CONTRIBUTIONS

TO THE

TERTIARY FAUNA OF FLORIDA,

WITH ESPECIAL REFERENCE TO THE

MIOCENE SILEX-BEDS OF TAMPA

AND THE

PLIOCENE BEDS OF THE CALOOSAHATCHIE RIVER.

BY

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PART I.

(1390)

PULMONATE, OPISTHOBRANCHIATE AND

ORTHODONT GASTROPODS.

TERTIARY MOLLUSKS OF FLORIDA.

PART I.

To the material described by Prof. Angelo Heilprin in the first volume of these Transactions much was soon added by the explorations of Mr. Joseph Willcox, the writer, Mr. Frank Burns, of the U. S. Geological Survey, and others. The number of species from the Plio-Miocene of Florida was, on the whole, about quadrupled, and, particular attention having been paid to the collection of the smaller species, it seemed that, of the Caloosahatchie Pliocene especially, a nearly complete enumeration of the mollusk fauna was made practicable. Hitherto the only attempt to monograph the fauna of any Tertiary horizon in the United States, with suitable illustrations, has been the fine quarto on the Pliocene of South Carolina by Messrs. Tuomey and Holmes. This work is unfortunately extremely rare and almost inaccessible to students, and, moreover, owing to the unconsolidated state of the beds in South Carolina, a considerable number of species belonging to the antecedent Miocene were included with the truly Pliocene species. Mr. Conrad and others have supposed, therefore, that the whole of the fauna described by Tuomey and Holmes belonged to the Miocene, and that there is not any development of Pliocene in that state. This opinion was as erroneous as that of the authors criticised, but in the opposite direction.

For these and other reasons connected with the later and more exact determination of our Tertiary faunas, it was thought desirable to make a thorough examination of molluscan remains of the Caloosahatchie beds, which might serve in some sense as a typical fauna with which those of other horizons might be critically compared and a better knowledge thus attained of the distribution, areal and geologic, of the animals of the Tertiary beds of Eastern North America.

Toward this end the authorities of the Wagner Free Institute of Science, the U. S. National Museum, under the direction of the Smithsonian Institution, and the U. S. Geological Survey have lent their aid.

The present paper is intended to include the greater part of the Gastropods. The second part will comprise the remainder of the Gastropods, the Pelecypods and Scaphopods in their biological sequence, together with a description of the beds from which the fossils have been derived and faunal lists for each horizon.

The condition of our Tertiary fauna has been hitherto very unsatisfactory from the redescription of species under several names from different localities, thus increasing the supposed faunal differences between different horizons and geographic areas. The nomenclature used has often been defective and far from up to date, while many fossils have been referred to wrong families and genera, because some of our paleontologists were not well acquainted

LAND AND FRESH-WATER FAUNA OF THE SILEX-BEDS.

This peculiar association of species whose abundance marks a special phase in the history of the silex-beds, namely, the culmination of the upward movement, I have decided to treat separately. This fauna was not of sudden appearance. Doubtless as soon as small hummocks became sufficiently elevated to be above the incursions of the tide they were invaded by the operculate *Helicina* and the beach-frequenting *Strophia*. The other land snails were probably later, but the fresh-water species would necessarily be delayed until the supermarine area was large enough to afford fresh-water ponds or streams not invaded by salt water. These last were naturally the latest and are the rarest, while the *Helicina* is found more or less mixed with the marine shells lower down, where it had been blown by the winds or washed by extraordinary storm-tides.

Family VIVIPARIDÆ.

Genus **LIOPLAX** Troschel.

Lioplax floridana n. s.

Plate 1, figure 3.

Shell thin, smooth, or slightly marked by incremental lines; the upper or posterior half of the whorls somewhat flattened; the periphery obtusely keeled; base well rounded; umbilicus none, whorls probably four or five, the type specimen decollated; suture distinct but not channelled; aperture rounded in front, narrow but not acute behind; outer lip, simple, thin. Lon. of decollate specimen 7.5; lat. of do. 6.0 mm.

A single specimen in poor condition, but characteristic, was collected by the writer at Ballast Point. It is sufficiently distinct from the *L. subcarinata* Say to need little comment; the flattish and peripherally angular whorls of the fossil enable one to discriminate between them at once.

