PHILADELPHIA, *June* 3, 1852.

DEAR SIR:

Having been requested to describe an interesting series of organic remains, collected by you while connected with the Expedition to Palestine, I submit the result of my examination, hoping you will not expect too much from one so little qualified as myself to do justice to the subject. Many of the species may have been described in European Journals to which I have not access, but longer delay in order to verify this supposition, is not permitted me. In the introduction I have alluded to the stratigraphical relations of these fossils, which I hope you will find correct. They are nearly all casts, except the specimens of *Ostrea* and *Exogyra*, all the species of which retain the shell mineralised. It is worthy of remark, that some species of this family and of *Pectenidæ* are widely distributed throughout the globe. Thus *Pecten quinquecostatus* and *Ostrea vesicularis* occur in Syria, Europe and America. *Ostrea falcata* and *Gryphæa vomer* of Morton, originally discovered in the Cretaceous beds of New Jersey, occur in Europe also, where they have since been described under other names, and I have elsewhere stated, that *Exogyra Boussingaultii* is found in Syria, Europe and America.

Respectfully submitted,

T. A. CONRAD.

Dr. HENRY JAMES ANDERSON.

DESCRIPTION OF THE FOSSILS OF SYRIA,

COLLECTED IN THE PALESTINE EXPEDITION.

INTRODUCTION.

The White Chalk of Syria appears to me to correspond in age with the Upper Chalk of Europe; but I am unable to determine by the fossils whether any difference in age occurs between the rocks of the various localities.

The Jurassic fossils of Syria are chiefly casts. One of them nearly resembles *Nerinea Gosæ*, a species of the European Oolite. Several other fossils have a general resemblance to species of the same age, occurring in Germany and England; but there is sufficient variation to warrant a separation in distinct species. I believe all the fossils of Syria described in the following pages to be Jurassic, except those indicated as Cretaceous species. The bivalves in this collection predominate over the univalves, though a few of the latter, as *Nerinea* and a species of *Turritella* are very abundant. Nearly all have been more or less distorted by pressure. In almost every instance they represent the entire shell, as though it lived and died undisturbed in the bed of a sea remote from shore. This bed of the Ocean, probably after ages of revolutions, lifting the strata above water and sinking them in repeated oscillations, became finally the floor of a far later sea, tenanted with animal life wholly different in all its external forms from those whose mineralised remains were scattered among them. Thus we find well preserved shells of *Exogyra* adhering to the Jurassic casts of various species of shells and Echinoderms, but as the other bivalves of the Cretaceous period are generally casts, they can only be separated from Jurassic forms by their general resemblance to cretaceous species; but, excepting the *Exogyra Boussingaultii*, *d'Orb.*, if it really be that species, I do not observe any undoubtedly Cretaceous fossils in any other state than in Chalk and a limestone evidently of the same age. The *Cardium biseriatum* is certainly nearly allied to *C. peregrinorsum* of d'Orbigny; but it appears to be sufficiently distinct, and is no doubt a Jurassic species, as the mineral character of the casts is the same as in the undoubted Jurassic fossils. The Oolite shells, which I cannot distinguish from published species, are *Ostræa scapha*, Roemer, and *Ostræa virgata*, Goldfuss.

The fossils of Syria described in the following pages are chiefly casts or internal moulds, and consequently it is difficult to refer them correctly to appropriate genera, and not less so to define a species by specific characters. It is therefore upon the figures that I rely for conveying a knowledge of the different species. In every instance, when not otherwise noted, the figures and descriptions represent casts.

ECHINODERMATA.

Echinus.—*Lin.*, *Lam.*

Echinus Syriacus, Pl. 1, fig. 1, and Pl. 22, fig 127. Depressed hemi-spherical; plates very small; pores pentagonal, minute, in vertical series; upper surface minutely granulated; primary tubercles small, arranged in series of four vertical lines; tubercles of the base comparatively large, the surface minutely granulated between them.

Local.: The Lebanon, Mountains of Moab.

Holaster.—*Agassiz.*

Holaster Syriacus, Pl. 1, fig. 2. Cordate, widely truncated posteriorly; anterior side of disk very oblique; canal wide and profound; ambulacral areas deeply impressed; posterior pair of ambulacra short and obtuse; posterior side of disk carinated in the middle; anus large, suboval, distant from the basal line; mouth transverse, suboval.

Local.: Mount Lebanon.

Cidaris.—*Lam.*

Spines of Cidaris, Pl. 1, fig. 3, 4, 5. These are apparently identical with European specimens in the Collection of the Academy of Natural Sciences of Philadelphia.

Local.: Bhamdûn.

TESTACEA.—BIVALVES.

Ostræa.—*Lin.*, *Lam.*

1. *Ostræa virgata*, Goldfuss, Nyst., Pl. 1, fig. 6, 7, 8. Ovate or obliquely cuneiform; superior valve flat, concentrically striated; inferior valve convex, affixed at the umbo, furnished with numerous narrow dichotomous ribs.

Ostræa virgata, Goldfuss, Petrifacten, vol. II, t. lxxvi, fig. 34.

Local.: The Lebanon, Bhamdûn.

I have with some doubt referred this to the Belgian species, a fossil of the Oolitic period.

2. *Ostræa Syriaca*, Pl. 2, fig. 12. Dilated, depressed, having concentric undulations and rugose lines; superior valve flattened, widely undulated; beaks small, not prominent.

Local.: Mukhtârah, Mount Lebanon.

3. *Ostræa linguloides*, Pl. 2, fig. 13. Subcuneiform, depressed; anterior and posterior margins straight; beak narrow, not prominent.

Local.: Mukhtârah, Mount Lebanon.

A single valve only was obtained, and it may be a young shell or variety of Ostræa scapha. It has a striking resemblance to *Ostræa cretacea*, Morton, but it is evidently a Jurassic species.

4. *Ostræa scapha*, Roemer, Pl. 15, fig. 78, 79. Ovate, rugoso-lamellated; superior valve flat or subdepressed; inferior valve concave, boat-shaped; umbo truncated, adhering; hinge depressed, oblique.

Ostræa scapha, Roemer, die Versteinerungen des Norddeutschen Oolithen-Gebirges, p. 59, t. 3, fig. 1.

The Ostræa scapha is an Oolitic species with which the Syrian fossil closely corresponds, if it is not identical.

Local.: Bhamdûn, Mukhtârah.

Exogyra.—*Say.*

Exogyra Boussingaultii, d'Orbigny, Pl. 1, fig. 9, and Pl. 2, fig. 10, 11. Oblong, arched, oblique; superior valve concave or nearly flat, irregular on the surface, concentrically laminated; cardinal tooth acute; inferior valve obliquely truncated or flattened on the sides, and carinated or angulated near the middle or anterior to the middle; posterior side furnished with large prominent irregular laminated ribs; beaks profoundly curved.

Local.: Mukhtârah, Bhamdûn, Mount Lebanon.

Ostræa Boussingaultii, d'Orbigny, Paléon. Franç., p. 702, pl. 468.

Exogyra Boussingaultii, ibid.; Fossils of Columbia, p. 57, pl. 3, fig. 10.

This species is well preserved and generally found with connected valves. It is abundant and frequently attached to various casts. It occurs thus on *Echinus Syriacus*, *Ammonites Syriacus*, *Trigonia Syriaca*, and *Turritella magnicostata*. As when attached, it is always to casts, it must have existed at a later period than the Jurassic species and may probably be the Cretaceous species to which I have referred it because I am unable to find a specific difference. D'Orbigny described his species from specimens found in Colombia. It also occurs in France. The ribs vary much in different specimens, some being much more profound or numerous, while in others slight undulations only mark the surface. In one small specimen the upper valve is strongly ribbed as in *Ostræa Matheroniana*, d'Orbigny.

The Syrian shell is generally of a subfalcate outline, and the superior valve frequently thickened on the posterior submargin which is truncated and ribbed, the ribs crossed by closely arranged undulated laminæ.

Pl. 1, fig. 9, represents a variety more profoundly costate than usual, and has the superior valve deeply concave and ribbed, a character not occurring in any other instance among the numerous specimens in the collection.

Pecten.—*Gualt.*, *Lam.*

Pecten ———. A fragment of a valve shewing the interior surface. Form suborbicular; ribs nearly equal in size, except towards the anterior and posterior margins; one rib only is much smaller than the others. $1\frac{3}{4}$ inches long.

Nucula.—*Lam.*

1. *Nucula submucronata*, Pl. 2, fig. 14. Elliptical, ventricose, anterior side short and pointed; cast of muscular impressions prominent; ligament margin slightly declining, nearly straight or slightly rounded; posterior end emarginate above, rounded inferiorly; basal margin nearly straight in the middle; summits angular.

Local.: Bhamdûn, Mount Lebanon.

No portion of shell remains on the cast, but the form of the cardinal teeth is very distinct.

2. *Nucula parallela*, Pl. 2, fig. 15. Subquadrate; convex; anterior side subrostrated; superior margin rectilinear and very oblique, extremity obliquely truncated; posterior side elevated, the end margin obtusely rounded; hinge and basal margins parallel; summits not prominent; beaks approximate; anterior basal margin rectilinear, oblique.

Local.: Bhamdûn, Mount Lebanon.

A cast somewhat distorted and compressed, but preserving nearly its original outline, which is peculiar.

3. *Nucula Syriaca*, Pl. 3, fig. 16. Triangular, ventricose, inequilateral; anterior side subcuneiform; basal margin tumid opposite the beaks; posterior end subtruncated.

Local.: Bhamdûn, Mount Lebanon.

This cast exhibits traces of the cardinal teeth.

4. *Nucula myiformis*, Pl. 3, fig. 17. Suboval, convex, inequilateral, anterior end truncated, nearly direct, slightly emarginate, angular where it joins the basal margin; beaks approximate; posterior end regularly rounded; basal margin rounded.

Local.: Bhamdûn, Mount Lebanon.

There is but one specimen of this species. It has an irregular carinated line anteriorly, which is partly and perhaps altogether owing to pressure which has distorted the cast. The form of the cardinal teeth is distinctly visible.

5. *Nucula perobliqua*, Pl. 3, fig. 18. Oblique; beaks nearly in a line with the anterior extremity; dorsal margin slightly curved; posterior extremity rounded.

Local.: Bhamdûn.

Trigonia.—*Brug.*

1. *Trigonia Syriaca*, Pl. 3, fig. 19, 20, 21, 23. Triangular, very inequilateral, slightly ventricose; anterior margin truncated, direct; posterior margin very oblique, sinuous; inner margin entire.

Local.: Mount Lebanon, near Bhamdûn.

This species is abundant and remarkable for the wide and profound space made by the hinge between the umbo and the anterior muscular impressions. The cardinal teeth have been very large, and the muscular impressions rugose, like those in the thick-shelled species of *Unio*. The summits are elevated, distant and acute.

In the Appendix there is a figure and description of the external character of the shell.

2. *Trigonia alta*, Pl. 4, fig. 24. Elevated, subtriangular, equilateral, ventricose; anterior and posterior margins truncated, direct and nearly parallel; summits elevated, acute, very remote; basal margin obliquely truncated, entire within.

Local.: Aklîm el-Jurd, Mount Lebanon.

This species has a remarkable erect and elevated form.

3. *Trigonia cuneiformis*, Pl. 3, fig. 22. Subtriangular; anterior side short, obtusely rounded; posterior side cuneiform, somewhat contracted towards the submargin, or behind the umbonal slope; umbo ventricose, broad; posterior margin subtruncated? basal margin oblique and slightly rounded; inner margin entire.

Local.: Aklîm el-Jurd, Bhamdûn.

A single fragment of this species is all I have seen; the comparative thickness through the umbones is much greater than in either of the preceding species, and the form of the posterior side very different.

ISOCARDIA.—*Lam.*

Isocardia crenulata, Pl. 4, fig. 26. Obtusely subovate, inflated; anterior side very short, margin rounded; posterior end truncated; basal margin crenulated, contracted near the middle.

Local.: Bhamdûn, Aklîm el-Jurd.

There are a few casts of this species in the collection, all more or less distorted. The figure represents the original form as nearly as I could restore it.

ASTARTE.—*Sow.*

1. *Astarte Syriaca*, Pl. 4, fig. 25. Suborbicular, compressed; summits approximate, acute; lunule acutely ovate; end margins obtusely rounded; basal margin rounded; beaks situated about one-third the shell's length from the anterior extremity.

Local.: Bhamdûn.

2. *Astarte orientalis*, Pl. 4, fig. 27. Subtriangular, convex; extremities acutely rounded; posterior margin rounded; basal margin regularly rounded.

Local.: Bhamdûn.

Resembles the preceding species, but is more convex, has less acute summits, more profoundly rounded base, etc.

3. *Astarte pervetus*, Pl. 4, fig. 28. Ovate, subtriangular, subequilateral; summits elevated, acute; anterior extremity acutely rounded; anterior and posterior hinge margins equally oblique; basal margin profoundly rounded.

Local.: Bhamdûn, Shâneih.

4. *Astarte engonata*, Pl. 4, fig. 29. Triangular; disk somewhat flattened; summits acute, direct; posterior side cuneiform, extremity angular; posterior basal margin rectilinear.

Local.: Bhamdûn.

5. *Astarte arctata*, Pl. 20, fig. 119. Triangular, compressed; valves flattened; end margins subtruncated.

Local.: Shore of the Dead Sea.

This is a water-worn cast, quite distinct from the preceding species.

ARCA.—*Lin.*

1. *Arca Syriaca*, Pl. 5, fig. 30. Oblique, subtriangular; anterior side short; summits elevated, rounded; valves flattened towards the base; beaks distant; inner margin crenate.

