7 in., length of mouth .3 in., width of body whorl .2 in.

*T. RETIFERA*. Pl. 67, fig. 12. Thick, fusiform, robust; whorls seven or eight, spire acuminate; mouth narrow, canal short and slightly bent, outer lip thick, simple, inner lip thin; surface coarsely cancellated by the crossing of longitudinal and revolving lines, the latter about fourteen in number, three or four of which are sometimes double.

*Dimensions*.—Length .28 in., length of mouth .12 in., width of body whorl .11 in.

*Locality*.—With the above from Wheelock.

Easily distinguished by its coarsely cancellated appearance.

*T. NODOCARINATA*. Pl. 67, fig. 13. Turrited; whorls seven, strongly carinated below the middle; suture distinct; mouth linear, columella straight; surface marked by a row of beading, directly below the suture, top of the whorl plain, carina marked by another nodose band larger than the first, rest of the whorl marked by about fifteen heavy revolving ribs, growing smaller on the canal and crossed by much smaller longitudinal lines.

*Locality*.—Wheelock, Texas. Collection of the Academy.

#### EUCHEILODON, *Gabb*, n. g.

I propose to found this genus to receive a beautiful little species of pleurotomoid shell from Wheelock and from Caldwell Co., Texas.

*Gen. Char*.—Allied to Pleurotoma; fusiform or scalariform; spire high; mouth

linear, canal straight, not emarginate anteriorly, posterior sinus shallow and situated a little distance from the suture, outer lip thin on the edge and crenate within, inner lip thin and marked by numerous bead-like teeth, seen only in the adult shell; surface marked like *Pleurotoma*.

*Observation.*—The most prominent character by far is the peculiar arrangement of the inner lip. The markings are not folds encircling the columella as in the well known genus *Voluta*, and in the following genus, but a row of minute beads which are found only in the adult individual. I have before me numerous immature specimens which show no trace of these beads or papillæ.

† *E. RETICULATA*. Pl. 67, fig. 18. Subscalariform, whorls eight, apex acuminate, mouth narrow, linear, outer lip thin on the edge, behind thickened and strongly dentate, inner lip beaded or toothed nearly the whole length, canal straight; surface of the first four whorls smooth and polished, of the fifth marked by minute longitudinal ribs, the remainder by revolving lines between which, but not extending over them, are numerous impressed longitudinal lines, giving under the glass a cancellated appearance.

*Dimensions.*—Length .45 in., length of mouth .22 in., width of body whorl .13 in.  
Collections of the Academy and Smithsonian Institution and my collection.

#### SCOBINELLA, *Con.*, 1848.

† *S. CRASSIPPLICATA*. Pl. 67, fig. 19. Fusiform, robust; spire straight on the sides; mouth about half the length of the shell, canal straight; umbilicus rudimentary; surface marked by revolving ribs, one narrow nodose rib at the top of the whorl, one wider nodose rib sometimes double on the shoulder, and numerous smaller plain ribs crossing the remainder of the whorl and alternating in size; the nodes on the first two ribs, which are somewhat wider than exhibited on the figure, give this shell a strongly cancellated appearance to the naked eye.

*Dimensions.*—Length .3 in., length of mouth .16 in., width of body whorl .13 in.

† *S. LAEVIPLICATA*. Pl. 67, fig. 20. Thick, fusiform; whorls eight or nine, carinate; apex acuminate; mouth narrow, canal short, outer lip striate within, corresponding with the external ribs, inner lip thickened, the folds on the columella smaller than in the preceding species; surface marked by twelve or fifteen angular revolving striæ; no traces of longitudinal ribs or nodes, but obsolete lines of growth.

*Dimensions.*—Length .22 in., length of mouth .08 in., width of body whorl .08 in.  
Collection of the Smithsonian Institution.

#### DISTORTIO, *Bolton*.

~ *D. SEPTEMDENTATA*. Pl. 67, fig. 21. Short, robust; whorls eight, spire short, acuminate; mouth patulous, outer lip thin on the edge, thickened behind the edge

and with seven robust teeth internally, inner lip thin, with a few small teeth, canal short, recurved, surface marked by varices and by irregular longitudinal ribs, crossed by numerous thick revolving lines, giving a coarsely reticulated appearance ; between the revolving lines are numerous finer striae.

*Dimensions*.—Length .9 in., length of mouth .4 in., width of body whorl .5 in.

PHOS, *Montf.*

✓ P. TEXANUS. Pl. 67, fig. 17. Subfusiform, whorls eight, spire high ; mouth small, outer lip with seven or eight teeth inside, inner lip with about six ; canal very short, recurved ; surface marked by numerous revolving ribs crossed by longitudinal ribs and very indistinct longitudinal impressed lines ; the ribs are slightly thickened where they cross on the upper part of the whorl so as to present the appearance of small tubercles or nodes. The young shells, having but three or four whorls, are more robust, polished and coarsely reticulated by distant lines.

*Dimensions*.—Length .5 in., length of mouth .17 in., width of body whorl .22 in.

PSEUDOLIVA, *Swains.*

✓ P. FUSIFORMIS, Con., MSS. Pl. 67, fig. 30. Fusiform, polished; umbilicus closed by the callus ; spire conical, whorls four, slightly convex ; suture profound ; impressed line on the body whorl obsolete ; aperture narrow, elliptical. Figure, natural size.

✓ P. LINOSA, Con., MSS. Pl. 67, fig. 31. Subfusiform, spire high, whorls six ; umbilicus open ; suture profound ; impressed line on the body whorl deep, rest of the whorl marked by numerous revolving ribs, first two or three whorls strongly undulate, aperture elliptical.

*Dimensions*.—Length .45 in., width of body whorl .3 in., length of mouth .3 in.

✓ P. CARINATA, Con., MSS. Pl. 67, fig. 32. Subovate; entire above the canal or impressed line ; whorls five, rounded ; suture channeled ; aperture elliptical ; umbilicus large and profoundly carinated within. Figure, natural size.

✓ P. PERSPECTIVA, Con., MSS. Pl. 67, fig. 29.

*Gastridium vestutum*, Con., Wailes' Report, Miss. p. 289, pl. 17, f. 4.

Short, ovate, ventricose, spire very short, suture channelled ; five revolving lines above the channel, below, seven or eight impressed revolving lines ; columella callous ; umbilicus large, polished within, and with a submarginal acute carina ; umbilical margin carinated ; labrum margin waved or dentate below the tooth at the termination of the canal.

"This is a very distinct species."—T. A. C.

AGARONIA, *Gray.* (*Hiatula*, *Swains.*).

✓ A. PUNCTULIFERA. Pl. 67, fig. 22. Fusiform, robust, whorls four, spire short ;

mouth nearly straight, wide; anterior sinus wide and moderately deep, posterior sinus narrow and deep; outer lip plain, nearly straight, inner lip with five or six very oblique folds. Surface marked by numerous longitudinal and revolving lines, so arranged as to leave between them a series of minute punctations; suture very distinct; a short distance below the suture there is a prominent revolving rib or carina of twice the size of the other ribs.

*Dimensions*.—Length .35 in., length of mouth .23 in., width of body whorl .14 in.

*Locality*.—Wheelock, Texas. Collection of Smithsonian Institution. Very rare.

I have seen one specimen from Claiborne, Ala., in the cabinet of Mr. Lea.