Family HELICINIDÆ.

Genus **HELICINA** Lamarck.

Helicina ballista n. s.

Plate 1, figures 2, 2 a.

Shell depressed-conic, five-whorled, solid, spire less than half the height of the shell; whorls slightly flattened above; suture distinct, not deep; sculpture of incremental lines and occasional not prominent wrinkles, crossed by faint impressed lines, with subequal interspaces, to the number of six or seven on the last whorl above the periphery; base full, evenly rounded, with a thin, smooth central callus; aperture oblique, semilunar; lip reflected, and in old specimens very thick, narrowest and thinnest near the pillar, which is very short and almost unrecognizable as distinct from the lip; alt. of shell 7.0; max. diam. 10.0; min. diam. 8.0 mm.

with the progress in systematic classification of the recent fauna, which bears equally upon the extinct forms when they are perfectly recognized.

The present paper, it is hoped, will make a beginning in the direction of a better and more natural classification of our Tertiary mollusks and of a clearance of the ground of synonyms, erroneous identifications and other misconceptions. It is, of course, not to be expected that the work can be fully carried out except by the combined efforts of all our paleontologists and the expenditure of years of labor and scientific devotion. By using a biologic instead of a stratigraphic system of division for the animals studied, the relation of the different faunas at once takes on an absorbing interest. I believe that the practice common in museums of arranging the fauna of each horizon only in a series of drawers by itself, is responsible for much retardation in paleontologic science. The ideal museum should have two series, one stratigraphic and one biologic, and in the latter should be arranged together all the animals of one family from its earliest to its latest appearance. In the present state of science, if but one system can be adopted, I believe that the biological sequence is by far the most important, notwithstanding some obvious inconveniences which attend it.

To the institutions above mentioned and to the officers of the Academy of Natural Sciences, Philadelphia, the members of the U. S. Geological Survey, and especially to Mr. Joseph Willcox, Mr. James Shepard, of New Britain, Connecticut; Mr. F. W. Crosby, of Washington, and various friends and correspondents in Florida, my thanks are due for co-operation and assistance.

The types of the fossils described are deposited in the Museum of the Wagner Free Institute of Science and the U. S. National Museum. The Museum of the Philadelphia Academy of Natural Sciences and the U. S. National Museum contain most of the original types of Conrad and other early paleontologists, and with them, when any question arose, the specimens here described have been carefully compared.

The drawings which have been photographically engraved for the illustrations of this paper were drawn with the pen by Dr. J. C. McConnell, of Washington, and Mr. J. H. Ridgway, of the U. S. Geological Survey. All those representing small species were outlined by camera. I think that these illustrations speak with sufficient clearness for themselves.

Terebra (Acus) protexta Conrad.

Cerithium protextum Conrad, Proc. Acad. Nat. Sci. Phila., iii. p. 26, 1845. Mörch, Malak. Blätt., xxiii. p. 121, 1877.

Acus protextus Dall, Rep. Blake Gastr., pp. 63, 65, 1889.

Miocene of the Carolinas and Florida; Pliocene of South Carolina and Caloosahatchie beds of Florida; Post-Pliocene of North Carolina and Florida. Recent on the coast of the United States from Cape Hatteras south to Florida and west to Texas, in 2 to 50 fathoms weedy bottom.

It is almost impossible to separate the varieties of *T. protexta*, *T. concava*, etc., from each other or from the fossil forms previously referred to, when a full series is examined. They intergrade almost without limit.

Terebra constricta H. C. Lea.

T. constricta H. C. Lea, Am. Journ. Sci., xl. p. 100, plate i. figure 18, 1841.

On an examination of the type of this species from the Claiborne sands, it turns out to be a trilineate *Cerithiopsis* or *Scila*, very closely related to *S. terebralis* C. B. Adams, of the recent fauna.

Family CONIDÆ.

Genus CONUS Linné.

Conus planiceps Heilprin.

Plate 11, figures 5, 5a.

Conus planiceps Heilprin, Trans. Wagn. Inst. I. p. 110, fig. 48.