Local.: Bhamdûn.

An imperfect cast. The internal plate has formed an angular furrow, and traces of crenæ or large teeth are visible at the base.

2. *Arca brevifrons*, Pl. 5, fig. 31. Oblique; sides flattened below the umbones, which are slightly contracted anteriorly; beaks remote; summits very prominent, oblique, nearly terminal; posterior side elongated, end margin obliquely truncated or slightly emarginate, nearly straight in the middle.

Local.: Bhamdûn.

3. *Arca indurata*, Pl. 5, fig. 33. Trapezoidal; anterior side short, acutely rounded; posterior margin obliquely truncated or slightly contracted, extremity rounded; umbonal slope angular; beaks distant, situated about one-third the shell's length from the anterior extremity; summits elevated, rounded; umbo slightly flattened; posterior slope obliquely flattened; diaphragm impression profound; basal margin rounded.

Local.: Bhamdûn.

4. *Arca orientalis*, Pl. 5, fig. 36. Oblique, triangular, ventricose; anterior side short; posterior margin oblique, sinuous, extremity angular; basal margin rounded in the middle, obliquely truncated anteriorly.

Local.: Bhamdûn.

An imperfect cast with traces of radiating lines; it exhibits no trace of marginal crenulations.

5. *Arca declivis*, Pl. 5, fig. 32. Ovate-oblong; sides somewhat flattened; beaks situated about one-third of the shell's length from the anterior margin; posterior hinge margin declining, subrectilinear; posterior end obliquely truncated; basal margin straight; within entire; beaks approximate; lunule lanceolate.

Local.: Aklîm el-Jurd.

Of this species there is only one somewhat distorted cast.

6. *Arca subrotunda*, Pl. 5, fig. 34. Cordate-triangular, profoundly ventricose; umbo very prominent, obliquely rounded; umbonal slope angular; beaks separated; posterior extremity acutely rounded?

Local.: Bhamdûn.

A portion near the base of this cast retains imperfectly the original external character of the species. It appears to have had broad flat ribs, separated by an impressed line.

7. *Arca acclivis*, Pl. 5, fig. 35. Oblique, subovate, ventricose; anterior side very short; beaks distant; summits angular; posterior margin obliquely subtruncated, extremity angulated; basal margin rounded.

Local.: Bhamdûn.

Corbula.—*Brug.*

Corbula congesta, Pl. 5, fig. 37, and Pl. 22, fig. 130. Subtriangular, ventricose, inequilateral; umbo broad; anterior side acutely pointed, recurved: (larger valve.)

Local.: Bhamdûn.

This species is abundant, exhibited in relief upon a piece of limestone. The shell in some instances is preserved, but weathered, and the lines, if it had any, obliterated.

Cardium.—*Lin.*, *Lam.*

1. *Cardium biseriatum*, Pl. 6, fig. 38, 39, 40. Rotundate-cordate; ventricose, subequilateral; posterior side rather longer than the anterior; the margin subtruncated and nearly direct; summits prominent, acutely rounded; basal margin profoundly rounded anteriorly, obliquely truncated posteriorly; surface of the valves marked with concentric lines as far as the umbonal slope; posterior submargin with about 15 slender minutely echinated radii; posterior margin crenulated within.

Local.: Bhamdûn, Mount Lebanon.

This abundant species resembles *Cardium perigrinorsum* and *Cardium Hillanum*, but is proportionally more elongated and the sulci are much larger. The largest specimen measures 2½ inches in length.

2. *Cardium crebriechinatum*, Pl. 6, fig. 41, 42, 43, and Pl. 15, fig. 77; Appendix, Pl. 2, fig. 16. Cordate, elevated, inflated, slightly oblique, subequilateral; summit elevated, acute; hinge margin declining; posterior end obliquely truncated or slightly contracted, extremity acutely rounded; beaks not approximate; surface of the cast marked with slender, closely arranged echinated radii.

Local.: Bhamdûn and vicinity.

The echinated tubercles appear to have been prominent by the markings on the cast. The small portion of shell remaining has the character almost obliterated. Fig. 41 is taken from a specimen which appears to retain nearly its original outline, though one beak has been pressed below the level of the other. One small cast shows a single row of minute tubercles in each intercostal space.

Since the above was written, I have seen a more perfect cast in the Collection of Professor Silliman, which is represented on Pl. 2, fig. 16, of the Appendix.

3. *Cardium Syriacum*, Pl. 7, fig. 45. Obliquely ovate-acute, elevated, ventricose; summits prominent, acute; posterior margin and extremity rounded; lunule large, cordate.

Local.: Bhamdûn.

The impressions of the anterior lateral teeth in this cast show that they were very thick and prominent, and the lunule seems to have been deeply impressed.

4. *Cardium Hermonense*, Pl. 22, fig. 129. An impression of a species with squamose ribs, the interstices crossed by laminated lines.

Local.: Summit of Mount Hermon.

5. *Cardium ?* Pl. 15, fig. 76. From two imperfect casts I have endeavored to restore the outline of this fossil. A third specimen, much distorted, exhibits the mineralised shell, a portion of which is marked by fine concentric raised lines.

Pholadomya.—*Sow.*

Pholadomya decisa, Pl. 7, fig. 44. Ovate-ventricose; ribs about 18 in number, distant posteriorly, one or two obsolete ribs posterior to the umbonal slope which is undefined; anterior side short, abrupt or direct on the margin, which is somewhat contracted, and biangulated; dorsal line concave or curved inwards; basal margin rounded; beaks contiguous.

Local.: Bhamdûn.

There is only one specimen of this species in the collection.

Panopæa.—*Ménard.*

Panopæa pectorosa, Pl. 7, fig. 46. Oblong-ovate, inflated; anterior side very short, margin obliquely truncated, obtusely subrostrated; extremity subangulated; beaks contiguous, summits acutely rounded, prominent, furnished with obscure concentric sulci, which are most conspicuous on the posterior side of the umbo; anterior basal margin obliquely truncated.

Local.: Bhamdûn.

This species resembles *Myacites elongatus*, Schloth, as figured in Goldfuss' Petrefacten, but is more ventricose and less elongated. There are two specimens, casts, and the one figured appears to have been altered little, if any, from its original form.

INOCERAMUS.—*Sow.*

Inoceramus Lynchii, Pl. 8, fig. 47. Subovate, equivalve? slightly ventricose, compressed posteriorly; summits elevated; beaks approximate; posterior margin oblique, slightly rounded; basal margin rounded; surface of cast marked with numerous regular concentric sulci; muscular impressions undefined.

Local.: Mount Lebanon, Bhamdûn.

The character of the hinge of this fossil is unknown to me, and I have referred it to *Inoceramus* only on account of its form, and the sulci which resemble some species of that genus.

This species bears the name of the indefatigable explorer, Captain Lynch of the Palestine Expedition.

MACTRA.—*Lin.*, *Lam.*

1. *Mactra petrosa*, Pl. 8, fig. 48. Subtriangular, ventricose; beaks approximate, situated posterior to the middle of the valves; summits rounded, prominent; anterior side subcuneiform, extremity rounded; posterior margin direct, truncated.

Local.: Between Mukhtârah and Jezzîn.

2. *Mactra pervetus*, Pl. 8, fig. 49. Triangular, ventricose, inequilateral; summits prominent, rounded; umbo somewhat oblique; anterior end acutely rounded; basal and posterior margins rounded.

Local.: Aklîm el-Jurd.

This species is more ventricose than the preceding, the umbo oblique, which in the other is direct, and the anterior side is shorter. No trace of the shell remains on the casts of either species.

3. *Mactra arciformis*, Pl. 8, fig. 50. Subrhomboidal, inflated, inequilateral; disk with concentric lines; summits rounded; posterior margin obliquely rounded; umbonal slope undefined; basal margin regularly rounded.

Local.: Bhamdûn, Khân Hussein, near Bhamdûn.

In this cast no trace of hinge teeth is visible, and the general form is the only indication, and an uncertain one, of the generic character. It is, therefore, only provisionally that this and some other casts described in this work, are referred to particular genera.

4. *Mactra Syriaca*, Pl. 8, fig. 51. Subtriangular, slightly ventricose, equilateral; summits prominent, angulated, not approximate; anterior margin rounded; posterior margin very oblique, nearly rectilinear or slightly contracted below the umbo; posterior extremity truncated; basal margin rounded.

Local.: Bhamdûn.

VENUS.—*Lin.*, *Lam.*

1. *Venus Syriaca*, Pl. 9, fig. 52. Cordate, ventricose; margins rounded; umbo broad; summits rounded.

Local.: El-Jurd, el-Jurd el-Toqâny.

This is a somewhat distorted cast, resembling in outline *Cytherea Poulsoni*, of the Alabama Eocene. The inner margin appears to have been entire.

2. *Venus indurata*, Pl. 9, fig. 53. Subtriangular, ventricose; anterior margin rounded; posterior side cuneiform, extremity rounded; posterior margin oblique and nearly straight; basal margin rounded.

Local.: 'Aklîm el-Jurd, Jurd el-Toqâny.

The inner margin appears to have been crenulated, but the traces are obscure.

Cytherea.—*Lam.*

Cytherea Syriaca, Pl. 9, fig. 54, 55, 56. Elliptical, slightly ventricose; extremities subtruncated; summits not prominent, rounded, situated about one-third the shell's length from the anterior extremity; basal margin rounded.

Local.: Bhamdûn, Mejdel Bâna.

This species is not uncommon, and the casts are frequently distorted.

Lucina.—*Lam.*

1. *Lucina Syriaca*, Pl. 10, fig. 57. Suborbicular, inequilateral, ventricose, suddenly contracted on the anterior and posterior submargins; umbonal slope angular; posterior margin subtruncated, direct; basal margin profoundly rounded.

Local.: Bhamdûn.

2. *Lucina? subtruncata*, Pl. 15, fig. 76. The figure represents a restored outline of this species as nearly as the fragments in the collection indicate it.

Local.: Bhamdûn.

Tellina.—*Lin.*, *Lam.*

1. *Tellina Syriaca*, Pl. 10, fig. 59, 60, 61. Subtriangular, convex; beaks distant from the anterior extremity; summits acute; anterior side slightly reflected; posterior margin rounded.

Local.: Bhamdûn, Khân el-Mezrâ'ah.

This fossil occuring only in casts, seems to be the most abundant of the bivalves in the collection, excepting *Exogyra Boussingaultii*, d'Orbigny.

2. *Tellina obruta*, Pl. 10, fig. 58. Triangular, rather elongated, posteriorly cuneiform; extremity subtruncated; hinge margin long and oblique; anterior extremity obtusely rounded; posterior side slightly reflected.

Local.: El-Ghŭrb el-Toqâny.

There is but one imperfect cast of this species; it presents traces of impressed concentric unequal lines.

Orbicula?—*Lam.*

Orbicula subobliqua, Pl. 10, fig. 61½. Oval, slightly oblique and somewhat ventricose, smooth, with indistinct lines of growth.

Local.: Bhamdûn.

A single valve of this species adheres to a piece of ferruginous limestone, containing specimens of *Ostræa scapha*.

UNIVALVES.

CHENOPUS.—*Phill.*

1. ***Chenopus turriculoides***, Pl. 10, fig. 62. Turrited; volutions six; whorls of the spire slightly convex; beak short and straight.

Local.: Bhamdûn, head of Wâdy es-Shahrûr.

Traces of the expanded labrum are visible in a few specimens of this species. They are generally distorted casts, some of which have small perfect specimens of ***Exogyra Boussingaultii*** adhering to them. Other casts are studded with the same shell which seems to have existed at a later period than the associated fossils, as it is evident that their shells must have disappeared and the casts become indurated before the ***Exogyræ*** existed. Distinct periods or long intervals of time are seldom traced in a single group of fossils, and these specimens therefore have more than ordinary interest for the geologist.

2. ***Chenopus induratus***, Pl. 11, fig. 69. Fusiform; volutions 5 or 6, those of the spire somewhat flattened laterally; spire conical; body-whorl ventricose, very large in proportion to the spire, regularly rounded inferiorly.

Local.: Bhamdûn.

3. ***Chenopus Syriacus***, Pl. 12, fig. 71. Turrited; volutions 6 or 7. A cast, somewhat distorted, with the spire and body-whorl nearly equal in length.

Local.: Bhamdûn.

This species resembles the cast of ***Natica prolonga***, Desh., figured in d'Orbigny's Paléontologie Française.

NATICA.—*Lam.*

1. ***Natica indurata***, Pl. 11, fig. 65 and 68. Subglobose, wider than high; volutions 4 or 5, ventricose; base widely umbilicated; aperture obliquely semicircular, rather more than half as long as the shell.

Local.: Mukhtârah, Mount Lebanon, Bhamdûn.

2. ***Natica Syriaca***, Pl. 12, fig. 70. Ovate, ventricose; volutions 4 or 5, rapidly diminishing towards the apex; spire very short; base umbilicated? aperture acutely subovate.

Local.: Mukhtârah, Jezzîn, el-Judeideh, esh-Shûf, Mount Lebanon.

A number of this large species occurs, often so pressed out of shape as hardly to be recognised.

PHORUS.—*Montf.*

Phorus Syriacus, Pl. 11, fig. 66. Volutions 5, those of the spire convex; body-whorl large and flattened.

Local.: Bhamdûn.

An imperfect cast representing a large species. The impressions of adhering bodies are few and large. The base is entirely concealed by the matrix.