#### FASCIOLARIA, Lam.

~*F. MOOREI*. Pl. 67, fig. 27. Fusiform; whorls eight, spire acuminate; mouth half the length of the shell, outer lip crenate within, inner lip with one tooth at the upper part, columella nearly straight, with three or four nearly transverse folds, the anterior of which is somewhat tuberculous; surface marked by large nodes, seven on the body whorl, crossed by numerous, alternating, revolving lines; suture well marked but shallow.

*Dimensions*.—Length 1.5 in., length of mouth .75 in., width of body whorl .65 in.

This may possibly be identical with *F. plicata*, Lea, but it differs from his figure in being higher, more slender and in having a straighter canal.

This species appears to be common both at Wheelock and in Caldwell Co., Texas, but the specimens in my collection from the latter locality are of a larger average size than those from Wheelock, some of them being twice as large as any I have seen from the other locality.

~*F. POLITA*. Pl. 67, fig. 28. Fusiform, whorls ten, rounded, spire elevated; aperture narrow, columella short, straight, outer lip simple, crenate within, columella with three large folds and one small one, the latter the most anterior; surface smooth, with several oblique impressed lines on the lower part of the body whorl.

*Dimensions*.—Length .6 in., length of mouth .27 in., width of body whorl .18 in.

Resembles *F. elevata*, Lea, but has a longer canal and differs in the width of the mouth, the size of the folds and in the absence of all traces of teeth inside the outer lip.

*Locality*.—Caldwell Co., Texas. My collection.

#### CYMBIOLA, Swains.

*C. TEXANA*. Pl. 67, fig. 33. Fusiform, whorls five, rounded and somewhat truncated at the upper parts, suture very distinct, apex mamillated; mouth? (very much broken, in the only specimen I have seen;) columella straight, inner lip above faintly striate, below with four large oblique folds; surface polished, but showing minute revolving

lines on the upper whorls and near the base of the body whorl, which are crossed by equally delicate longitudinal lines, giving the first three whorls a finely cancellated appearance.

*Dimensions*.—Length about 1 in., width of body whorl .4 in.

*Locality*.—Wheelock, Texas. Collection of the Smithsonian Institution.

#### MITRA, Lam.

M. MOOREANA. Pl. 67, fig. 24. Shell subfusiform, whorls eight, apex mamillated, suture distinct; mouth about half the length of the shell, outer lip sharp, plain, inner lip heavy, four large folds on the columella; surface marked by short spinous nodes on the angle of the whorls (about eight on the body whorl), and by numerous fine revolving lines, crossed by prominent lines of growth.

*Dimensions*.—Length 1·05 in., length of mouth .6 in., width of body whorl, including spines, .5 in.

*Locality*.—Wheelock and Caldwell County, Texas. The figure was accidentally reversed.

M. EXILE. Pl. 67, fig. 23. Shell subfusiform, whorls eight, the first three smooth and polished, the remainder truncated above; suture deep; mouth small, linear, outer lip simple, four folds on the columella; surface, except the first three whorls, marked on the upper edge, immediately below the suture, by a broad, slightly undulating band, and by prominent longitudinal ribs, which form almost continuous lines from the top of the fourth whorl to near the base of the body whorl, body whorl marked at the base by a few transverse lines, continuation of the folds on the columella.

*Dimensions*.—Length .25 in., length of mouth .09 in., width of body whorl .08 in. Common.

#### ERATO, Risso.

✓ E. SEMENOIDES. Pl. 67, fig. 49. Ovoid, whorls about three, spire very low; mouth linear, narrow, inner lip with a number of large teeth; outer lip very much inverted so as to resemble in an old specimen a nearly perfect Cypræa, finely crenulated inside, anterior emargination deep.

*Dimensions*.—Length .15 in., greatest width .09 in.

Resembles closely *E. semen*, (*Marginella semen*, Lea,) but can be distinguished by its size, being not as large by one-third.

*Locality*.—Caldwell Co., and Wheelock, Texas.

This species has never been found at Clairborne, nor has *E. semen* yet been seen from the Texan strata.

NEVERITA, *Risso.*

— N. ARATA. Pl. 67, fig. 35. Subglobose, oblique, approaching *Sigaretus* in the angle of the body whorl; whorls five, very much enveloped, spire low, suture indistinct; mouth ovate, outer lip very thin, inner lip thick, with a slight emargination between the inner and outer lip at the posterior angle; umbilicus large, nearly filled by the callosity on which exists sometimes two, sometimes three deep, transverse grooves, surface smooth, polished.

Common from both localities.

*Dimensions.*—Height .18 in., greatest diameter of mouth .25 in., width of body whorl .31 in.

## LUNATIA.

L. MOOREI. Pl. 67, fig. 34. Thin, subglobose; whorls three, flattened above, spire low; mouth ovate, outer lip plain, arcuate, inner lip and columella very thin; umbilicus closed, callus very small, almost rudimentary; surface smooth.

*Dimensions.*—Height .15 in., length of mouth .12 in., width of body whorl .13 in.

*Locality.*—Caldwell County. My collection. Rare.

MONOPTYGMA, *Lea.*

— M. CRASSIPLICA, Con., MSS. Pl. 67, fig. 37. Fusiform, moderately thick, aperture rather narrow; fold on the columella thick and elevated.

*Dimensions.*—Length 1 in., width of body whorl .5 in., length of mouth .55 in.

*Locality.*—Wheclock, Texas.

“It is interesting to find a second species of this genus with a more prominent fold than the typical shell. It confirms the propriety of separating the species from those of *Ancilla*, and the genus *Monoptygma* may now be regarded as of Eocene origin and probably does not occur in the upper tertiaries.”—Conrad, MSS.

ARCHITECTONICA, *Bolton*, 1698. *Solarium*, *Lam.*, 1799.

A. TEXANA. Pl. 67, fig. 38. Subconical, whorls five or six, smooth, spire low; mouth rhomboidal; umbilicus wide and bordered on the edge by a single row of tubercles; body whorl has a sharp carina on the margin; surface above smooth; suture almost obliterated, surface below, and in the umbilicus, striate across the whorl.

*Dimensions.*—Height .3 in., diameter of disc .6 in.

— A. VESPERTINA. Pl. 67, fig. 39. Subconical; whorls four, carinated; spire low; mouth rhomboidal, umbilicus wide; suture linear and faintly undulating; surface above marked by numerous very obscure revolving lines, which show a slight tendency to carry tubercles; these are only visible under a glass; edge of body whorl bounded by

a rounded carina; under surface much more distinctly striate than the upper; on the edge of the umbilicus, and on the middle of the inner side of the whorl in the umbilicus, there is a row of tubercles, and between the two rows are small revolving lines.

*Dimensions*.—Height .2 in., diameter of disc .55 in.

*Locality*.—Caldwell Co., Texas. My collection.

✓ *A. MEEKANA*. Pl. 67, fig. 40. Discoid, whorls five, strongly carinate on the edge and somewhat rounded below; mouth subrhomboidal; umbilicus wide; surface above marked on the edge and on the middle of the whorl by two large, revolving nodose lines, and on the rest of the top by five smaller ones; between the two large ones there are numerous cross lines passing from one to the other; below, besides the "keel" on the edge of the whorl, there are seven ribs, one large one bordering the umbilicus and six smaller alternating ribs; in the umbilicus there is one rib on the middle of the whorl, besides the one on the edge.

*Dimensions*.—Height 1 in., diameter of disc .32 in. width of umbilicus .15 in.