This species appears very uniform in its characters, and sufficiently distinct from *C. haitensis* Sowerby. I have seen no other species from the silex-beds at Tampa, while this is sent from Martin Station, about twelve miles north of Ocala, Florida, by Mr. Willcox, in a silicified rock, apparently referable to the Vicksburg horizon of Upper Eocene age. The Eocene *Conus sauridens* Conrad is closely related to this species.

Conus cruzianus n. s.

Plate 5, figure 12.

Shell elongate pyriform, thin, deeply spirally sulcated; whorls ten or twelve, apex acute, arising from a spire but little elevated, and having its slope concave in profile; sides of the shell with about twenty deep, uniform rounded sulcations, separated by slightly narrower cords; anteriorly these cords are rounded and finely striated spirally, midway they are a little flattened, and near the spine they are even marked with a shallow median sulcus; the channels are not striate between the cords, or but in the faintest manner; sides of the shell slightly swelling, falling away toward the spire, which is rounded at the margin, striated with fine distinct threads, and with a narrow striated

SUPERORDER STREPTONEURA.

Order CTENOBRANCHIATA.

Superfamily TOXOGLOSSA.

FAMILY TEREBRIDÆ.

Genus **TEREBRA** Bruguière.

Section *Acus* (Humphrey) Gray.

Terebra (Acus) dislocata Say.

Cerithium dislocatum Say, Journ. Acad. Nat. Sci. Phila., II. p. 235, 1822.
Terebra Petitii Kiener, Mon. Ter., p. 37, plate xiii. figure 32, 1838.
Terebra rudis Gray, P. Z. S., 1834. p. 60.
Terebra dislocata Holmes, Post-Pl. Fos. S. C., p. 70, plate xi. figure 12, 1858.
Terebra carolinensis (Conrad, *ex parte*) Holmes, *op. cit.*, p. 70.
Terebra dislocatum Emmons, Rep. N. Car. Geol. Sur., p. 257, 1858.

Habitat, Eocene of Mississippi (var. *tantula* Conr.); Miocene of Virginia, North Carolina and of Ballast Point silex-beds, Florida; Pliocene of the Carolinas; Caloosahatchie beds; Post-Pliocene of the whole coast from Maryland southward. Recent from Maryland southward to Florida, the Bahamas and Venezuela.

This well-known form indulges in many variations and has a dwarf variety which indulges in a parallel series of variations. Some of its examples agree exactly with Eocene specimens of *T. tantula* Conrad†, and specimens which have been identified by good authorities with *T. divisura* Conrad, though not the typical form of that species, are critically close to some of the recent shells. The specimen from Ballast Point is about half way between *T. tantula* and *T. protexta*. Miocene specimens from South Carolina are before me, agreeing exactly with the large typical *dislocata* var. *rudis*. Among the recent shells any one of the variations above noted can be duplicated.

Terebra (Acus) concava Say.

Turritella concava Say, Journ. Acad. Nat. Sci. Phil., V. p. 207, 1827; De Kay, N. Y. Moll., p. 113, 1843.
Cerithium concavum Ravenel, Cat. 14, 1834.
Acus concavus Dall, Rep. Blake Gastr., II. p. 63, 1889.

Caloosahatchie beds, not uncommon.

This species varies greatly. It has a stout form and a slender form. Both of these have varieties with weak and with strong sculpture. The typical form of *concava* has a strong nodulous rib on each side of the suture, with the middle of the whorl constricted and sculptured with fine spiral lines. This appears very distinct, but graduates toward the dwarf form of *T. dislocata* and the finely sculptured form of *T. protexta* when a sufficient number of specimens from a large range of coast are compared. The fossil specimens vary in exactly the same way that the recent ones do.

† *A. tantula* in Tampa silex beds and at Big Tunnel Springs.

Conus Pealii Green.

Conus Pealii Green, Trans. Albany Inst. i. p. 123, pl. 3, fig. 3, 1830.
Conus Stearnsii Conrad, Am. Journ. Conch. V. p. 104, pl. 10, fig. 1, 1869.
Conus planiliratus Gabb, *op. cit.*, p. 230; not of Sowerby or Guppy.