TURRITELLA.—*Lam.*

1. ***Turritella Syriaca***, Pl. 15, fig. 75. Subalate; volutions 6 or 7, convex; suture deeply impressed; aperture subquadrangular; base umbilicated.

Local. Bhamdûn.

A specimen of this species exhibits traces of revolving lines which are very distinct on the body-whorl, and about 5 in number between the suture and upper margin of the aperture.

2. *Turritella magnicostata*, Pl. 10, fig. 63, 64. Turrited; volutions rounded, longitudinally ribbed; ribs large, distant, rounded; revolving lines prominent, some large and distant, with generally 3 finer, unequal intermediate lines.

Local.: Bhamdûn, Jezzîn.

The aperture is not preserved in any of the specimens, and I have therefore only provisionally referred it to *Turritella;* a specimen has a valve of *Exogyra Boussingaultii* attached to it.

3. *Turritella peralveata*, Pl. 20, fig. 120. Turrited; volutions 9 or 10, convex, with 3 equal and equidistant prominent revolving carinæ on each; space above and below the carinæ equal in width and concave.

Local.: Bhamdûn.

Nerinea.—*Defr.*

1. *Nerinea Syriaca*, Pl. 12, fig. 72; Pl. 11, fig. 67, young. Turrited; volutions numerous; sulcus wide, excavated; volutions angulated nearly in the middle, the sides straight and oblique.

Local.: Near the Greek Church of Bhamdûn.

A cast of this species is represented in fig. 72, and it bears a striking resemblance to *Nerinea Gosæ*, *Roemer*, (Ool. p. 143, t. xi, fig. 27.)

2. *Nerinea Bhamdunensis*, Pl. 22, fig. 132. A comparatively small subulate species, the angle of the volutions being situated much below the middle.

Local.: Near the Greek Church of Bhamdûn.

The specimens are so imperfect that any other difference than the position of the angle between this species and *Nerinea Syriaca* is not distinctly visible.

Strombus.—*Lin.*, *Lam.*

Strombus pervetus, Pl. 13, fig. 73. A large distorted cast, having a short spire with four or five volutions.

Local.: Aklîm es-Shûf, Lebanon.

Ammonites.

Ammonites Syriacus, Pl. 14, fig. 74. Discoid, bicarinated, costate; ribs alternated in size, 6 or 7 of which become very prominent or tubercle-shaped on the inner submargin; some of the intermediate ribs short, acutely pointed interiorly, little prominent, sometimes obsolete; periphery bicarinated, each carina ornamented with compressed rounded tubercles, about 20 in number; back somewhat concave, nearly flat in the middle.

Local.: Bhamdûn.

Dr. Anderson informs me that this species occurs in some European collections under the name above given. It is in all probability somewhere described; but I have not the means of ascertaining in what work it is published. It is an abundant fossil and quite variable in the comparative size of the ribs and in its thickness, which in part may be owing to pressure. The figures represent two of the differences in form and ribs, and fig. *a* exhibits one to which a young *Exogyra Boussingaultii* is attached.

ORGANIC REMAINS OF THE CHALK.

ASTARTE.—*Sow.*

1. *Astarte undulosa*, Pl. 16, fig. 81 and 86; Pl. 17, fig. 89, 90, and 99. Triangular, inequilateral, compressed, with concentric angular ridges; posterior extremity subtruncated; basal margin regularly rounded.

Local.: Near Deir Mâr Sâba, Desert of Judah.

2. *Astarte mucronata*, Pl. 17, fig. 88. Triangular, elevated, compressed; beaks prominent, acute; posterior margin very oblique, straight; disk with concentric lines; posterior extremity truncated, direct; inner margin crenulated.

Local.: Wâdy Kidrôn.

CORBULA.—*Lam.*

1. *Corbula sublineolata*, Pl. 16, fig. 83. A cast of the left valve. Suboval, equilateral, ventricose, marked with very minute, closely arranged concentric lines.

Local.: Wâdy Kidrôn.

2. *Corbula Syriaca*, Pl. 21, fig. 125. Triangular, ventricose; surface with prominent angular concentric ribs; posterior end rounded.

Local.: Near Safed.

A cast of the larger valve, resembling *C. oniscus*, an Eocene species of Alabama.

OPIS.—*Defr.*

Opis undatus, Pl. 17, fig. 87. Triangular, compressed, with concentric irregular or unequal angular ridges; umbonal slope carinated, terminal; posterior slope or area excavated, angular; beaks curved forward, and the apex nearly on a line with the anterior extremity, which is regularly rounded; posterior extremity angular.

Local.: Mount of Olives.

This fossil has considerable resemblance externally to *Venilia Conradi* of Morton. The hinge is unknown, and it is referred to *Opis*, from its outline. It belongs no doubt to that genus or to *Venilia*.

NUCULA.—*Lam.*

1. *Nucula perovata*, Pl. 17, fig. 91. Ovato-subtriangular, compressed? very inequilateral; posterior end subtruncated, direct; disk with concentric lines anteriorly; inner margin crenulated.

Local.: Wâdy Kidrôn.

This species is represented by one specimen which has been flattened by pressure. The original outline of the shell, however, has probably not been much altered.

2. *Nucula crebrilineata*, Pl. 17, fig. 92, 93. Subtriangular, ventricose; disk covered with fine very closely arranged regular concentric lines.

Local.: Deir Mâr Sâba.

Of this species the few specimens found have probably lost their original form. I have therefore figured two specimens, of which the upper figure is probably the least distorted. The shell is generally preserved.

3. *Nucula* ———, Appendix Pl. 1, fig. 5. An impression in chalk of a compressed, inequilateral species from Safed.

4. *Nucula perdita*, Pl. 17, fig. 96. Ovato-oblong, inequilateral; anteriorly acute; posterior end rounded; anterior side slightly contracted; disk with regular, closely arranged concentric lines.

Local.: Desert of Juda, Mâr Sâba.

The shell is well preserved in some specimens of this species, which is not a rare fossil.

5. *Nucula* ———, Pl. 19, fig. 111. A distorted and rather obscure cast from Safed.

Cucullæa.—*Lam.*

1. *Cucullæa subrotunda*, Pl. 17, fig. 94. Suborbicular, inequilateral; disk flattened in the middle; umbonal slope angular; posterior hinge margin elevated; disk minutely striated concentrically, having fine obscure radiating lines; radii distinct and distant behind the umbonal slope.

Local.: Wâdy Kidrôn, 1½ miles below Jerusalem.

A portion of the shell remaining on the specimen figured exhibits traces of fine reticulated lines.

2. *Cucullæa lintea*, Pl. 17, fig. 95. Rhomboidal, very inequilateral, compressed, having fine radiating lines and transverse wrinkles; umbonal slope acutely carinated; posterior margin truncated, not very oblique; hinge extremity posteriorly forming a right angle with the posterior margin.

Local.: Between Mâr Sâba and the Dead Sea.

3. *Cucullæa parallela*, Pl. 17, fig. 98. Rhomboidal, compressed; posterior end truncated; umbonal slope carinated; posterior slope wide, flattened; disk having a few distant striæ radiating from the beaks; hinge line parallel with the basal margin.

Local.: Summit of Mount of Olives.

The specimen of this species is broken anteriorly, and it is doubtful to what genus it should be referred.

Arca.—*Lin.*

Arca fabiformis, Pl. 17, fig. 97. Oblong-subovate; disk contracted from beak to base; marked with minute closely arranged radiating lines; umbonal slope slightly prominent, subangulated; posterior slope marked with more distinct lines than the disk; basal margin contracted.

Local.: Wâdy Kidrôn, near Jerusalem.

Crassatella.—*Lam.*

Crassatella Syriaca, Pl. 17, fig. 100. Subovate, convex, marked with concentric lines, most prominent on the umbo; posterior hinge line straight, declining; posterior extremity

subtruncated, direct; umbonal slope subangulated; anterior side short, margin rounded; basal margin rounded.

Local.: Deir Mâr Sâba.

This shell is perfectly preserved in the only specimen collected.

LITHODOMUS.—*Cuv.*

Lithodomus cretaceus, Pl. 17, fig. 101. Subcylindrical, narrowed anteriorly, subrostrated.

Local.: South of Nabulûs, Mount Gerizîm.

A distorted and imperfect cast is the only representative of this species in the collection.

GRYPHÆA.—*Lam.*

1. *Gryphæa capuloides*, Pl. 18, fig. 103, 104. Oblong-ovate; inferior valve profoundly ventricose; umbo narrowed, somewhat curved laterally, often truncated by adhesion.

Local.: El-Sîleh, Hills of Samaria.

This species occurs in chalk and is well preserved, but the hinge and the interior of the larger valve are concealed in the matrix. A variety can scarcely be distinguished from *Gryphæa vesicularis* by its outline and general character; but the species is much smaller.

2. *Gryphæa vesicularis*, Brown, Pl. 18, fig. 105. Semiglobose, retuse at base, smooth; inferior valve ventricose; subauriculated on one side; superior valve plano-convex, operculiform.

OSTRÆA VESICULARIS, Lam., Desh., ed. vol. 7, p. 246. Goldfuss' Petrefacten, 2, p. 23, No. 61, pl. 181, fig. 2, a, o.

PYCNODONTA RADIATA, Fisher, Bull. de Moscow, 8, pl. 1.

Local.: Near Neby Mûsa, Mâr Sâba.

There is but one inferior valve of this shell in the collection, and it perfectly agrees with the common form of *Gryphæa vesicularis*, abundant in the chalk formation of Europe and the United States.

EXOGYRA.—*Say.*

Exogyra densata, Pl. 18, fig. 102. Ovate-oblong; inferior valve ventricose, angulated about the region of the umbo where it is very thick; surface with concentric laminated lines; umbo narrowed, somewhat flattened laterally; superior valve flat or slightly convex, with closely arranged rugose concentric prominent lines.

Local.: Mountains of Moab, half way between the Dead Sea and Kerak.

A handsome species, well preserved, and remarkable for its proportional extension from beak to base.

Exogyra densata, var., Pl. 18, fig. 106. A fragment of the larger valve. Thick, ventricose, regularly rounded; umbo very large and thick; beak much curved; second volution prominent and rounded; hinge area large and thick.

Local.: Wâdy Zerqa Ma'în; East of Dead Sea; found also near Kerak.

The description and figure are from a fragment of an inferior valve, remarkable for its great thickness about the hinge and umbo.

AVICULA.—*Lam.*

Avicula Samariensis, Pl. 19, fig. 107. Obtusely ovate, convex; margins rounded; ears short and elevated.

Local.: Wâdy Burkîn, Hills of Samaria.

The impression in chalk represents a squamose shell with five or six distant rays, slightly impressed and darker colored than the other portion of the valve.

PECTEN.—*Lin. Lam.*

1. *Pecten delumbis*, Pl. 19, fig. 110, and Appendix, Pl. 1, fig. 4. Suboval or suborbicular, compressed, rugose? ears small and equal.

Local.: Desert of Judah, Wâdy en-Nâr, Mâr Sâba, Safed.

An impression in chalky limestone. The valves were probably rugose on the exterior about the umbo, as all the impressions have fine wrinkles on that portion of the shell.

2. *Pecten obrutus*, Pl. 19, fig. 114. Ovate, convex-depressed; ribs about 22 in number, angulated, narrower than the interstices, smooth and destitute of distinct lines; ears unequal.

Local.: Bituminous limestone of Neby Mûsa.

CARDIUM.—*Lin. Lam.*

1. *Cardium bellum*, Appendix, Pl. 1, fig. 3. Subovate, ventricose, with numerous regular concentric ribs, closely arranged and terminating on the posterior side of the umbonal slope; posterior slope marked with fine radiating lines.

Local.: Deir Mâr Sâba.

This beautiful species is allied to *C. Hillanum* and *C. perigrinorsum*, but is more ovate, with a more pointed apex and narrower umbo, and the posterior radiated space is much narrower.

2. *Cardium ovulum*, Pl. 19, fig. 108. Oblique, suborbicular, inequilateral, ventricose; anterior margin regularly rounded; surface concentrically striated.

Local.: Wâdy Zerqa Ma'în.

ASTARTE.—*Sow.*

1. *Astarte lintea*, Pl. 19, fig. 109. Subtriangular, elevated, compressed, inequilateral; posterior margin very oblique, subrectilinear; margins rounded; surface with fine closely arranged concentric lines.

Local.: Hills of Samaria, el-Sileh.

2. *Astarte sublineolata*, Pl. 19, fig. 112. Triangular, compressed, inequilateral; surface with numerous minute regular closely arranged concentric lines.

Local.: Near Safed.

VENUS.—*Lin. Lam.*

Venus perovalis, Appendix, Pl. 1, fig. 2. Oval, inequilateral, ventricose, finely striate concentrically; summits and margins rounded.

Local.: On the road to Kerak from the Dead Sea.

The piece of limestone in which this shell is imbedded contains a very small smooth *Buccinum*, a small species of *Inoceramus*, very like a species found in Alabama, a small *Opis* and a *Corbula*.

I should infer from the few distinct forms in this small piece of limestone that the rock is of the era of the Upper Chalk.

INOCERAMUS.—*Sow.*

Inoceramus aratus, Pl. 19, fig. 113. A fragment; a dilated ventricose species with distant acute concentric ridges and concave interstices.

Local.: Near Neby Mûsa.

A small portion of the shell remaining exhibits minute concentric impressed lines, not very closely arranged; the cast anteriorly has a subtuberculated aspect on the ridges.

LUCINA.—*Lam.*

Lucina Safedensis, Pl. 19, fig. 115. Lenticular, compressed, subequilateral; surface with about fifteen prominent concentric striæ and intermediate minute concentric lines.