This beautiful species, under a glass, looks as if covered with "beading," all the ribs having that peculiar structure. Four specimens from Caldwell Co., in my collection. One very fine one from Wheelock, in the collection of the Smithsonian Institution.

#### SPIRORBIS, *Swains.*

✓ *S. LEPTOSTOMA*. Pl. 67, fig. 41. Discoid; whorls three, carinated and partly enveloping the preceding whorl; mouth contracted, circular and advanced at a tangent from the subjacent whorl; surface marked by irregular undulating transverse striae.

*Dimensions*.—Diameter .3 in.

*Locality*.—Common from Wheelock, and found in Caldwell Co.

#### TURRITELLA, *Lam.*

✓ *T. NASUTA*. Pl. 67, fig. 42. Shell elongated, slender; whorls many (number? eleven in one inch); mouth small, suture distinct; surface marked by eight revolving lines, two or three of which are larger than the rest.

*Dimensions of a specimen one inch long*.—Width of body whorl .2 in., length of mouth .15 in.

All the specimens I have seen are broken and nearly all worn smooth. It is common.

*Locality*.—Caldwell Co., Texas, and Wheelock.

#### EULIMA, *Risso.*

✓ *E. EXILIS*. Pl. 67, fig. 43. Elongated, slender, polished; whorls eight; apex acuminate, mouth small, outer lip nearly straight.

*Dimensions.*—Length .23 in., width of body whorl .05 in., length of mouth .05 in.

*Locality.*—Caldwell Co. My collection with the next two species. Rare:

— E. TEXANA. Pl. 67, fig. 44. Elongated, more robust than the preceding; whorls eight, slightly rounded, narrow; surface polished; suture distinct.

*Dimensions.*—Length .12 in., width of body whorl .03 in., length of mouth .02 in.

— E. TENUA. Pl. 67, fig. 45. Very elongated and narrow; whorls nine, rounded; suture distinct; mouth very small; oval.

*Dimensions.*—Length .15 in., width of body whorl .025 in., length of mouth .02 in.

#### DENTALIUM, Lam.

— D. MINUTISTRIATUM. Pl. 67, fig. 46. Very slightly curved, marked by numerous small longitudinal ribs, all of the same size, no trace of alternation; aperture round.

*Dimensions.*—Length 1 in., width of aperture .08 in.

*Locality.*—Common at Wheelock.

#### DITRUPA.

D. SUBCOARCUATA. Pl. 67, fig. 47. Arcuate, widened in advance of the middle; aperture contracted, circular; surface polished.

*Dimensions.*—Length .33 in., greatest diameter .07 in., diameter of aperture .035 in.

*Locality.*—Common at Wheelock.

#### BULLA, Klein.

— B. KELLOGII. Pl. 67, fig. 50. Subcylindrical; spire hidden; mouth linear, outer lip straight; umbilicus rudimentary, surface smooth.

*Dimensions.*—Length .14 in., width .07 in.

Rare, but I have seen it both from Wheelock and Caldwell Co.

#### VOLVULA, A. Adams.

V. CONRADIANA. Pl. 67, fig. 51. Subcylindrical, narrow; apex of body whorl about as high as the width of the lower part of the mouth; mouth linear, extending the whole length of the shell and slightly wider anteriorly than elsewhere, outer lip nearly straight; inner lip slightly thickened at the anterior extremity; surface marked by microscopic impressed revolving lines.

*Dimensions.*—Length .17 in., width .06 in.

*Locality.*—Rare from both localities.

— V. MINUTISSIMA. Pl. 67, fig. 52. Subglobose; mouth arcuate, subtruncate anteriorly; substance of shell moderately thick; surface minutely granular; a distinct fold is formed by the inner lip anteriorly and bounds the mouth in that direction.

*Dimensions*.—Length .09 in., width .05 in.

*Locality*.—More common than the preceding, from Caldwell Co. My collection.

#### HELCION, *Montfort.*

H. LEANUS. Pl. 67, fig. 48. Subcircular, apex sub-marginal, inclined anteriorly; surface marked by numerous, irregular, radiating ribs, crossed by undulating lines of growth. Rare.

*Dimensions*.—Diameter .06 in., height .03 in.

#### CORBULA, *Brug.*

✓ C. TEXANA. Pl. 67, fig. 54. Inflated, subtriangular, thick, umbones large; right valve marked by numerous large, transverse ribs; umbonal slope rather abrupt; basal margin regularly rounded; left valve?

*Dimensions*.—Length .3 in., width .38 in., depth of right valve .15 in.

Common. I have seen numerous specimens of the right valve, but no left valves.

#### TELLINA, *Brug.*

✗ T. MOOREANA. Pl. 67, fig. 56. Wide, flattened, nearly equilateral; beaks small, inclined internally; hinge line in advance of the beaks, straight, posterior slightly curved; surface smooth, or covered only by obsolete lines of growth.

*Dimensions*.—Length .5 in., width .9 in., thickness .2 in.

*Locality*.—Caldwell Co. One specimen, in my collection.

#### CIBOTA, *Brown.* (*Byssocardia*, Swains.)

✗ C. MISSISSIPPIENSIS. Pl. 67, fig. 58.

*Byssocardia Mississippensis*, Con., Jour. Acad. Nat. Sci., 1st series, Vol. 1, pl. 13.

Inequilateral, equivalve; beaks small, incurved, situated in advance of the middle; basal margin, below and in advance of the beaks, deeply emarginate; surface marked by numerous dichotomous radiating folds, crossed by imbricating lines, presenting a reticulated or granulated appearance; area very narrow; hinge narrow, almost linear in the middle, anteriorly and posteriorly, the crenulations are oblique, sometimes angulated.

*Dimensions*.—Length .7 in., width 1.6 in.

Common.

#### LEDA, *Schum.*

✗ L. COMPSA. Pl. 67, fig. 57. Inequilateral; beaks very small, incurved; shell rounded anteriorly, acuminate posteriorly; basal margin very regularly curved; hinge teeth very small, fosset triangular; surface marked by numerous transverse ribs,

smaller in the middle than elsewhere, doubling in thickness and changing their direction on the umbonal ridge, and continuing somewhat larger posterior to the ridge than in advance of it; there is a furrow immediately posterior to the ridge, about equal in size to the ridge itself.

*Dimensions*.—Length .45 in., width 1.3 in., height of valve .1 in.

*Locality*.—Caldwell Co., Texas. My collection.

**NŒTIA, Gray.**

~ *N. PULCHRA*. Pl. 67, fig. 55. Subquadrangular; beaks small, incurved; umbonal slope nearly straight; anterior margin rounded, basal arcuate, posterior subangular; surface marked by numerous radiating and transverse lines; edge crenate within; posterior muscular scar subtriangular, anterior subrhomboidal.

*Dimensions*.—Length .27 in., width .35 in.

**CRASSATELLA, Lam.**

~ *C. ANTESTRIATA*. Pl. 67, fig. 53. Subquadrate; beaks very small; umbonal slope wide, umbonal ridge rounded; anterior margin semicircular, basal regularly arcuate, posterior subbiangular; surface marked by numerous, large, transverse folds, which commence at the anterior margin, but disappear before reaching the middle of the shell, leaving the rest almost perfectly smooth, (this is not the result of attrition); interior margin very delicately crenate, anterior muscular impression semilunar, posterior subquadrate.

*Dimensions*.—Length .5 in., width .6 in.