Recent on the Florida coast and northward to the Carolinas. Fossil, Caloosahatchie beds.

As Mr. Gabb observed, it is almost impossible, without the color-markings, to identify cones; and, therefore, identifications must always be taken as approximate. But I cannot join him in uniting *C. Pealii* with Sowerby's much larger and coarser species. The identification, from Green's specimens, of *C. Pealii* and *C. Stearnsii*, was made by Dr. Stimpson; from the description alone one would suppose Green was dealing with a young specimen of *C. pygmæus* Reeve or some other species. However, the species now known as *C. Pealii*, as reinstated by Stimpson, would keep its name at any rate, since Green's name is much older than Sowerby's. It is probable that the shells referred to *C. planiliratus* by Mr. Gabb included specimens of several species, but *C. Pealii*, not being known from the Antilles, was probably not one of them. The Caloosahatchie shells in form and sculpture agree absolutely with fresh specimens of *C. Pealii*, so I cannot refer them elsewhere.

Conus centurio, *C. Delessertii*, *C. flavescens* and *C. floridanus*, deprived of color, cannot be specifically separated from each other. In the recent state the forms are easily recognizable, and by comparison of a large number of specimens one can generally recognize a certain facies, undefinable but existent, which gives probability to one's identification of the colorless fossils.

Conus floridanus Gabb.

Conus floridanus Gabb, Am. Journ. Conch. IV. p. 195, pl. 15, fig. 4, 1868.
Conus floridensis Sowerby.

This species differs from the fossil *C. marylandicus* Green chiefly in its greater anterior attenuation and straighter sides. A number of specimens which seem properly referable to it were obtained from the Caloosahatchie beds. The recent form is found as far north as Cape Hatteras, but is not known from south of the Florida Keys.

Conus pygmæus Reeve.

Conus pygmæus Reeve, Conch. Icon. *Conus*, fig. 260, 1843.

Caloosahatchie beds. The recent form ranges from Florida southward to New Grenada and among the Antilles. The fossils referred to this species sometimes retain indications of their color-pattern. They are shorter, stouter, more squarely and generally channeled than *C. Pealii* and the channels are crossed by elevated lines of growth not visible elsewhere.

channel close to and in front of the suture; transversely the sculpture is only of lines of growth, which cover the whole shell, but are not prominent; aperture narrow, especially behind, posterior angle hardly notched, pillar straight, simple. Max. lon. of shell 27.5; of aperture 23.0; max. lat. of shell 13.3 mm.

White Tertiary (Pliocene?) limestones of the Island of Santa Cruz, West Indies.

This shell, now pure white, retains traces of yellow flammules on the spire, radiating from the apex, and irregular yellowish blotches on the sides.

This species is of entirely different form from *C. planiliratus* Sowerby, *C. gracilissimus* Guppy, *C. aratus* Gabb and other Antillean sulcate cones. *C. Bonaczyi* Gabb has also a widely different form, with the spire unstriated. I judge of Gabb's species, of course, by his types at Philadelphia, as the fossils have never been figured. I have had this species for a long time, and take this opportunity of figuring it.

Conus adversarius Conrad.

Conus adversarius Conrad, Am. Journ. Sci., vol. xxxix. p. 388, 1840; vol. xli. p. 345, pl. 2, fig. 3, 1842. Tuomey & Holmes, Pleioc. Foss. S. C., p. 131, pl. 27, fig. 14.

Conus Tryoni Heilprin, Trans. Wagner Inst. I. pp. 82, 133, figs. 10, 75, 1887

Miocene of North Carolina (Conrad); of Maryland (Meek); Pliocene of South Carolina (Tuomey & Holmes); Caloosahatchie beds (Heilprin, Willcox, Dall, Burns and others). also upperhed at Alum Bluff, Fla.

A larger series than was available to Prof. Heilprin when he renamed this species, has enabled me to conclude that *C. Tryoni* is merely the full-grown and most perfect form of *C. aduersarius*. The shell is remarkably variable in form and in its sculpture, which, never very strong, may be almost absent; the spire may be faintly coronated with tubercles on the carina or plain, the carina may be sharp or gently rounded. Conrad's original figure is defective in making the spire revolve in a nearly horizontal plane as in a dextral shell, whereas it is always more oblique.