Local.: Safed.

TEREBRATULA.—*Lam.*

Terebratula Hermonensis, Pl. 20, fig. 123. Triangular, ventricose; ribs about 28 in number, narrow, the interstices transversely striated; lesser valve more ventricose than the other, with a broad flattened space in the middle, slightly raised, and having ten ribs upon it; umbones obtusely rounded.

Local.: Summit of Mount Hermon.

UNIVALVES.

FUSUS.—*Lam.*

Fusus Ellerii, Pl. 16, fig. 82. Fusiform; spire elongated; volutions convex, longitudinally ribbed; ribs large, rounded, on the body-whorl less prominent; surface of the shell, finely striated with reticulated lines; beak long and narrow.

Local.: Wâdy Burkîn, Hills of Samaria.

This fine species was discovered by C. Ellery Anderson, (Dr. A's son,) and is dedicated to him to commemorate his zeal in the pursuit of objects of Natural History, during a fatiguing and hazardous journey through parts of Syria not visited by the Expedition.

CHENOPUS.—*Phillipi.*

A species of *Chenopus* occurs with longitudinal ribs about 1½ inches long.

Local.: Between Kefr Hûneh and el-Judeideh, 'Ain el-Jîsh.

HIPPURITES.—*Lam.*

Hippurites Syriacus, Pl. 16, fig. 84. Dentiform, elongated, curved; side opposite the longitudinal furrow angulated; surface with distant annular impressed lines and longitudinal wrinkles; upper surface with oblique slightly curved numerous angular lines. (A cast.)

Local.: A little north of Bethel.

The cast of this species bears some resemblance in shape to the tooth of a *Mosasaurus*. The diameter of the thickness is of an acutely ovate outline.

NERINEA.—*Defr.*

Nerinea cretacea, Pl. 16, fig. 85. Turrited; volutions rounded, with a revolving series of tubercles near the suture.

Local.: Between Neby Samwîl and el-Jîb.

The figure represents the mould impressed by a species of *Nerinea*, but the cast was not found and the specific character is therefore obscure.

ANCYLOCERAS.—*D'Orbigny.*

Ancyloceras Safedensis, Pl. 20, fig. 117, 118. A fragment of a cast and an impression exhibit a species with prominent angular ribs, numerous and subequal or gradually lessening towards the apex.

Local.: Safed.

BACULITES.—*Lam.*

Baculites Syriacus, Pl. 20, fig. 121. A fragment of an ovate species with the shell well preserved and mineralised occurs. The shell is pearly, not very thin, and the lines of growth, fine and regular, are profoundly curved on the narrower portion of the shell.

Local.: The Cliff above 'Ain Terâbeh.

Baculites ——, Pl. 20, fig. 122. This represents the interior of a species, probably the same as the preceding, in which the septa are mineralised, and are remarkably thick and well preserved.

Local.: The Cliff above 'Ain Terâbeh.

AMMONITES.—*Brug.*

Ammonites Safedensis, Pl. 21, fig. 124. Flattened, ribs little prominent, generally about as wide as the interstices, subnodulous and terminating on the periphery in flattened tubercles with a rounded margin; inner submargin of the volutions tuberculated.

Local.: Safed.

A large species in chalk which seems to approximate *A. Rhotomagensis*, Defrance; but that species has a double row of tubercles towards the periphery, while the Syrian species apparently has but one.

NUMMULITES.

Nummulites Arbiensis, Pl. 22, fig. 127. Suborbicular, the annular lines appearing rugose and imbricated on the weathered surface; thickness unknown in consequence of all the specimens being greatly distorted; the transverse lines are minute and shew the septa to have been very numerous.

Local.: 'Arby.

This species occurs in great numbers in hard white limestone, standing in relief upon the weathered surface, various sizes crowded together, from one-eighth or less to three-fourths of an inch in diameter. Not a single one can be observed in its normal shape, all having been contorted by pressure.

DENTALIUM.—*Lin.*

Dentalium cretaceum, Appendix, Pl. 1, fig. 1. Much curved, very tapering towards the apex, finely striated longitudinally and transversely wrinkled.

Local.: Safed.

ECHINODERMATA.

ECHINUS.—*Lin.*

Echinus Kerakensis, Pl. 19, fig. 116. Oval, convex; tubercles very small, closely arranged and equal; base concave.

Local.: Kerak.

This species is obscure, being worn at the base, and nearly all the upper surface is imbedded in limestone.

RECENT SHELLS.

HELIX.—*Lin.*

1. *Helix lithophaga*, Pl. 22, fig. 128. Depressed-convex, moderately thin; volutions five, those of the spire flattened; suture margined by a carinated line; base convex; umbilicus rather large, but more than half covered by the lip which is widely reflected; color whitish varied with pale-brown irregular angular spots in series of revolving lines, four on the large whorl; base without colored markings.

Local.: Wâdy en-Nâr, below Deir Mâr Sâba.

This species is remarkable for its habit of penetrating limestone rocks. It has been supposed to be a variety of *Helix planospira*, *Muller;* but it appears to me quite distinct from that species. The carinated line, angular spots and widely reflected lip, which more than half covers the umbilicus, are sufficient to distinguish it from *planospira* independent of the habit of the animal which perforates indurated limestone and resides in the deep cavities it makes.

2. *Helix ligata*, *Muller*, Pl. 15, fig. 80. Globose, imperforate, striated; spire elevated, subturbinate, whorls four, somewhat convex, the large one inflated,s lightly descending; columella oblique, somewhat contracted; aperture lunato-rotundate; peristome slightly expanded; margin of columella dilated, widely callous.

HELIX LIGATA, Muller, Verm. II, p. 58, No. 252. Chem. P. 2, p. 110, fig. 128. Férussac, Hist. t. 20, fig. 1, 2, 4. Lam., Desh. ed., 134, p. 90.

Local.: Between Mukhtârah and Jezzîn.

This species is nearly allied to *H. pomatia* and *H. cincta*, and inhabits Italy, Russia near Odessa, the Caucasus, Morea, etc. A slight trace of the colored bands is visible on the dead and bleached specimen from which the figure has been drawn.

CARACOLLA.—*Lam.*

Caracolla tuberculosa, Pl. 22, fig. 129. Trochiform, minutely umbilicated; spire elevated, volutions each with a tuberculated carina above the suture and a revolving series of smaller tubercles in the middle; sides of volutions flattened and oblique, transversely rugose; periphery of body-whorl profoundly carinated, the carina reflected and furnished with numerous unequal tubercles; base convex, profoundly rugose; peristome reflected.

Local.: Shore of the Dead Sea.

A single specimen, with the two volutions nearest the apex broken, was obtained. The shell is bleached and remarkably similar in form to a species of *Trochus*.

PALUDINA.—*Lam.*

Paludina Phialensis, Pl. 22, fig. 130. Turrited, volutions five, regularly rounded; suture profoundly impressed; base umbilicated; aperture ovate; labium reflected; labrum slightly reflected.

Local.: Lake Phiala.

This is a small species without any prominent character. It is thin and fragile and has traces of a pale-brown epidermis.

APPENDIX.

Some interesting fossils have been sent to Dr. Anderson for comparison with those of the Expedition. Of these, a number were kindly furnished by Professor Silliman, and the others by a Society in Cincinnati, (Friends of Missions.) I have described some new species from both collections and add them in an Appendix. They are all Jurassic forms, with the exception of a species of *Janira*, which however is probably Jurassic, although lower in the scale of formations than the genus has hitherto been observed. Two species of *Polyparia* occur which have been omitted. On the first plate of the Appendix, fig. 1 to 5 represent Cretaceous shells of the Expedition.

BIVALVES.

Janira.—*Shum.*

Janira Syriaca, Pl. 1, fig. 6. Subtriangular, elevated; superior valve slightly concave, with rather narrow, unequal ribs and concentrically wrinkled, about twenty-six in number; inferior valve ventricose, with six large ribs, rounded and finely wrinkled; intervals with generally four rounded unequal ribs.

The genus *Janira*, according to d'Orbigny, commenced with the Cretaceous period, which is characterised by numerous species, and the *Janira Syriaca* may possibly belong to that era; but as it accompanied a group of exclusively Jurassic fossils, and its matrix is apparently of the same mineral character with that of the latter, I have supposed it to be Jurassic and arranged it accordingly.

Local.: 'Abeih.

Ostræa.—*Lin.*, *Lam.*

Ostræa corticosa, Pl. 1, fig. 7. Subovate; superior valve flat, with very irregular radiating folds and numerous small scales; inferior valve not deeply convex, and with narrow, not prominent, irregular ribs and prominent large scales. This species is very perfect, generally showing a mark of attachment at the umbo of the inferior valve, and in general appearance is not unlike some forms of *Plicatula*.

Ostræa virgata ? Pl. 1, fig. 8. This I suppose to be the same species figured on Plate 1 of the Expedition, fig. 6 to 8. The figure on the Appendix plate represents the hinge and upper valve of a specimen in excellent preservation.

OPIS.—*Defr.*

Opis equalis, Pl. 2, fig. 9. Triangular, ventricose, beaks central; anterior end acutely rounded; posterior truncated; basal margin regularly, not profoundly curved.

Opis orientalis, Pl. 2, fig. 10. Triangular, inequilateral; anterior margin of umbo acutely rounded; posterior side cuneiform, slightly sinuous; posterior end obliquely truncated.

Opis obrutus, Pl. 2, fig. 12. Triangular, inequilateral, elevated; margins of umbo angular; basal margin nearly straight; posterior slope concave. On one of the casts of this species are traces of concentric lines.

Local.: 'Aleih.

ASTARTE.—*Sow.*

Astarte lucinoides, Pl. 2, fig. 11. Orbicular or lentiform; inequilateral; beaks not prominent.

Astarte subcordata, Pl. 2, fig. 13. Subcordate, inequilateral; summits prominent; margins rounded.

INOCERAMUS.—*Sow.*

Inoceramus Syriacus, Pl. 2, fig. 14. Subrhomboidal? ventricose, concentrically sulcated; ligament margin recurved; anterior and posterior margins abrupt; basal margin rounded.

The cast is considerably distorted, and the figure represents the original form as nearly as the specimen indicates it.

Local.: 'Aleih.

Inoceramus elevatus, Pl. 2, fig. 15. Suboval, equilateral? elevated, profoundly ventricose; umbo large and prominent with rather large concentric undulations, not profound; base and extremities rounded; beaks contiguous.

The cast of this species is broken anteriorly and somewhat distorted.

PHOLADOMYA.—*Sow.*

Pholadomya Syriaca, Pl. 2, fig. 17. Suborbicular, inequilateral, ventricose; valves with radiating tuberculated ribs, wanting on the posterior side where there are concentric lines or furrows of rather large size.

There is but one specimen of this cast, much distorted.

CARDIUM.—*Lin.*

Cardium crebriechinatum, Pl. 2, fig. 16. This species is refigured here to represent a cast more perfect in its outline than those on Pl. 6.

ARCA.—*Lin.*

Arca longa, Pl. 3, fig. 18. Trapezoidal, inequilateral; sides flattened or slightly contracted; anterior extremity rounded; posterior slightly curved; basal margin slightly contracted. The figure of this shell is too angular and abrupt posteriorly, for the ligament margin forms a regular curve with the posterior margin.

Arca Bhamdunensis, Pl. 3, fig. 19. Elliptical, inequilateral, ventricose; posterior side cuneiform; basal margin curved.

Local.: Bhamdûn.

Arca cuneus, Pl. 3, fig. 22. Rhomboidal, inflated in the umbonal region; sides flattened; anterior side very short, extremity rounded; posterior side cuneiform, extremity angular; basal margin slightly curved.

CUCULLÆA.—*Lam.*

Cucullæa opiformis, Pl. 3, fig. 21. Triangular, elevated, inequilateral; summits profoundly elevated; sides flattened.

An imperfect cast, remarkable for the elevation of the summits and the widely remote beaks.

NUCULA.—*Lam.*

Nucula abrupta, Pl. 3, fig. 20. Ovate, convex, inequilateral; anterior dorsal and ligament margins straight and oblique; posterior extremity much above the line of the base; basal margin rounded.

Local.: 'Aleih.

Nucula ? obtenta, Pl. 3, fig. 23. Ovato-triangular, ventricose, inequilateral; posterior side subcuneiform; extremities subtruncated; basal margin regularly rounded.

TELLINA.—*Lin.*

Tellina Syriaca ? Pl. 3, fig. 25. This appears to be a variety of *T. Syriaca*, a species represented on Pl. 10, fig. 59, 60, 61.

Local.: 'Aleih.

ORBICULA.—*Cuv.*

Orbicula ? Syriaca, Pl. 3, fig. 24. Obtusely ovate, convex, with concentric lines.

An obscure small species attached to a cast of *Inoceramus Lynchii*.

TRIGONIA.—*Brug.*

Trigonia Syriaca, Pl. 4, fig. 26. This figure represents the external character of a species previously described and figured from casts. See Pl. 3, fig. 20, 21, 23. Here the shell though broken at the base is otherwise well preserved and mineralised.

Local.: 'Aleih.

Trigonia distans, Pl. 4, fig. 27. Ventricose, concentrically ribbed; ribs distant, narrow, prominent, somewhat undulated, terminating on the umbonal slope which is profoundly carinated; valves contracted anteriorly to the umbonial carina; posterior area contracted or concave.

Local.: Bhamdûn.

PANOPÆA.—*Mén.*

Panopæa orientalis, Pl. 4, fig. 28. Oblong-ovate, inflated, very inequilateral; summits prominent; anterior basal margin obliquely truncated.