**ANOMIA, Linn.**

~ *A. EPHIPPIOIDES*. Pl. 67, fig. 59. Very irregularly subquadrate, sometimes nearly circular, sometimes almost triangular; convex, occasionally marked by longitudinal rugæ, and always by distinct lines of growth; lower valve, the muscular foramen large; ligament margin thickened.

*Size of largest specimen*.—Length 1.5 in., width 1.3 in.

Common.

**SERPULA, Linn.**

*S. TEXANA*. Pl. 67, fig. 41. Triangular, surmounted by a longitudinal ridge, transversely rugose; aperture subquadrangular. On shells.

*Dimensions*.—Diameter .01 in. to .02 inch.

**FLABELLUM.**

*F. PACHYPHYLLUM, Gubb and Horn*. Pl. 69, figs. 1, 2, 3. Flat, wedge-shaped, edges forming an acute angle; edge coarsely toothed; sides longitudinally striate,

crossed by several transverse ridges; laminæ thick, edges dentate, sides of laminæ granulous, granules without any marked arrangement.

*Dimensions*.—Height .8 in., breadth .8 in., thickness .5 in.

*Locality*.—Caldwell Co., Texas. My collection. I have seen no specimens of this, or the following species, from Wheelock.

TROCHOSMILIA MORTONI, G. and H. Pl. 69, figs. 4, 6. Straight or somewhat curved near the apex, exteriorly striate; striæ denticulate, sometimes connected by the junction of opposite teeth; laminæ crowded, thin.

*Dimensions*.—Length 1 in., breadth 1·1 in., thickness .7 in.

#### CYLICOSMILIA, *M. Edw.*

C. CAULIFERA, *G.* and *H.* Pl. 69, figs. 7–9.

*Turbinolia caulifera?* Con., Jour. Acad., 2d series, Vol. 1, pl. 13, figs. 33 and 34.

Conical, slightly flattened, with the laminæ coarsely granulous; columella large, occupying one-third of the calice, exteriorly striate; striæ with their edges acute, often dichotomous, connected by short, transverse bands.

*Dimensions*.—Length .75 in., width .4 in., thickness .35 in.

*Locality*.—Caldwell Co., Texas. My collection.

This species differs slightly from the generic description, in having ribs which are dichotomous, but as the genus was described from a single species, and as the present species differs in no other respect, it is fair to infer their generic identity, and to conclude that the absence of ramifications is not a generic character.

This species is probably identical with *Turbinolia caulifera* of Conrad, described from Vicksburg, Miss. Should it prove distinct we would suggest the specific name *C. dichotoma*. Conrad's species is, according to the figure, a true *Cylicosmilia*.

#### CRETACEOUS SPECIES.

##### FUSUS, *Klein.*

F. HOLMESIANUS. Pl. 68, fig. 4. Fusiform, whorls eight, angulated; spire acuminate, elevated, not as long as the mouth; surface marked by a series of elongated nodes on the angles of the whorls, (fourteen on the body whorl,) crossed by very fine revolving lines; mouth long, canal long and nearly straight.

*Dimensions*.—Length .9 in., width of body whorl .45 in., length of mouth .6 in.

*Locality*.—Ripley Group, Eufala, Ala. Collection of Prof. Holmes.

##### NEPTUNEA, *Bolton.*

N. IMPRESSA. Pl. 68, fig. 5. Fusiform, whorls six, rounded; spire sharp, but not

very high; mouth ovate, canal moderately long, outer lip simple, inner lip coated with a somewhat heavy layer of enamel, a very small sinus between the two lips posteriorly, not an emargination but rather a continuation of the suture, lined with enamel; surface in some specimens nearly smooth, in others closely marked by fine impressed, revolving lines.

*Dimensions*.—Length .8 in., width of body whorl .5 in., length of mouth .55 in.

*Locality*.—Hardeman Co., Tenn. Ripley Group.

This species, with all the following, which are from Tennessee, were kindly loaned me by my friend, Prof. Safford, of the Geological Survey of that State, who informs me that he found the peculiar marls of the "Ripley Group" alternating in his State, with a limestone, which from the lithological character of the fossils from it, I should think to be identical with the limestone of Prairie Bluff, Ala.

#### FASCIOLARIA, *Lam.*

F. SAFFORDI. Pl. 68, fig. 6. Fusiform, spire? (broken in all the specimens); suture distinct; mouth linear, columella slightly recurved and with three small oblique folds, inner lip slightly thickened at the upper part; surface marked by longitudinal ribs, (about eleven on the body whorl,) crossed by numerous revolving lines.

*Dimensions*.—Length of the body whorl of the smallest, but most perfect specimen, .6 in., width of ditto .4 in., length of mouth .55 in.

*Locality*.—With the above. Prof. Safford.

#### ROSTELLARIA, *Lam.*

R. ROSTRATA. Pl. 68, fig. 7. Fusiform, outer lip very much produced laterally; whorls six; canal moderately long; surface marked by nodes on the angle of the whorl, which are prolonged below into ribs extending over a large portion of the whorl; other markings? Casts.

*Dimensions*.—Length about 1 in., width of body whorl, including lip, .7 in.

*Locality*.—Burlington Co., N. J., and Prairie Bluff, Ala.

These specimens have been in the Museum of the Academy for a number of years, marked with the above name by Dr. Morton, and with his name attached; they have not, however, been heretofore described.

#### CANCELLARIA, *Lam.*

C. EUFALENSIS. Pl. 68, fig. 8. Subfusiform, spire elevated; whorls five, rounded; mouth subquadrate; surface marked by numerous, large, revolving ribs, between which are smaller ones, and crossed by longitudinal ribs of about the same size as the

former; where the two sets of large ones cross they are slightly enlarged; umbilicus apparently obsolete, (specimen somewhat broken at that spot.)

*Dimensions*.—Length .5 in., width of body whorl .4 in., length of mouth .2 in.

*Locality*.—Ripley Group, Eufala, Ala. Prof. Holmes.

#### CYPRÆA, *Linn.*

*C. MORTONI*. Pl. 68, fig. 8. Ovate; (casts) spire enveloped; mouth finely crenate on both sides; shell widest about the middle; no marking on the cast.

*Dimensions*.—Length .65 in., width .45 in., height .4 in. from mouth to back.

*Locality*.—Prairie Bluff, Ala., and blue marl, Burlington Co., N. J.

#### CHEMNITZIA, *D'Orb.*

*C. OCCIDENTALE*. Pl. 68, fig. 10. Turrited; whorls nine or ten; suture deep; mouth subquadrate; surface marked by a nodose carina around the upper part of the whorls; other markings?

*Dimensions*.—Length 4.5 in., width of body whorl 2 in., greatest diameter of mouth 1.5 in.

*Locality*.—Indian Territory, near the Choctaw Mission, from a deposit containing *Globiconcha elevata*, Shumard, *Ammonites Vespertinus*, Morton, and *Gryphaea Pitcheri*, Morton.

I was enabled to procure this species through the kindness of my friend, Dr. Janeway. There is a *Turritella* in the collection with the above species, allied to, and probably identical with, *T. planilateralis*, Conrad. It exhibits a slight difference in the arrangement of the ribs, but I shall hesitate to consider this of specific importance. Further research may prove them to be different. Although the specimen above described still retains the shell, it is so much weathered as to have obliterated any fine markings which may have existed.