Conus proteus Hwass.

Conus proteus Hwass, Encycl. Meth., vers. i. part 2, p. 682, 1789. Tryon, Man., vi. p. 12, pl. 2, figs. 30–35, 1884.

Conus Berghausii? Gabb, Am. Phil. Trans. xv., 1873, p. 232 (not of Hoernes, Foss. Wiener beck., pl. i. fig. 3).

Conus Mercati? Heilprin, Trans. Wagn. Inst. I. p. 83, 1887 (not of Hoernes, Brocchi, etc.).

Specimens collected by me on the Caloosahatchie retain the colors sufficiently to leave no doubt as to their affinities with the recent cones of the Florida coast and Antilles, with which they absolutely agree otherwise. I have not seen Gabb's shells, but have no doubt they should also be referred to *Conus proteus*, which for that matter has many other synonyms, and is generally supposed to be Gmelin's doubtful *Conus spurius*.

Conus daucus Linné.

Young specimens (to 25.0 mm. long) were found in the Caloosahatchie beds, which, after careful comparison, seemed referable here. The line of relationship connecting the Eocene *Conus sauridens*, the Miocene *C. planiceps* and the present fossil specimens, seems to culminate in the recent specimens of *C. daucus*, which, with many similar characters, reach a size and development somewhat superior to any of their precursors.

Conus sp. indet.

Casts of a species of *Conus* were obtained at White Beach, indicating a species larger than any of the recent species of the region, with a very flattened spire, the apex being slightly raised, the whorls smooth and convexly rounded, with deep sutures, sides of the shell straight and smooth (unless near the canal, which is broken); whorls about 14. Max. diam. of internal cast 47.0, lon. (est.) 75.0 mm.

This form, though larger, resembles most the largest flat-spired variety of *Conus papilionaceus* Hwass, now living in Floridian waters.

Family PLEUROTOMIDÆ.

Genus PLEUROTOMA Lamarck.

Pleurotoma albida Perry.

Plate 4, figure 8 a.

Pleurotoma albida Perry, Conch., expl. pl. xxxii. fig. 4, 1811. Dall, Blake Report, Gastr., p. 72, 1889.
Pleurotoma haitensis Sowerby, Quart. Journ. Geol. Soc. vi. p. 50, 1849.
Pleurotoma Barretti Guppy, Quart. Journ. Geol. Soc. xxii. p. 190, pl. xvii. fig. 6, 1866. (Miocene, Santo Domingo.)
Pleurotoma cochlearis Conrad, Journ. Acad. Nat. Sci. Phil., 2d ser. 1, p. 115, pl. xi. fig. 23 (bad), 1848.
Pleurotoma virgo Lamarck.

Later Eocene of Vicksburg, Mississippi; Miocene of Western Florida, Santo Domingo and Bowden, Jamaica; silex-beds of Ballast Point, Tampa Bay, Florida; Pliocene marls of Caloosahatchie River, Florida; recent, in the Gulf of Mexico and the Antilles, in 26 to 125 fathoms.

This is a remarkable species. Its genealogy is complete for a period which it would be difficult to estimate in terms of years. The Eocene specimens agree exactly with recent specimens of the same size, and vary within the same limits. It is very probable, however, that they never attained the size of some of the recent specimens. Conrad's figure is incredibly bad, but I have compared authentic specimens of the fossils.

Pleurotoma servata Conrad.

Pleurotoma servata Conrad, Jour. Acad. Nat. Sci. Phila., 2d ser. 1, p. 115, pl. xi. fig. 18 (poor), 1848.

Later Eocene of Vicksburg, Mississippi; Miocene of Ballast Point silex-beds, Tampa Bay, Florida.

Several more or less broken pieces and defective specimens agreeing with those named *servata* by Conrad were obtained from the silex-beds.

Genus DRILLIA Gray.

Section *Cymatosyrinx* Dall.

Drillia lunata Lea.