Local.: Bhamdûn.

An imperfect cast. In the figure the summits are not sufficiently elevated and the ligament margin is too much so.

UNIVALVES.

NERINEA.—*Defrance.*

1. *Nerinea? cochleæformis*, Pl. 4, fig. 29. Turrited; whorls obscurely crenulated or tuberculated; space between the ridges profoundly concave.

Local.: 'Ain 'Anûb.

2. *Nerinea* ——, Pl. 4, fig. 30, 31. A comparatively short species, too imperfect to describe.

Local.: Hadith, Lebanon.

3. *Nerinea? Orientalis*, Pl. 5, fig. 32. Sides of volutions straight, longitudinally ribbed; ribs rounded, slightly curved and but little prominent; volutions of the spire, with about six revolving lines on each.

Local.: 'Ain 'Anûb.

The description of this species refers to three or four fragments, two of which have the inferior volution scalariform.

4. *Nerinea Syriaca*, Pl. 5, fig. 33, 34, 35, 37, 38. Varieties of *N. Syriaca* previously described, and a cast figured on Pl. 12, fig. 72.

Local.: 'Ain 'Anûb, Lebanon.

5. *Nerinea abbreviata*, Pl. 5, fig. 36. Cylindrical; spire short, conical, scalariform; suture margined by a minute raised line; columella four-plaited.

Local.: 'Ain 'Anûb, Lebanon.

6. *Nerinea* ——. A fragment, representing part of a very large species occurs in the collection sent from Cincinnati. This fragment of the body-whorl measures 3½ inches in width; the base is strongly striated with revolving lines.

Local.: 'Ain 'Anûb.

ACTÆONELLA.—*D'Orb.*

Actæonella Syriaca, Pl. 5, fig. 40. Ovato-oblong, smooth, acuminated above, dilated inferiorly; columella three-plaited.

Local.: Sabbatic River, Lebanon.

CERITHIUM.—*Adans., Lam.*

Cerithium bilineatum, Pl. 5, fig. 39. Subulate; volutions 12, with straight sides, those of the spire having two distant, revolving lines on each; suture compressed; body-whorl rounded inferiorly.

Local.: 'Ain 'Anûb.

NATICA.—*Lam.*

Natica Orientalis, Pl. 5, fig. 41. Globose; volutions three, flattened above; spire not prominent.

Local.: 'Aleih.

TURRITELLA.—*Lam.*

Turritella Syriaca, Pl. 5, fig. 42. A specimen of the species figured on Pl. 15, fig. 75. Local.: 'Ain 'Anûb.

CANCELLARIA.—*Lam.*

Cancellaria petrosa, Pl. 5, fig. 43. Subfusiform; turrited, spire scalariform; ribs large, distant, oblique.

BIVALVES.

LITHODOMUS.—*Cuv.*

Lithodomus stamineus, Pl. 5, fig. 44. Oblong; elegantly and profoundly striated concentrically; disk contracted in the middle; umbonal slope rounded, inflated; posterior margin oblique; slightly curved.

CARDIUM.—*Lin.*

Cardium biseriatum, Pl. 5, fig. 45. Previously described and figured. See Pl. 6, fig. 38, 39, 40. Fig. 45 represents a specimen in which the markings or lines are very distinct.
Local.: 'Aleih.

UNIVALVES.

AMMONITES.

Ammonites Libanensis, Pl. 6, fig. 46. Compressed; obscurely ribbed transversely; whorls flattened, four or five in number; periphery of the umbilicus strongly ribbed; ribs of the volutions in the umbilicus with a prominent tubercle on each; septa unequal, three-lobate on the sides. Diameter eight inches, thickness near aperture $2\frac{1}{2}$ inches.
Local.: Mount Lebanon, five miles East of Beirût.

HIPPURITES.—*Lam.*

Hippurites liratus, Pl. 7, fig. 47, 48. Elongated, curved, imbricated, profoundly ribbed; ribs narrow, irregular, unequal, diameter ovate.
The cast, fig. 48, is longitudinally finely striated, and exhibits but faint traces of the longitudinal ribs on the shell.
Local.: Bhamdûn.
Hippurites plicatus, Pl. 7, fig. 49. Pyramidal, obscurely plicated longitudinally.
Local.: 'Aithâth.

NATICA.—*Lam.*

Natica ? scalaris, Pl. 7, fig. 50. Short-fusiform; spire prominent, scalariform, consisting of 5 volutions with concave sides; body whorl with two distant revolving obtuse carinæ, the inferior one tuberculated.

Chenopus.

Chenopus ——, Pl. 8, fig. 51, 52. These two figures represent two species too imperfect for description.

Local.: 'Abeih, Lebanon.

BIVALVES.

Corbula.—*Lam.*

Corbula Aleihensis, Pl. 8, fig. 53. Suboval, equilateral; both valves profoundly ventricose; posterior end obliquely truncated; beaks remote; anterior basal margin subtruncated.

Local.: 'Aleih, Lebanon.

Orbicula.—*Lam.*

Orbicula ? ——, Pl. 8, fig. 55. A very small species with angular lines.

Local.: Mount Lebanon.

ECHINODERMATA.

Echinus.—*Lin.*

Echinus Libanensis, Pl. 8, fig. 54. Depressed; base deeply concave; primary tubercles small, the largest consisting of a single series, and rather closely arranged, whole surface minutely granulated; on the periphery and base, the primary tubercles consist of 4 or 5 series nearly equal in size.

Local.: Mount Lebanon.

Echinus bullatus, Pl. 8, fig. 56. Depressed-hemispherical; primary tubercles in two distant series, one tubercle in each series larger than the others and very prominent, only two of the primary tubercles large and situated about the periphery, secondary tubercles in two approximate series, rather large, closely arranged, and gradually increasing in size from apex to base.

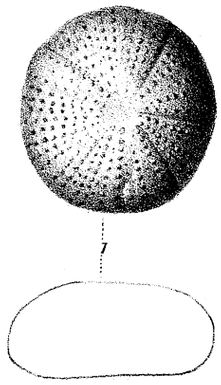
Local.: Mount Lebanon.

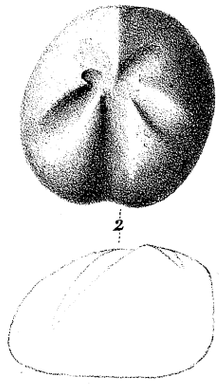
The base of this specimen is concealed by a portion of the rock in which it was imbedded.

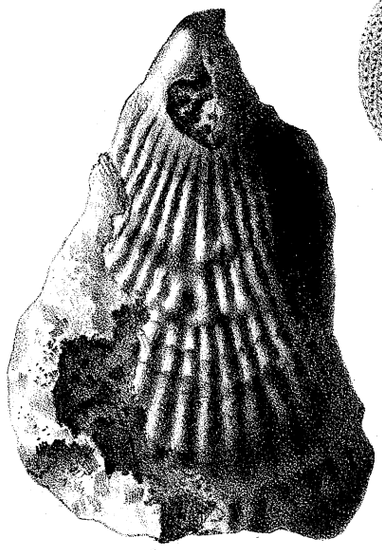
THE END.

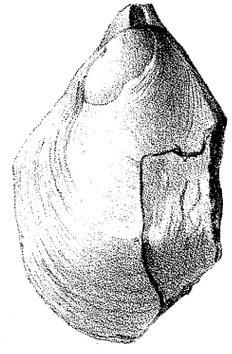
ERRATA.

Page	86,	line 9 from bottom,	*for*	nearly	*read* nearly to.
"	87,	" 3 "	"	Aklîm	" Aqlîm.
"	88,	" 9	"	'Aïthâth	" 'Aithâth.
"	90,	" 10 from bottom,	"	Area	" Arca.
"	91,	last line, ...	"	el-Dâmûr ...	" ed-Dâmûr.
"	99,	line 18, ...	"	form	" forms.
"	105,	" 22, ...	"	'Aîthath	" 'Aithâth.
"	107,	" 2, ...	"	'Ard	" Ard.
"	112,	" 7, ...	"	Hâsbeîya ...	" Hâsbeiya.
"	126,	" 21, ...	"	souweîd	" suweid.
"	127,	" 1 & 2, ...	"	Semu'y	" Semû'y.
"	160,	" 29, ...	"	Kharayan ...	" Kharâyin.
"	169,	" 10, ...	"	to	" of.
"	169,	" 23, ...	"	Haneideh ...	" Huneideh.
"	170,	" 9 from bottom,	"	which	" while.
"	171,	" 1, ...	"	Mezeirat	" Muzeirat.
"	174,	" 28, ...	"	crebrilineatae	" crebrilineata.
"	184,	" 23, ...	"	Uheimĭr	" Uheimir.
"	184,	" 7 from bottom,	"	el-Dera'ah ..	" ed-Dera'ah.



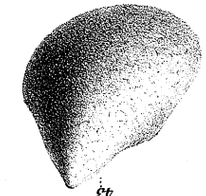


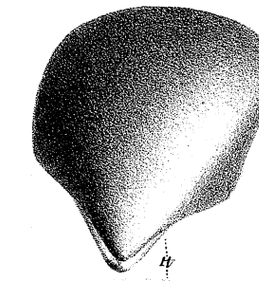


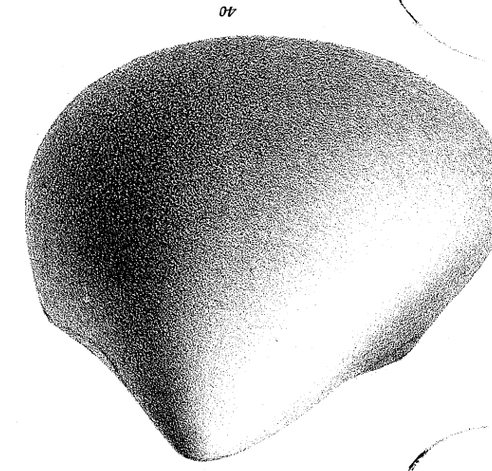


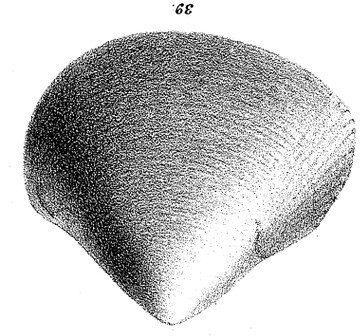
T. Sinclairs lith. Phila.

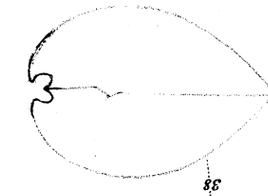
T. Sinclairs lith. Phila.

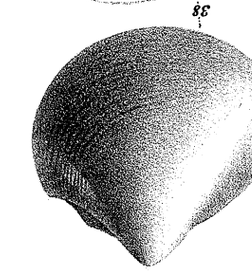










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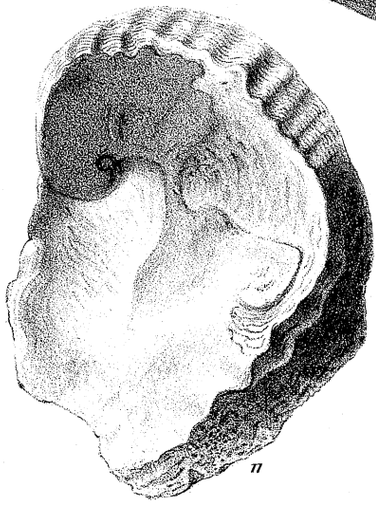
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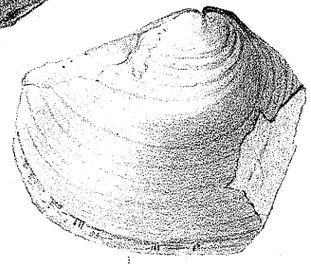
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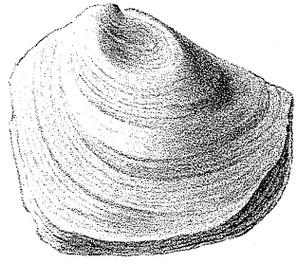


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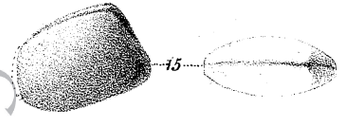
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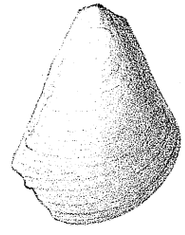
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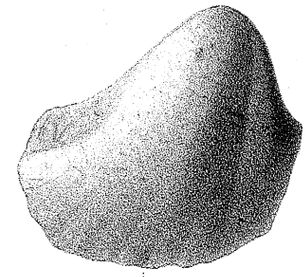
T Sinclairs lith Phila.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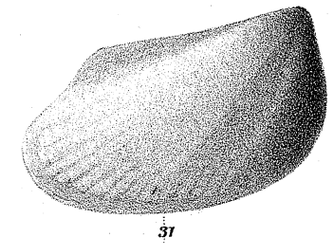
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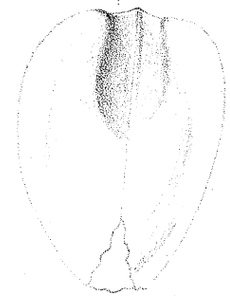

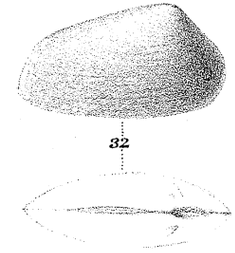
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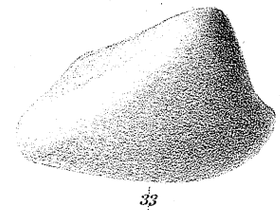
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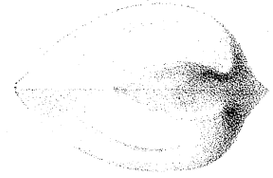