#### LUNATIA.

*L. HALLI*. Pl. 68, fig. 11. Elongated, subglobose, spire high; whorls five, rounded and angulated above; mouth elliptical, umbilicus open; surface smooth or minutely wrinkled.

*Locality*.—Common in the ferruginous and the black marl of New Jersey. It is very rare, however, to find the shell preserved. Of fourteen specimens in my collection, only two show any remains of shell, and but one exhibits the surface markings.

This species approaches *N. paludinaformis*, H. and M., but can be readily distinguished by the great difference in size, by the angulation of the whorls, the markings and the open umbilicus.

## TURRITELLA, Lam.

T. SAFFORDI. Pl. 68, fig. 11. Scalariform; whorls eight or ten, somewhat carinated below, flattened on the side; suture profound; mouth subquadrate; surface marked by three small revolving lines on the lower portion of the whorl, near the suture, and on some specimens by obscure revolving lines near the whole whorl, always crossed by waved lines of growth.

*Dimensions*.—Length (restored) 2·2 in., width of body whorl ·6 in., length of mouth ·4 in.

*Locality*.—Hardeman Co., Tenn. Prof. Safford. From the light grey limestone alternating with marls of the Ripley Group.

T. TENNESSEENSIS. Pl. 68, fig. 13. Turred, spire high; whorls? (10?) flattened or concave on the side, carinated strongly below; mouth subquadrate; surface marked by numerous revolving striae, two or three of which are generally larger than the rest, the remainder usually alternating, one or two small ones with one slightly larger.

*Dimensions*.—Length (restored)? 1·2 in.? width of body whorl, one inch from apex, ·35 in.

*Locality*.—Hardeman Co., Tenn., marls of Ripley Group. Prof. Safford.

T. PUMILA. Pl. 68, fig. 14. Turred, whorls? (spire is broken) rounded and strongly striate; mouth round; shell very thick; surface marked by three heavy revolving lines on the convexity of the whorl, and one at the base just above the suture, which is small but distinct.

*Dimensions*.—Length of fragment ·5 in., width of body whorl ·3 in., diameter of mouth ·1 in.

*Locality*.—With the above. Prof. Safford.

T. HARDEMANENSIS. Pl. 68, fig. 15. Turred; whorls seven, strongly carinated at the middle; mouth rounded; surface marked by two or three large ribs below the carina and two above.

*Dimensions*.—Length ·6 in., width of body whorl ·27 in., length of mouth ·2 in.

*Locality*.—With the above. Prof. Safford.

I have seen a very young specimen of this species from the *Ripley Group in New Jersey*. It is in the cabinet of Mr. Lea, and was found in a bed with the same lithological characters as the Ripley in the South, and associated with *Leda protexta*, Gabb, *Legumen ellipticus*, Con., *Leda longifrons*, Con., *Pinna laqueata*, Con.; and other species, all of which are characteristic of that group. I believe this to be the first time that this group has been recognized north of Tennessee, and we now have the key to the synchronism of the cretaceous formations east of the Mississippi.

DENTALIUM, *Linn.*

D. RIPLEYANUM. Pl. 68, fig. 17. Very slightly arcuate, moderately thick, surface marked by faint longitudinal ribs especially on the inner side of the curve and by obsolete lines, crossed by circular lines of growth.

*Dimensions*.—Length of fragment .5 in., greatest external diameter .15 in.

*Locality*.—Eufala, Alabama. Ripley Group.

PHOLAS, *Linn.*

P. CRETACEA. Pl. 68, fig. 18. Tube conical, rounded at the widest end, surface marked by oblique lines; shell?

*Dimensions*.—Length of tube 1 in., diameter (greatest) .35 in.

*Locality*.—Raritan Bay, N. J., in wood, and replaced by pyrites.

Collection of the Academy.

TEREDO, *Linn.*

T. IRREGULARIS. Pl. 68, fig. 19. Tube irregular, tortuous, dilated in places and sometimes transversely wrinkled.

Shell twice as large as that of *T. tibialis*, more abruptly truncate anteriorly. I have been able to see but a small portion of the shell of this species. It is imbedded in the portion of the tube figured. Collection of the Academy.

GASTROCHAENA, *Spengl.*

G. AMERICANA. Pl. 68, fig. 20. Elongated conical; transversely wrinkled; termination of widest end, round.

*Dimensions*.—Length 2.5 in., greatest diameter .5 in.

*Locality*.—Common in the yellow limestone of Timber Creek, and found with the above species in the brown marl of Burlington Co., N. J.

ISOCARDIA, *Lam.*

I. CONRADI. Pl. 68, fig. 21. Triangular, equivalve; beaks large, inclined anteriorly; umbones large; anterior margin nearly straight, basal sinuate, posterior subangular below, nearly straight above; surface marked by fine concentric lines.

*Dimensions*.—Length 1.1 in., width 1.4 in., diameter 1 in.

*Locality*.—Prairie Bluff, Ala., and Timber Creek, N. J. Casts.

VENUS, *Lim.*

V. RIPLEYANA. Pl. 68, fig. 22. Inequilateral; beaks small, anterior; cardinal

margin strongly curved, anterior semicircular, basal and posterior regularly rounded, surface marked by regular transverse ribs.

*Dimensions*.—Length .55 in., width .7 in., diameter .38 in.

*Locality*.—Ripley Group, Hardeman Co., Tenn. Prof. Safford.

This species may be distinguished from *Dione Delawarensis*, Gabb, in its external appearance, by being shorter proportionally, and more pointed posteriorly. The surface markings are different, those of the latter species being finer and not so regular.

V. MEEKANA. Pl. 68, fig. 23. Subtriangular, beaks small, curved strongly anteriorly; umbones small; lunule bordered by an impressed line; cardinal margin curved.

*Dimensions*.—Length .35 in., width .5 in., height of valve .1 in.

*Locality*.—Ripley Group, Eufala, Alabama. Collection of the Smithsonian Institution, No. 551.

#### CORBULA, *Brug.*

C. SUBCOMPRESSA. Pl. 68, fig. 24. Subquadrate, beaks nearly central; umbones large, umbonal ridge angular, umbonal slope abrupt, anterior margin regularly rounded, posterior slightly sinuous, posterior subtriangular; hinge very small.

*Dimensions*.—Length .14 in., width .22 in.

*Locality*.—Two miles east of Middleton, Hardeman Co., Tenn.

This species resembles closely *C. compressa*, Lea, from the Eocene of Ala., although it is undoubtedly distinct.

C. GRASSIPLICA. Pl. 68, fig. 25. Subtriangular, heavily ribbed, thick; beaks large and incurved; umbones large and round; umbonal ridge small and marked by a distinct groove immediately in advance of it, rest of the shell marked by about a dozen very coarse transverse ribs except on the umbones which are smooth apparently from attrition. Inside hinge large, caudal prolongation marked by two pit-like depressions.

*Dimensions*.—Length .15 in., width .2 in., height of right valve .07 in.

*Locality*.—From a cut on the Memphis and Charleston R. R., where it crosses the Tennessee and Mississippi State line, with *Astarte crenulirata*, Con. Prof. Safford.

C. EUFALENSIS, Pl. 68, fig. 26. Subtriangular; angles, except posterior, rounded; beaks small, pointed anteriorly; left valve very convex; margin strongly incurved, almost at a right angle; anterior margin above straight, below abruptly rounded; basal margin very slightly sinuate; posterior margin angular at its junction with the basal, incurved above; hinge large; right valve?