Pleurotoma lunatum Lea, Trans. Am. Phil. Soc., new ser. ix. p. 269, pl. 37, fig. 93. 1843.
Drillia lunata Conrad, Proc. Acad. Nat. Sci. Phila., 1862, p. 562.
Drillia (Cymatosyrinx) lunata Dall, Rep. Blake Gastr., p. 95. 1889.

Miocene of Petersburg, Virginia and Chipola River, West Florida; Pliocene of the Carolinas, Caloosahatchie beds of Florida.

This fine species is not rare in the Caloosahatchie marls. It does not appear to have survived to the present day, but is represented by *D. æpynota*, *D. Moseri*, and other allied but distinct species. In the Floridian Miocene other species of the same type existed, but smaller, of which the following will serve as an example.

Drillia Newmani n. s.

Plate 4, figures 5, 5a.

Shell small, seven-whorled, with a small, smooth nucleus of two whorls; the remainder is transversely sculptured by (on the last whorl eleven) very uniform, rounded, moderately elevated, slightly sigmoid ribs or waves, which are most prominent on or just behind the periphery of the whorls, which do not cross the anal fasciole and on the base become gradually obsolete; the spiral sculpture is hardly visible except on the last whorl, and consists of fine rounded threads, most evident on the base and canal, and fading as they recede from the base; anal fasciole smooth, rather wide, unsculptured except by incremental lines; suture appressed over the ribs of the preceding whorl, and thus rendered slightly wavy; last rib varicoid; canal short, wide; outer lip not internally lirate; inner lip concave, simple, with a moderate callus. Max. lon. of shell 12.5; max. lat. 4.8 mm.

Ballast Point silex-beds, Tampa Bay, Florida; Newman.

This species may best be compared with *D. æpynota* (Rep. Blake Gast., pl. xxxvi. fig. 10), than which the shell is proportionally more slender, with smaller, shorter and less prominent ribs, narrower and less excavated anal fasciole, and smaller nucleus. It is also a smaller shell than the small varieties of *D. æpynota* and much less stout and swollen in appearance.

Drillia æpynota Dall var. acila.

Drillia (Cymatosyrinx) æpynota Dall, Rep. Blake Gastr., p. 96, pl. xxxvi. fig. 10. 1889.

Caloosahatchie beds. Recent off the coast of the Carolinas in 25 to 120 fathoms.

The fossils differ from the recent shells in having the spire slightly more drawn out and acute, the anal fasciole consequently wider and more marked

PLATE V.

Fig. 1. *Marginella styria* Dall; 5.55; p. 54.

Fig. 2. *Marginella* (*apicina* var. ?) *pardalis* Dall; 10.0; p. 49.

Fig. 3. *Marginella gravida* Dall; 8.3; p. 55.

Fig. 4. *Marginella precursor* Dall; 16.0; p. 47.

Fig. 5. *Niso Willcoxiana* Dall; 31.0; p. 160.

Fig. 5 b. The same, view of the base; 13.0; p. 160.

Fig. 6. *Marginella floridana* Dall; 5.0; p. 49.

Fig. 7. *Marginella Willcoxiana* Dall; 16.6; p. 50.

Fig. 8. *Marginella denticulata* Conrad; 8.0; p. 51.

Fig. 9. *Volutella amiantula* Dall; 2.5; p. 56.

Fig. 10. *Cypræa* (*Siphocypræa*) *problematica* Heilprin; summit of young shell; p. 167.

Fig. 10 b. The same; front view of young shell; 38.0; p. 167.

Fig. 11. *Eulima convidea* Kurtz & Stimpson; 13.0; p. 159.

Fig. 12. *Conus cruzianus* Dall; 27.5; p. 25.

Fig. 12 b. *Cypræa Willcoxii* Dall; 46.0; p. 166.

Fig. 12 c. The same, view of the base; 46.0; p. 166.


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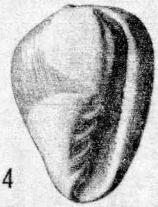
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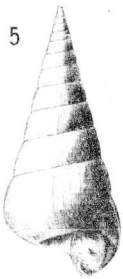
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PLATE XI.

Fig. 1. *Cypræa pinguis* Conrad ; 34.0 ; profile ; p. 164.

Fig. 1 a. The same from below.