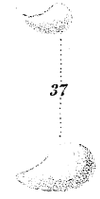
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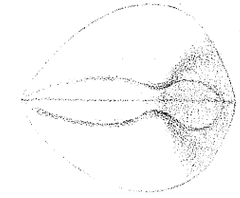


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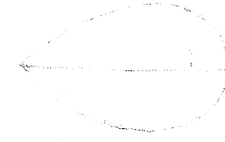

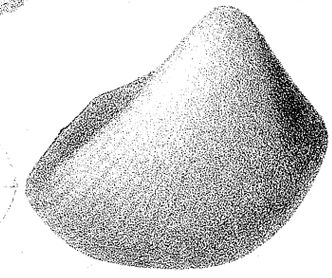
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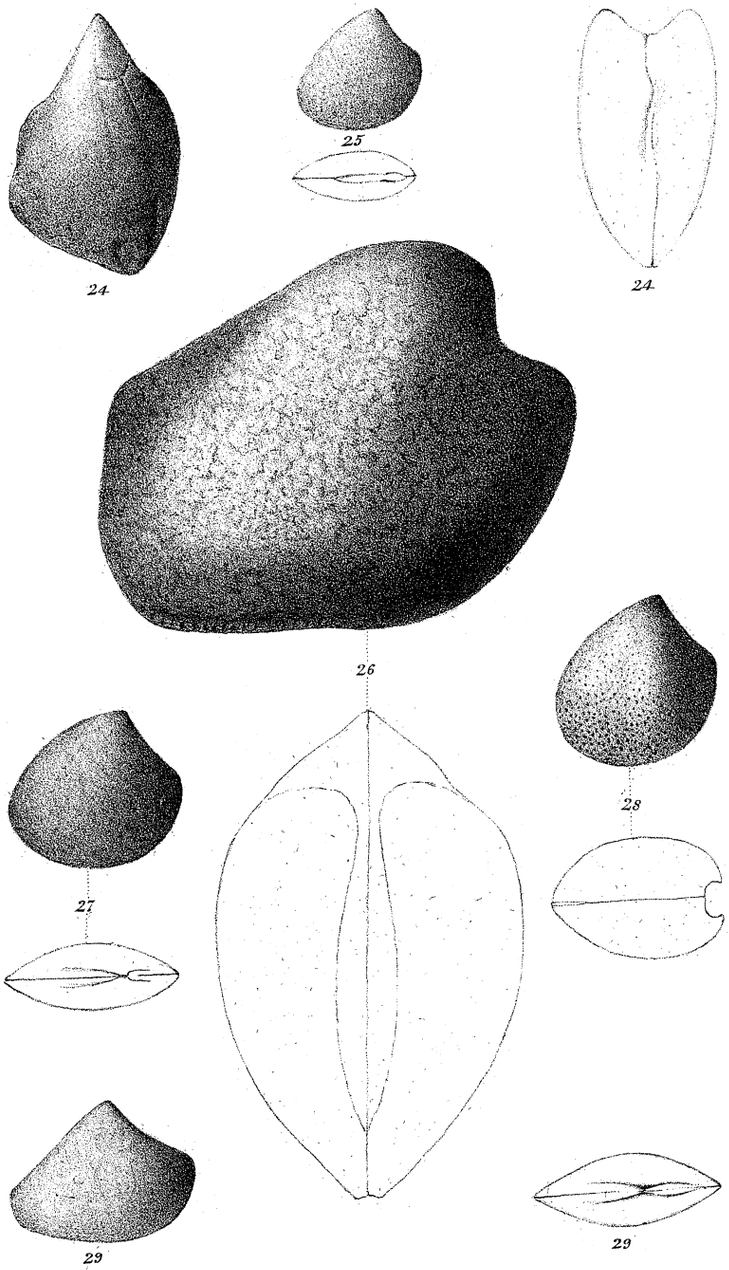
T Sinclair's lith. Phil.



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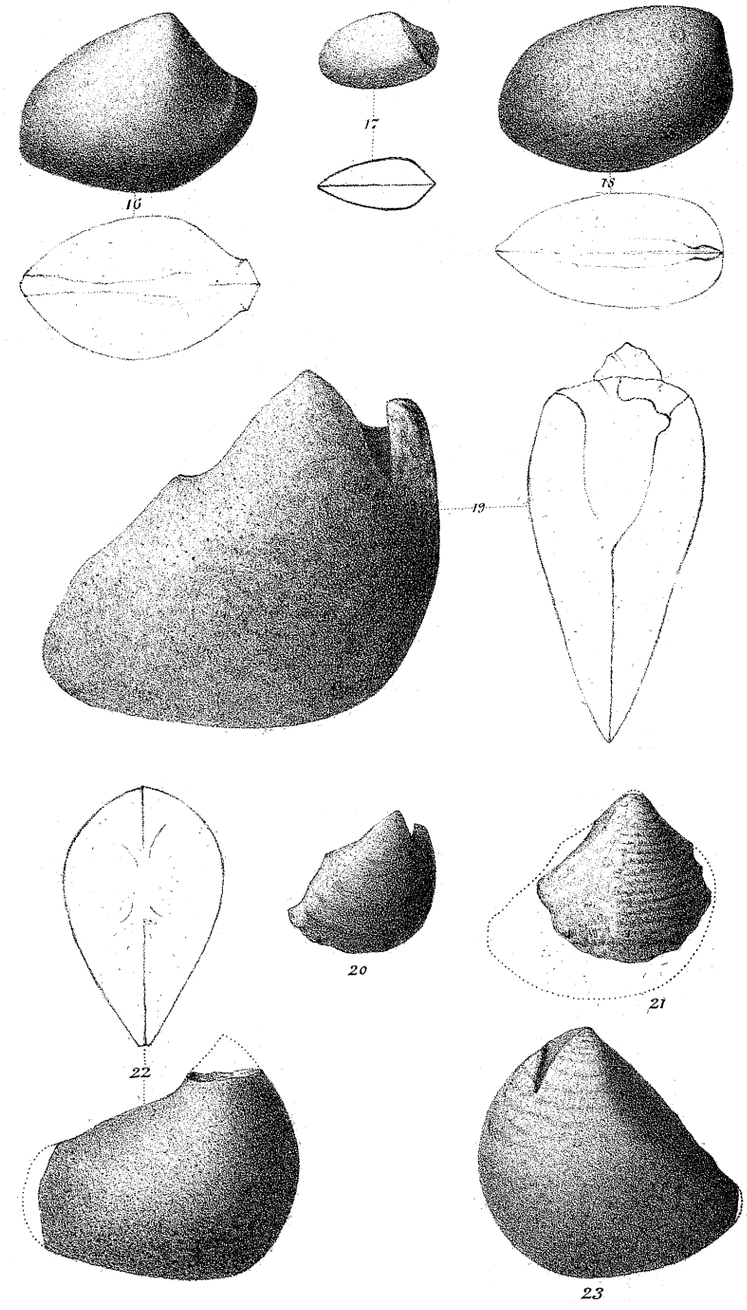

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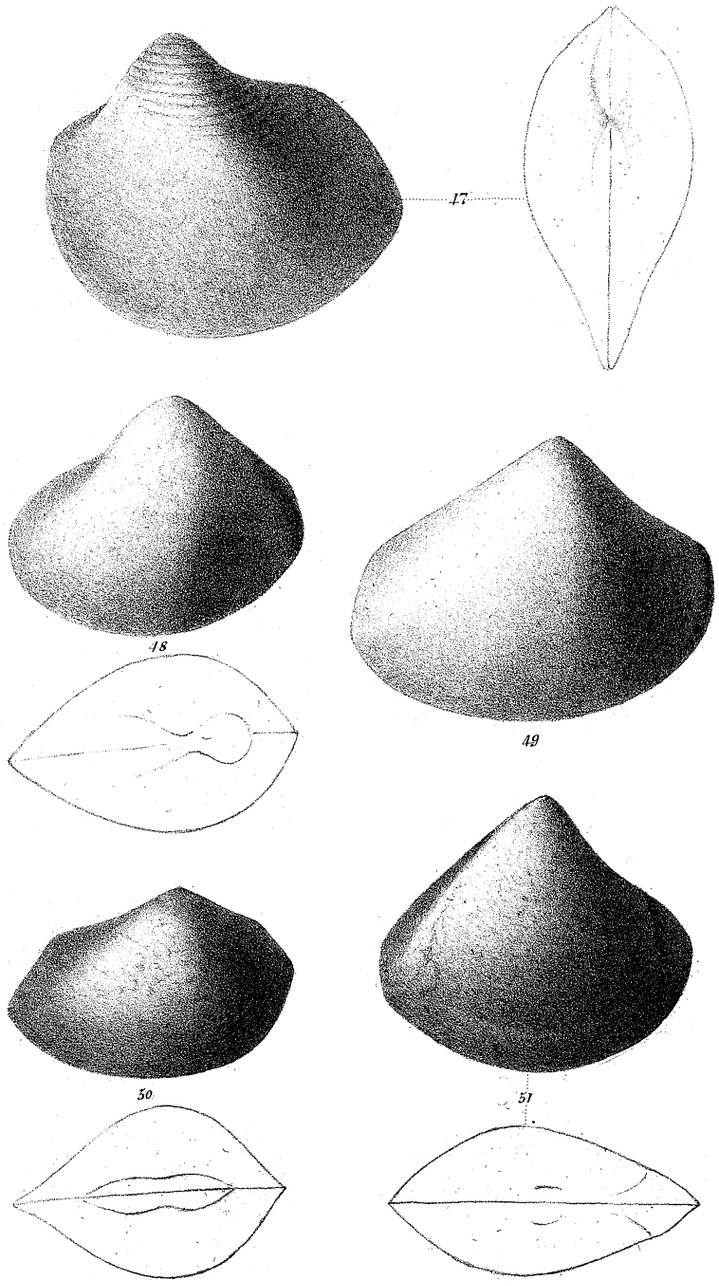

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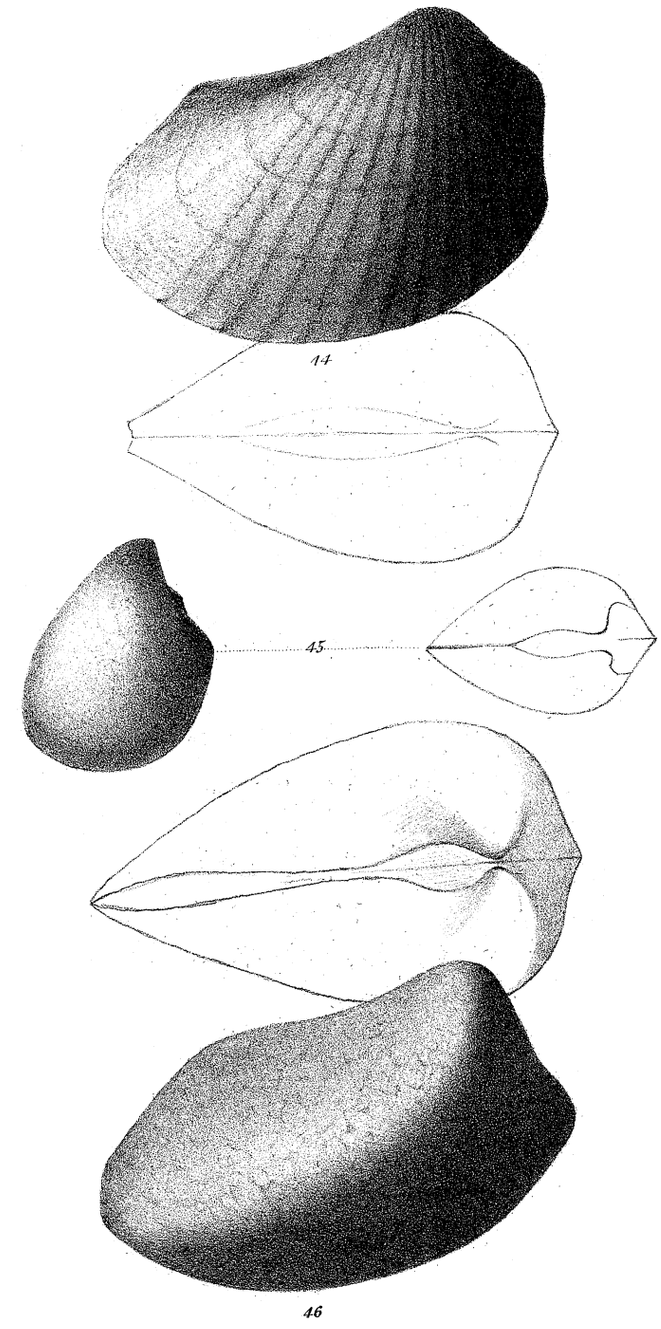