*Dimensions*.—Length .4 in., width about .7 in., height of left valve .2 in.

*Locality*.—Ripley Group, Eufala, Ala. Collection of Smithsonian Institution, No. 560.

#### ASTARTE, *Sow.*

A. OCTOLIRATA. Pl. 68, fig. 27. Subquadrate, flattened; beaks small and very

anterior; cardinal margin curved, anterior slightly sinuate, basal and posterior regularly rounded; surface marked by about eight large transverse ribs and numerous smaller ones; lunule small, deep.

*Dimensions.*—Length .15 in., width .2 in., height of valve .03 in.

*Locality.*—Ripley Group, Eufala, Ala. My collection.

#### CRASSATELLA, Lam.

*C. PTEROPSIS.* Pl. 68, fig. 28. Subtriangular, flattened; beaks very small; in some specimens a slight depression in advance of the umbonal ridge, which is rounded; surface marked by heavy transverse ribs, which become faint on and behind the umbonal ridge; hinge rather small; muscular scars deeply impressed; cardinal margin straight, anterior margin regularly rounded, basal margin slightly sinuous, posterior subangular.

*Dimensions.*—Length .9 in., width 1.4 in., height of valve .2 in.

*Locality*—Ripley Group, Hardeman Co., Tenn., Prof. Safford; and from the same formation at Eufala, Ala. Collection of the Smithsonian Institution, No. 553.

#### CARDITA, Brug.

*C. SUBQUADRATA?* Gabb. Prof. Safford sent me, with the other species, several fragments of specimens, which must have been at least two inches in diameter. They are of the same outline, and, as far as I can ascertain, have the same markings as the above species. In the larger specimens the intermediate radiating ribs die out, leaving the ribs of nearly the same shape as *C. planicosta* of the Eocene formation.

*Locality.*—They are from Hardeman Co., Tenn.

#### CARDIUM, Linn.

*C. MULTIRADIATUM.* Pl. 68, fig. 29. Subquadrate, equilateral; beaks small; surface marked by numerous, fine, radiating ribs of equal size.

*Dimensions.*—Length 1 in., width .9 in.

*Locality.*—Ripley Group, Eufala, Ala. Collection of the Smithsonian Institution, No. 509.

This is most probably identical with a cast found abundantly in the brown marl of New Jersey.

#### MODIOLA, Lam.

*M. SAFFORDI.* Pl. 68, fig. 30. Gibbous, widened posteriorly; beaks small, anterior; umbones very large; umbonal ridge prominent, rounded, with a rounded furrow anterior to it; cardinal margin nearly straight, posterior margin rounded, anterior wide and regularly rounded, basal sinuous; surface marked by regular radiating ribs,

except a small space between the umbonal ridge and the beak, leaving a little more than one-third of the basal portion plain, or only marked by lines of growth.

*Dimensions*.—Length 3 in., width 6 in., greatest height of valve 2 in.

*Locality*.—From the marls and alternating limestone of the Ripley Group, Hardeman Co., Tenn.

*M. ovata*. Pl. 68, fig. 31. Shell wide; beaks anterior; cardinal line nearly straight, posteriorly rounded, basal slightly sinuate; surface marked by obscure, concentric lines of growth.

*Dimensions*.—Greatest length 8 in., width 1.5 in., diameter 6 in.

*Locality*.—Yellow Limestone, Timber Creek, N. J. Collection of the Academy.

#### TRIGONIA, Brug.

*T. EUFALENSIS*. Pl. 68, fig. 32. Subtriangular, resembles *T. alaeformis*, Sow., in outline, not quite so elongate anteriorly; beaks posterior; lunule distinct; surface marked by about fourteen ribs, the more anterior of which proceed from the lunule anteriorly and then cross the shell at right angles with the lunule, exhibiting a tendency to being nodose, especially near the lunule; lunule marked by ten or twelve transverse ribs; cardinal margin somewhat incurved, anterior elongate and subtriangular, basal sinuous and deeply serrate, posterior regularly rounded; internally, hinge teeth small, muscular impressions deep; pallial line entire; a small tooth-like ridge or process extends along the middle of the alation, as in *T. alaeformis*.

*Dimensions*.—The figure is of the natural size.

*Locality*.—This is a very distinct species, and I have never seen a specimen larger than the one figured. It is common at Eufala, Ala. Collection of the Academy.

#### AXINÆA, Poï. (*Pectunculus*, Lam.)

*A. ROTUNDATA*. Pl. 68, fig. 33. Subcircular, somewhat convex; beaks small and central; surface marked by radiating, impressed and transverse lines; area narrow; hinge crenations large, lateral teeth straight and placed obliquely; muscular impressions subquadrate, but slightly differing in outline; margin distinctly crenate.

*Dimensions*.—Length 8 in., width 9 in., height of valve 3 in.

*Locality*.—Eufala, Ala., Ripley Group. Prof. Holmes.

I have an imperfect specimen before me nearly two inches across.

#### NUCULA, Lam.

*N. DISTORTA*. Pl. 68, fig. 34. Triangular, very inequilateral; beaks anterior, marginal; lunule large, cardinal margin nearly straight, posterior subangular, basal regularly rounded, anterior nearly straight; surface marked by obsolete radiating and transverse lines.

*Dimensions*.—Length .23 in., width .3 in., depth of valve .1 in.

*Locality*.—Ripley Group, with *Corbula crassiplaca* and *Astarte crenulirata* on the Mississippi and Tennessee State line. Prof. Safford.

N. EUFALENSIS. Pl. 68, fig. 35. Equilateral; beaks small; surface marked by numerous, concentric lines.

*Dimensions*.—Length .35 in., width .55 in., height of valve .1 in.

*Locality*.—Common in the Ripley Group at Eufala, Ala. My collection.

#### LEDA, Schum.

L. PROTEXTA. Pl. 68, fig. 35.

*L. protexta*, Gabb, Jour. Acad. Nat. Sci., 2d series, Vol. 4, p. 303, pl. 48, fig. 23. (24 in text per errorem.)

This species was originally described from a cast from New Jersey. Through the kindness of Prof. Safford I am now enabled to describe it more fully.

*Spec. Char*.—Very wide transversely; beaks small, incurved; posterior end acuminate, curved slightly upwards; anterior and basal margins regularly rounded; surface marked by numerous, transverse ribs.

*Dimensions of the most perfect specimen*.—Length .5 in., width .25 in., diameter .2 in.

*Locality*.—Hardeman Co., Tenn. Ripley Group.

One specimen in the lot, received from Prof. S., is as large as the cast originally described, but it is broken.

L. SLACKIANA. Pl. 68, fig. 36. Inequilateral, (casts); muscular scars large and deep; margin crenate; cardinal line apparently curved, basal irregularly rounded; hinge teeth apparently large, cup very distinct, pallial line very distinct.

*Dimensions*.—Length about .6 in., width about .8 in.

*Locality*.—Dark marl, Crosswicks, N. J. My collection.

This is one of the finest casts I have ever seen from New Jersey. I take pleasure in dedicating it to my friend, Dr. J. H. Slack, to whom I am indebted for this and several other new species.

#### ARCA, Linn.

A. SAFFORDII. Pl. 68, fig. 37. Gibbous, nearly equilateral; beaks small, overhanging the area; umbones broad; area narrow and transversely striate; anterior margin narrower and straighter than the posterior, which is regularly curved; surface marked by obscure radiating and concentric lines; hinge rather broad, curved; teeth large.