Fig. 2. *Cypræa Heilprinii* Dall ; from below ; 26.5 ; p. 166.

Fig. 2 a. The same in profile.

Fig. 3. *Cancellaria* (*Trigonostoma*) *subthomasiæ* Dall ; 20.0 ; p. 44.

Fig. 4. *Cardita* (*Carditamera*) *recta* Conrad, var.? Tampa silex-beds ; 33.0. See Part II. = Tegea Dall pl. VI, f. 142.

Fig. 5. *Conus planiceps* Heilprin ; summit ; p. 25.

Fig. 5 a. The same, young shell ; 22.0 ; p. 25.

Fig. 6. *Bittium priscum* Dall, Tampa silex-beds ; the base is defective in the specimen figured ; 7.0. See Part II.

Fig. 7. *Potamides* (*Lampanella*) *transecta* Dall, Tampa silex-beds ; 17.5. See Part II.

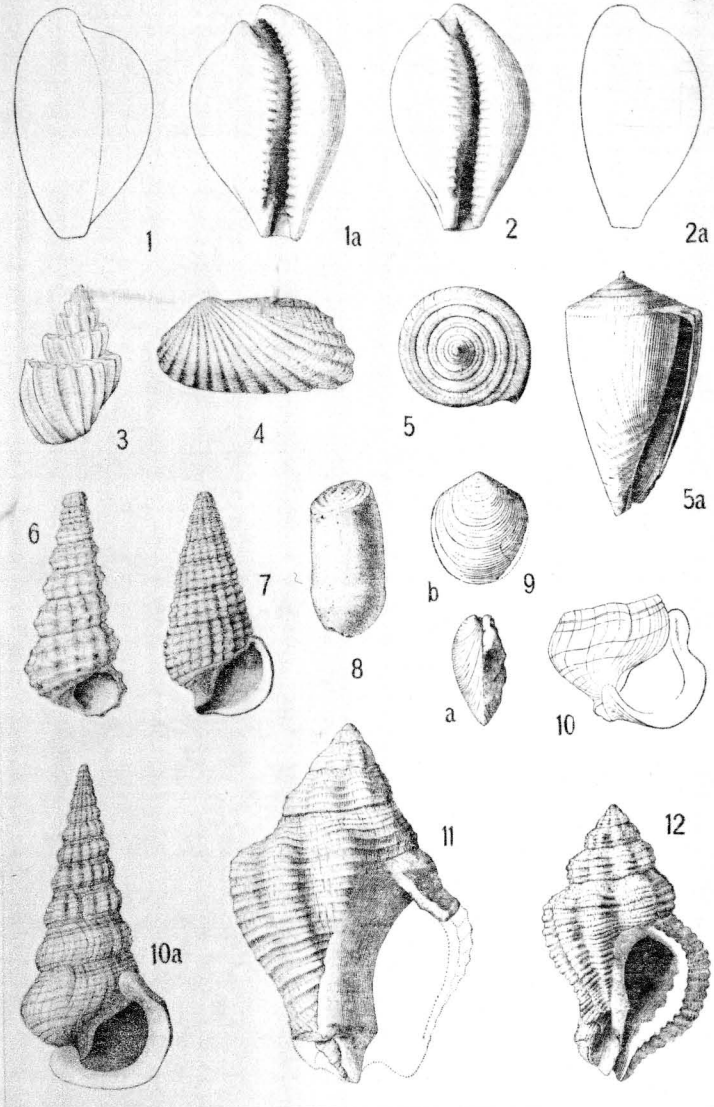
Fig. 8. Cast of burrow of *Lithophagus*, common in the silex-beds. See Part II.

Fig. 9 a, b. *Diplodonta alta* Dall, Tampa silex-beds ; 14.0. See Part II.

Figs. 10, 10 a. *Pyrazus* (*Pyrazisinus*) *campanulatus* Heilprin, Tampa silex-beds ; 42.0. See Part II.

Fig. 11. *Coralliophila magna* Dall ; imperfect adult specimen ; 45.0 ; p. 155.

Fig. 12. *Coralliophila magna* Dall ; young and nearly perfect example ; 20.0 ; p. 155.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