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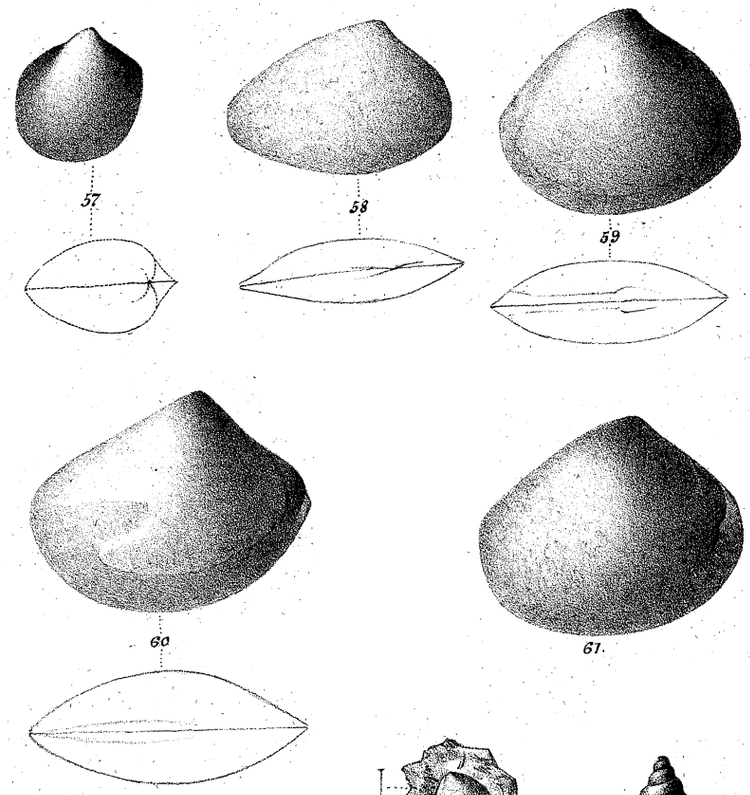

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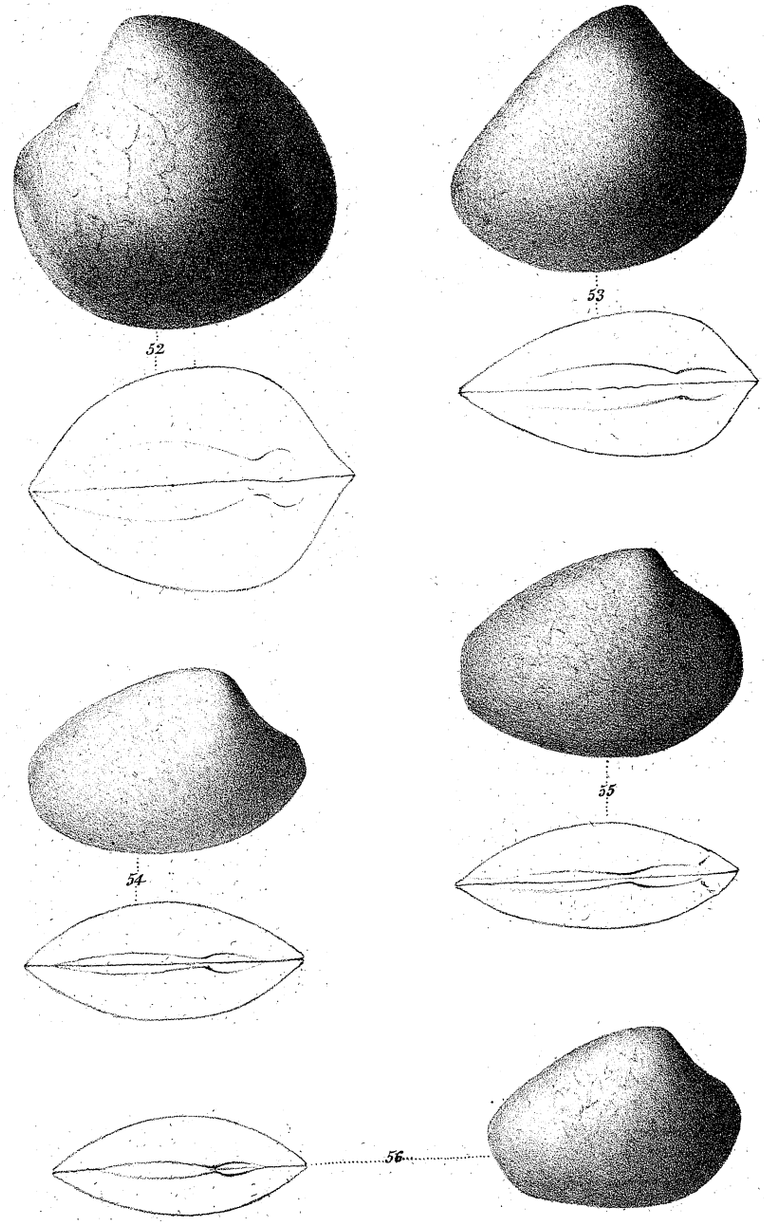

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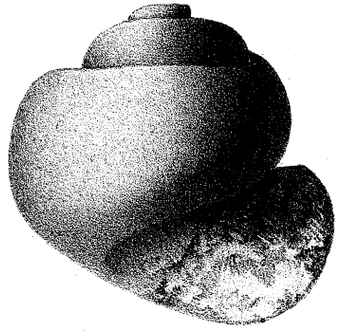

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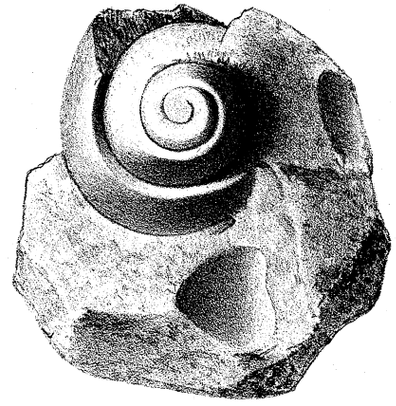

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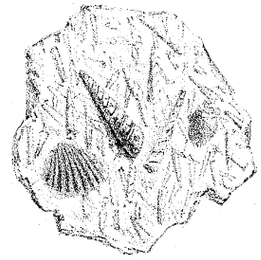

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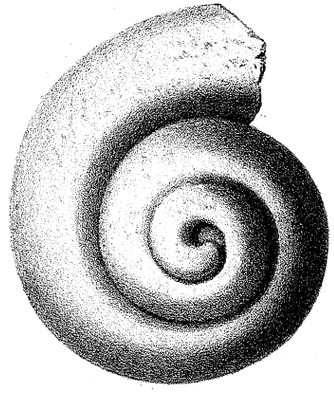

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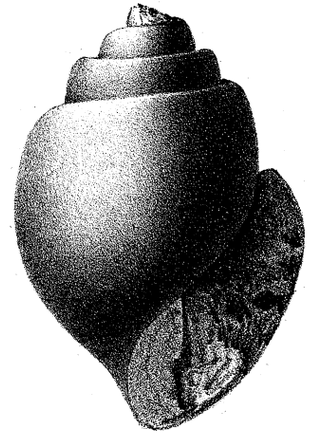

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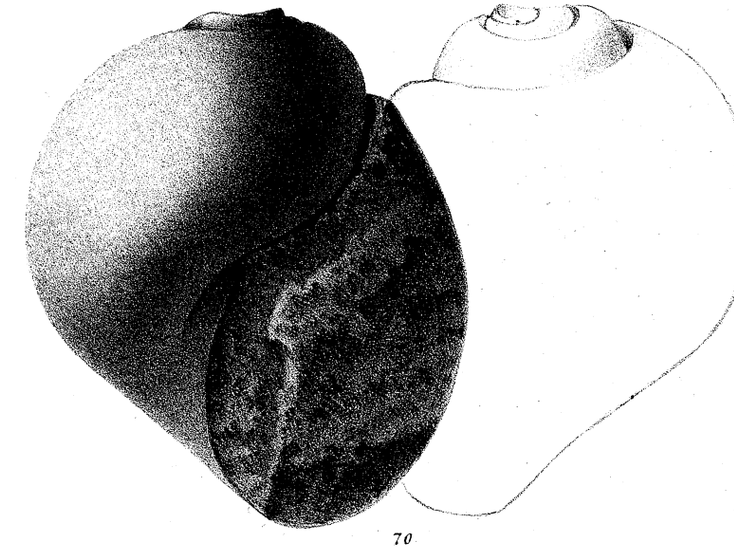

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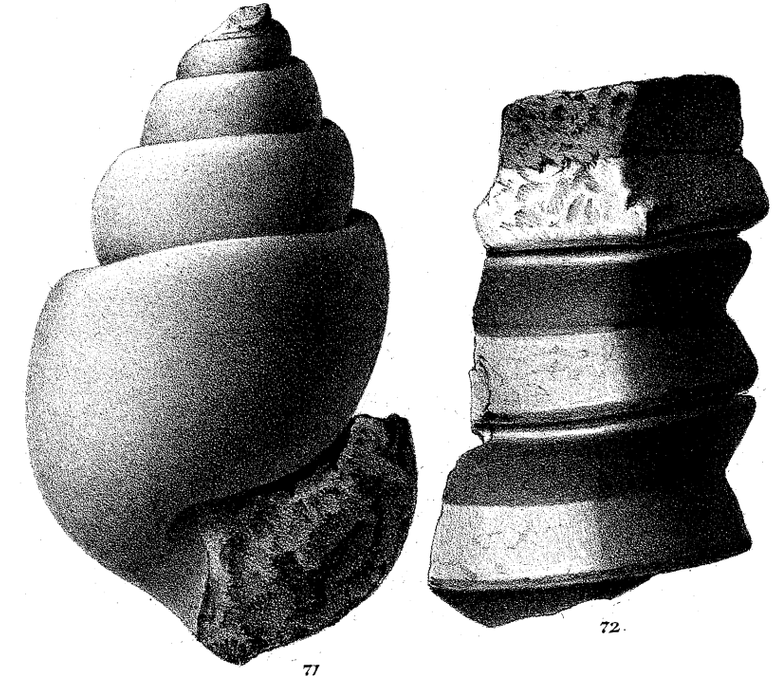

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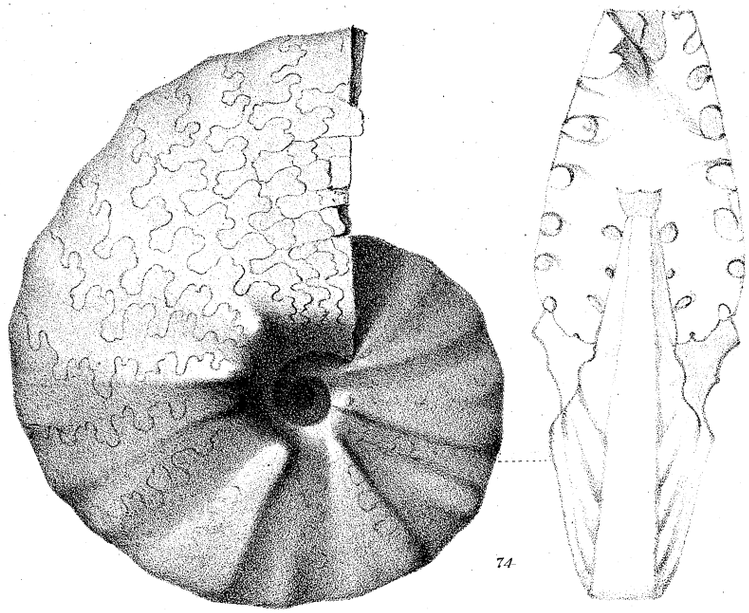
T. Sinclairs lith Phila.

73

T. Sinclair's lith Phila.



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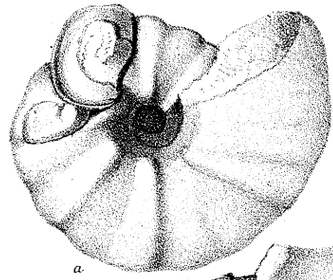

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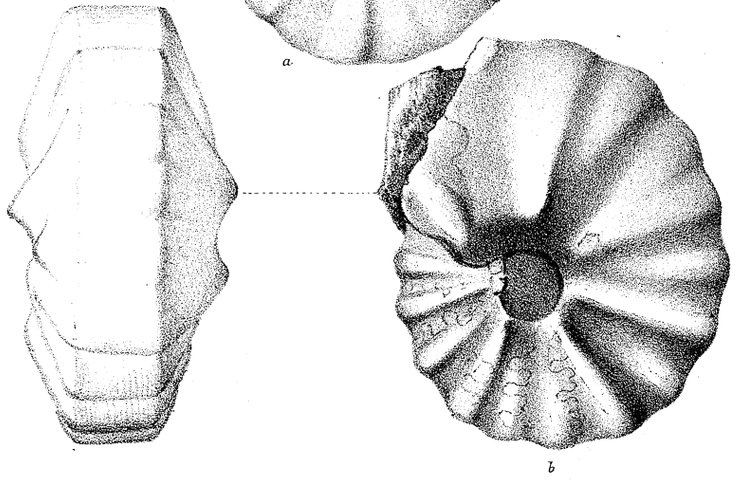

b

T. Sinclair's lith. Phila.

76

76

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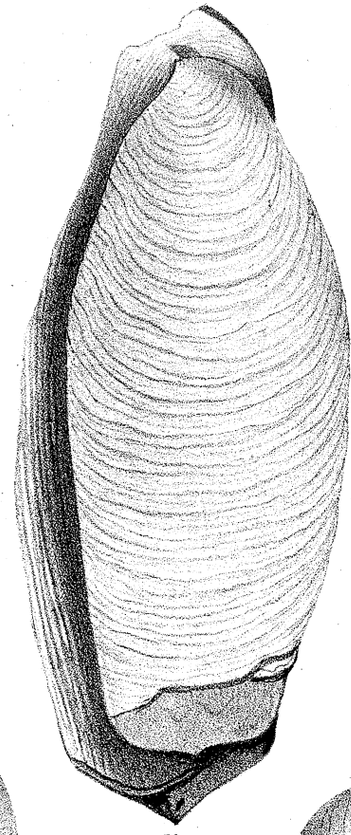

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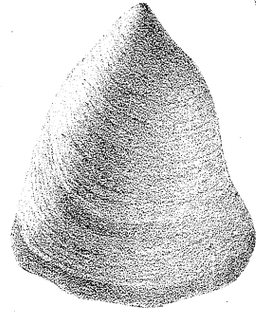

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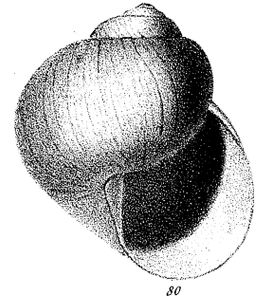

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T. Sinclairs lith. Phila.