*Dimensions*.—Length .2 in., width .26 in., height of valve .1 in.

*Locality*.—Hardeman Co., Tenn. Prof. Safford. Also found in the Ripley Group of New Jersey.

A. (MACRODON) EUFALENSIS. Pl. 68, fig. 38. Inequilateral; beaks large; umbones large and slightly grooved in the middle by a shallow sulcus, which extends nearly to the base of the shell; area very small; hinge line straight, lower edge of the hinge slightly curved; lateral teeth very long; anterior margin curved, basal sinuous, posterior margin curved, upper part inclined anteriorly; surface marked by numerous radiating ribs and smaller transverse lines.

*Dimensions*.—Length 4 in., width 5 in.

*Locality*.—Eufala, Ala. Ripley Group. My collection.

There is a specimen (No. 516) in the collection of the Smithsonian Institution, apparently of this species, 1.8 in. wide.

#### OSTREA, *Linn.*

O. CRENULIMARGINATA. Pl. 68, fig. 40, 41. Subtriangular, sometimes elongated oval; attached; portion of the outside of the shell not attached is very squamose; hinge about an equilateral triangle, central groove of the hinge deep; internal margin strongly crenate, muscular impression large; upper valve?

*Dimensions*.—Length 2.2 in., greatest width about 2 in.

*Locality*.—Found in a marl bank, two miles east of Middleton, Tenn. Rather common and associated with *O. denticulifera*, Con.

#### DISCOIDEA, *Klein.*

D. OCCIDENTALE. Pl. 68, fig. 42, 43, 44. Circular, ambulacres narrow about four ambulacral plates to one interambulacral; interambulacral plates narrow, numerous; anus? obliterated by weathering; mouth small, central; under surface marked by numerous small tubercles, placed irregularly; upper surface, if any existed they have been obliterated.

*Locality*.—Cretaceous, Oregon. My collection.

#### SERPULA, *Linn.*

S. HABROGRAMMA. Pl. 68, fig. 16. Rounded above, attached by a flat base; surface smooth or obscurely wrinkled transversely, and sometimes with two or three longitudinal lines; aperture round.

*Dimensions*.—Width of aperture .06 in., length of tube 1.5 in.

*Locality*.—On the upper valve of *Gryphaea vesicularis*, from the Yellow Limestone, Long Branch, N. J. Collection of the Academy.

#### HAMULUS, *Morton.*

H. SQUAMOSUS, *Gabb.* Pl. 58, fig. 45.

Cat. Cret. p. 1, Proc. Acad. Nat. Sci. 1859.

*H. onyx*, *Morton*, (pars) Synopsis Cret. p. 73.

Elongated, curved at the narrow end into a hook sometimes with as much as three fourths of a whorl, all in the same plane; mouth slightly constricted, nearly circular, edge thin; surface marked by two or three wrinkled longitudinal folds on each side and a heavy squamose plate, very irregular in the plane of the curve on each side.

*Dimensions*.—Length about 1 in., exclusive of the curve, greatest width of the plates .4 in., diameter of mouth .12 in.

*H. major*, n. s. Pl. 68, fig. 46. Large, regularly curved, tapering, marked by three or four large longitudinal corrugations; mouth contracted?; no lateral expansion.

*Dimensions*.—Length exclusive of whorl 1.8 in., diameter of whorl 1.3 in., greatest width of tube .6 in., (slightly compressed.)

*Locality*.—Ripley Group, Eufala, Alabama. Prof. Holmes.

From a careful study of the species of this genus I am satisfied that it is distinct from *Serpula*, although Bronn in his "Index Palæontologicus" so refers it.

I have seen a large number of specimens of *H. onyx* and *H. squamosus*, and have never been able to detect any sign of attachment to another substance. They appear to have constituted a distinct genus of serpuloid animals, always free, with a hook-like shell irregularly angular externally and round internally. The present species tends to confirm this opinion. I have seen several specimens and they all agree with the above statements.

#### FLABELLUM.

*F. striatum*, *G. and H.* Pl. 69, fig. 10, 11. Thick, wedge shaped; angles of case acute; laminæ thin, edge finely crenate, slightly undulate; sides coarsely granulous, granules regularly arranged in striæ, towards the edge of the laminæ fine.

*Locality*.—Rotten limestone of Prairie Bluff, Alabama.

#### TROCHOSMILIA, *M. Edw.*

*T. conoides*, *G. and H.* Pl. 69, fig. 12, 14. Resembles closely *T. Mortoni*, above described, differing in its much more robust form and the finer striæ exteriorly which are granulous.

*Locality*.—Cretaceous, N. J.

#### PLATYTROCHUS.

*P. speciosus*, *G. and H.* Pl. 69, fig. 15, 17. Conical, laminæ exsert, denticulate and granulous; exterior coarsely striate from the continuations of the exsert lamellæ, striæ alternating in size, coarsely granulous, often denticulate on the edge; depth of cup exceeding half the length of the mass.

*Dimensions*.—Length .5 in., breadth of top .57 in.

*Locality*.—Hardeman Co., Tenn. Prof. Safford.

These specimens are remarkable for their fine state of preservation. For distinctness, the lamellæ are not represented as numerously on fig. 15 as they really exist. Fig. 16 is correct in number.

#### HIPPOTHOA.

*H. IRREGULARIS*, *G. and H.* Pl. 69, fig. 18, 20.

Proc. Acad. Nat. Sci. 1860, p. 366.

Colony spreading, on shells, forming straight or but slightly curved lines ; branching nearly at right angles, though generally from but one side of the cell ; cells oval, flattened, placed closely together and united by a stout pedicle ; opening nearly central with its greatest diameter in the direction of the length of the cell, often with an ovarian vesicle at the distal extremity.

*Locality*.—Timber Creek, N. J. Allied to *H. simplex*, d'Orb., in the shape of the cell.

#### CELLEPORA.

*C. BILABIATA*, *G. and H.* Pl. 69, figs. 21, 23.

Proc. Acad. Nat. Sci., p. 366, 1860.

Colony encrusting, generally in elongated patches ; cells in lines, arranged in irregular quincunx, convex ; opening, viewed from above, nearly circular ; cell walls above and below the mouth project, forming two labiate processes.

*Locality*.—Timber Creek, N. J.

*C. CARINATA*, *G. and H.* Pl. 69, figs. 24, 26.

Proc. Acad. Nat. Sci., 1860, p. 266.

Colony incrusting ; cells in quincunx ; walls of cells meeting anteriorly, forming a carina, whose apex projects forward and towards the oral opening ; apex often perforated ; carina often diminishing as it approaches the cell below.

*Locality*.—Timber Creek, N. J.

*C. TYPICA*, *G. and H.* Pl. 69, figs. 27, 29.

Proc. Acad. Nat. Sci., 1860, p. 366.

Colony encrusting, in large patches ; cells arranged in radiating lines, usually in quincunx, irregular exteriorly, small, rhomboidal ; spaces between the oral openings wide, perforated by numerous, large accessory foramina. Encrusting a *Terebratula Harlani*, Morton, to which is also attached a specimen of *Ostrea panda*, M., formerly in Dr. Morton's collection, now in the collection of the Academy.

*Locality*.—Marl of New Jersey.

#### RETICULIPORA.

*R. SAGENA*, *G. and H.* Pl. 69, figs. 30, 32.

Proc. Acad. Nat. Sci., 1860, p. 366.

Colony large, (about one inch in diameter,) formed of plates; lateral plates not numerous, given off rectangularly; summit of plates perforated by cells, and thicker than the rest of the plate; lateral openings triangular, without any marked arrangement.

*Locality*.—Timber Creek, N. J.

Resembles *R. obliqua*, D'Orb.

#### REPTOMULTICAVA.

*R. CEPULARIS*, *G. and H.* Pl. 68, fig. 33, 35.

Proc. Acad. Nat. Sci., 1860, p. 367.

Colony irregular, nodulated, with a tendency to a pyramidal outline; cells elongated; hexagonal, large.

*Locality*.—Timber Creek, N. J.

#### MULTICRESIS.

*M. PARVICELLA*, *G. and H.* Pl. 69, fig. 36, 38.

Proc. Acad. Nat. Sci., 1850, p. 367.

Colony large, anastomosing in the manner of *Rhipidogorgia flabellum*: cells small, resembling those of *M. lanata*, D'Orb.; cellules wanting.

#### A D D E N D A .

#### E O C E N E S P E C I E S .

##### CIRSOTREMA, Mörch.

*C. MEGAPTERA*. Pl. 68, fig. 1. Elongated, scalariform; whorls seven or eight (?) apex broken; strongly cancellate, the transverse ribs being the smallest, and marked by large varices placed irregularly; the lower part of the body whorl has a carina about the size of the longitudinal ribs; aperture circular, with a very wide, irregular lip-like varix.

*Locality*.—Eocene, Ala. Dr. Spillman.

##### LEIORHINUS, n. g.

Fusiform; spire about as long as aperture; columella slightly twisted and with a fold or thickening on the edge, extending to the end of the canal; inner lip thickened and with one tooth near the suture; outer lip thickened posterior to the edge, edge thin and incurved, with a small emargination posteriorly, and opposite to the

tooth on the inner lip; no anterior sinus; surface smooth or only marked by lines of growth.

This genus appears to occupy a position between *CLAVATULA* and *PERRONA*. It differs from the former in being smooth, in having no anterior sinus and in the columella; from the latter by its higher spire and different general shape. It resembles more nearly some of the *FASCIOLARIAS* in outline.

✓ *L. CRASSILABRIS*. Pl. 67, fig. 60. Fusiform; whorls seven, rounded and slightly truncated above; apex acuminate; aperture irregularly oval, with small crenulations on the thickened portion, internally, of the outer lip; suture distinct, with a slightly depressed line on the upper part of the whorl, below the suture.

*Locality*.—Eocene, Claiborne, Ala. Collection of the Academy.

#### AXINÆA, *Poli.*

*A. INTERCOSTATA*. Pl. 68, fig. 2. Orbicular: beaks small, incurved; surface marked by numerous, compound ribs, composed generally of three, sometimes four, smaller ones and with smaller, transverse markings between these ribs; area very small, hinge teeth large, lower part of the internal edge crenulated.

*Locality*.—Eocene. Alabama. Dr. Spillman.

#### PECTEN, *Linn.*

*P. SPILLMANI*. Pl. 68, fig. 3. Equivalve, orbicular: surface marked by about twenty-two radiating ribs, each with one or two very small ones on each side, and with the crests of all minutely granulous; alations? (both ears are broken in the specimen before me).

*Locality*.—Eocene. Alabama. Dr. Spillman.

#### C R E T A C E O U S.

I have recognized a number of species of foramenifera, in a marl from near Mullica Hill, N. J., of the same age as the Timber Creek limestone (upper part of No. 5 of Meek and Hayden,) abounding in corals, the most common of which is *Eschara digitata*. The matrix is fortunately not so hard as that at Timber Creek, and both the corals and foramenifera are much better preserved. I shall not describe any at present, except the beautiful *Dentalina*, given below. I expect, however, at some not very distant period to characterize them. I have not yet seen *Cristellaria rotula*, said by Lyell to occur at Timber Creek, although I have examined several hundred specimens.

#### DENTALINA, *D'Orb.*

*D. PULCHRA*. Pl. 68, figs. 40, 41. Elongated, very slightly arcuate; cells large, more convex towards the large extremity; diameters of cells equal; surface marked

by about ten heavy, longitudinal ribs; sutures obliterated; opening small, tubulate and inclined in the direction of the curve.

*Dimensions*.—Length about .25 in., greatest diameter .03 in.

*Locality*.—Near Mullica Hill, N. J. My collection. Rare.

#### OSTREA, *Linn.*

*O. TECTICOSTA*. Pl. 68, figs. 47, 48. Elongated, irregularly oval, arcuate; beaks acuminate, ligament area triangular, oblique; muscular impressions rather large; lower valve generally attached, deep, usually deepest along the median line, but becoming flattened towards the basal margin; surface marked by numerous prominent, imbricating ribs, radiating from the middle line and not from the beaks; upper valve not so deep as the lower; surface only marked by the usual lines of growth; upper half of the internal margins of both valves denticulate, corresponding in the lower valve with the external plications.

*Locality*.—Cretaceous. Tennessee and New Jersey. My collection.

This species was sent to me last Spring, by Prof. Safford, when I referred it provisionally to *O. larva*, (*O. falculata*, Morton,) thinking it might be one of the many varieties of that species. I am now, however, satisfied that it is distinct. It is wider, the plications on the lower valve are more numerous, and have a different arrangement from *O. larva* and are imbricating, and the upper valve is not plicated. It has, besides, no alations near the beaks as in Lamarck's species. I have one specimen of a lower valve from New Jersey, kindly given me by my friend, Mr. C. C. Abbott.

#### BRYOZOA.

##### ACERVICLAUSA, n. g., *Gabb and Horn*.

Colony tubular, probably encrusting, consisting of numerous superposed layers, each layer covered with cells, surrounded by a space in which are no cellules; cellular margin slightly elevated, interspace of cells depressed.

*Relations*.—This genus is established from several well preserved specimens of one species, and appears to occupy a place intermediate between MULTICLAUSA and SEMI-MULTICLAUSA. The specimens are tubular and coarsely striate within.

*A. VERMICULARIS*, *G. and H.* Pl. 69, figs. 42, 44. Colony tubular, nodulate externally; cells small, uniform in size, with one side flattened, and with a tendency to an irregular, transverse linear arrangement. In the specimen figured there are eight layers of cells superposed.

*Locality*.—Near Mullica Hill, N. J., in the deposit mentioned above. My collection. Presented by Mr. Abbott. Rare.

HETEROCHRISINA, n. g., *Gabb and Horn.*

Colony dendroid, fixed at its base, from which slightly flattened branches arise, dichotomous; branches provided with cells on their upper surface; cells oval, having their long diameter directed alternately to the opposite sides of the branch; laterally the cells are arranged in rows with flutings from one row of cells to the other: below, branches irregularly striate. The increase takes place only by additions to the extremity.

This genus occupies an intermediate place between FILICRISINA and BICRISINA, the former having one row of cells on the upper surface, the latter two, while HETEROCHRISINA, from the peculiar arrangement of the cells on the upper surface, appears to occupy a transitional place between the one and two-rowed *Crisinidæ*.

H. ABBOTTII, *G. and H.* Pl. 69, figs. 45, 47. Colony formed of slender branches, slightly compressed; cells oval, edge rounded, slightly elevated, with a fine groove bounding the cell; lateral cells irregularly oval.

*Locality.*—With the above. My collection; from Mr. Abbott.