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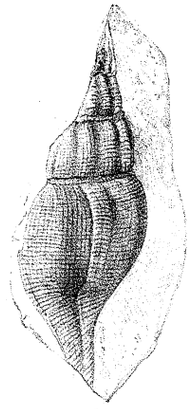
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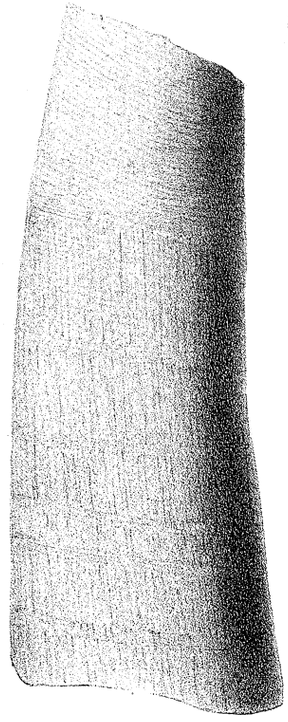
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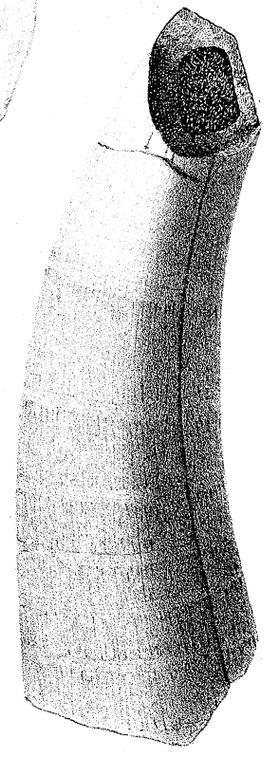

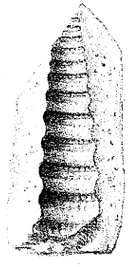
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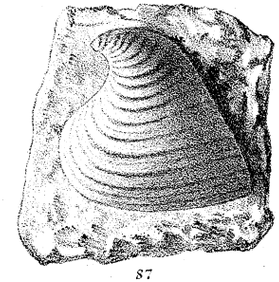
86

T Sinclairs lith Phila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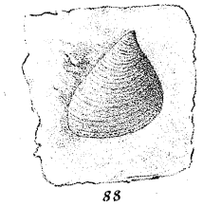
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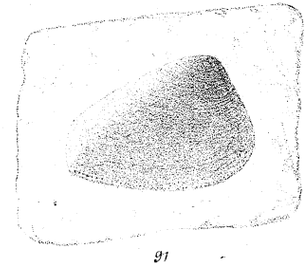
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92


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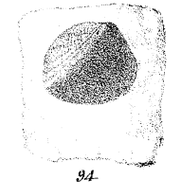
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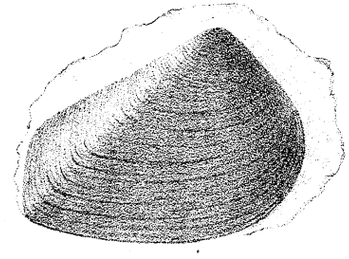
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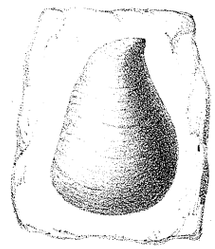
101

T Sinclairs lith Phila

102



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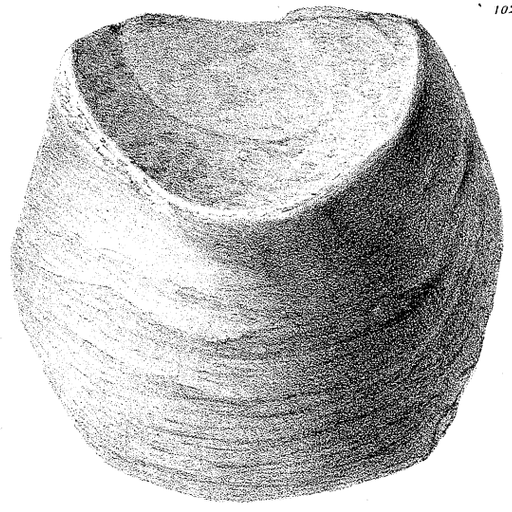

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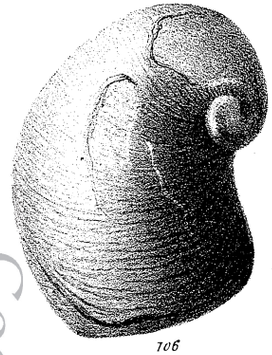

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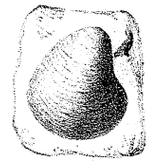

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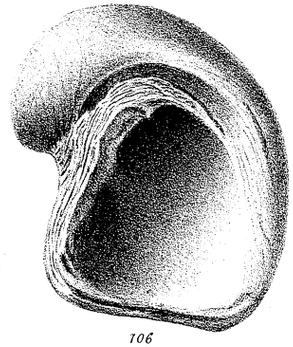
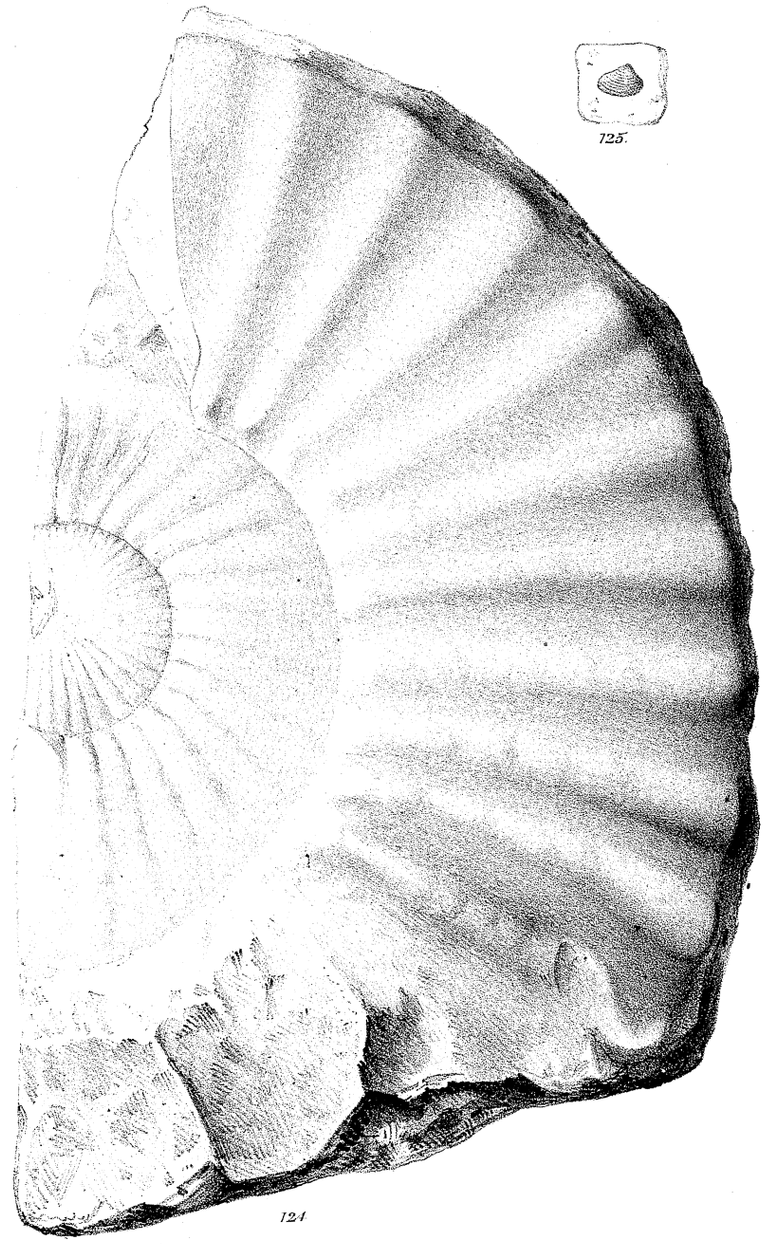


106

T. Sinclair's lith. Phila.d

125.



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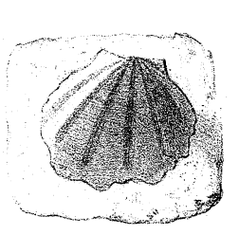
T. Sinclair's lith. Phila.d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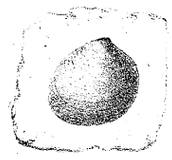
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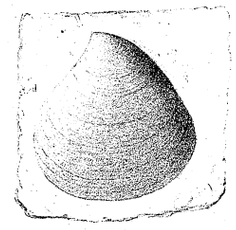
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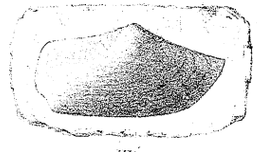
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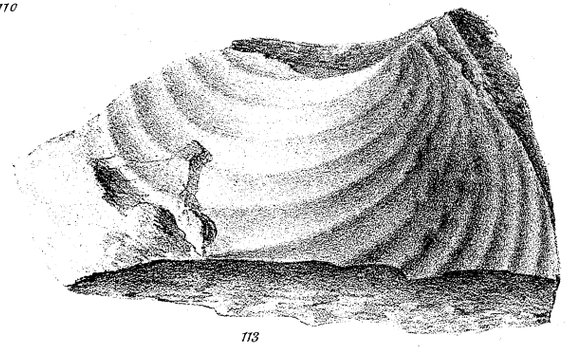
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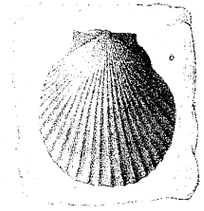
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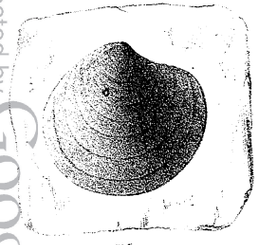
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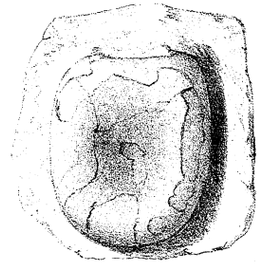
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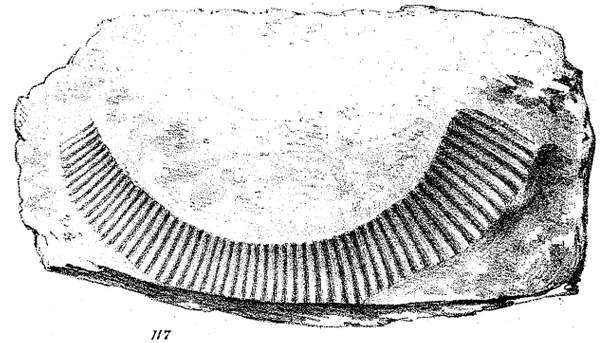
T. Sinclair's lith. Phila.d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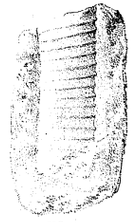
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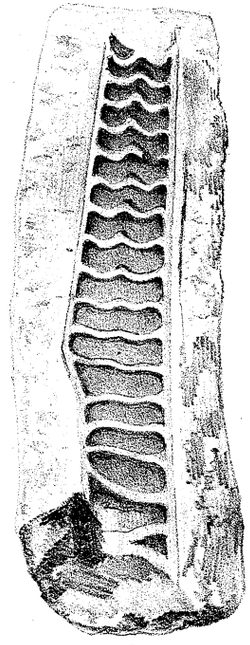
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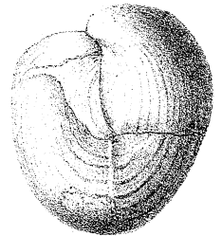
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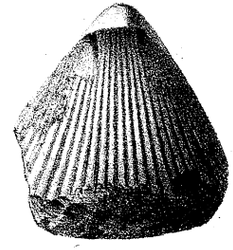
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T. Sinclair's lith. Phil.

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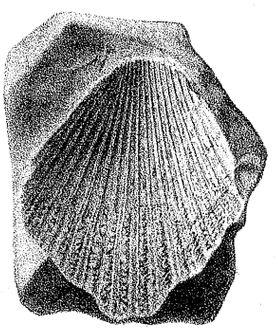

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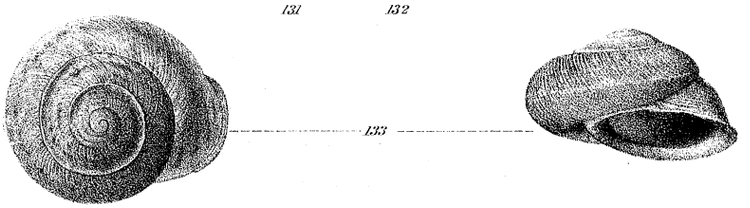
REGENT SHELLS.

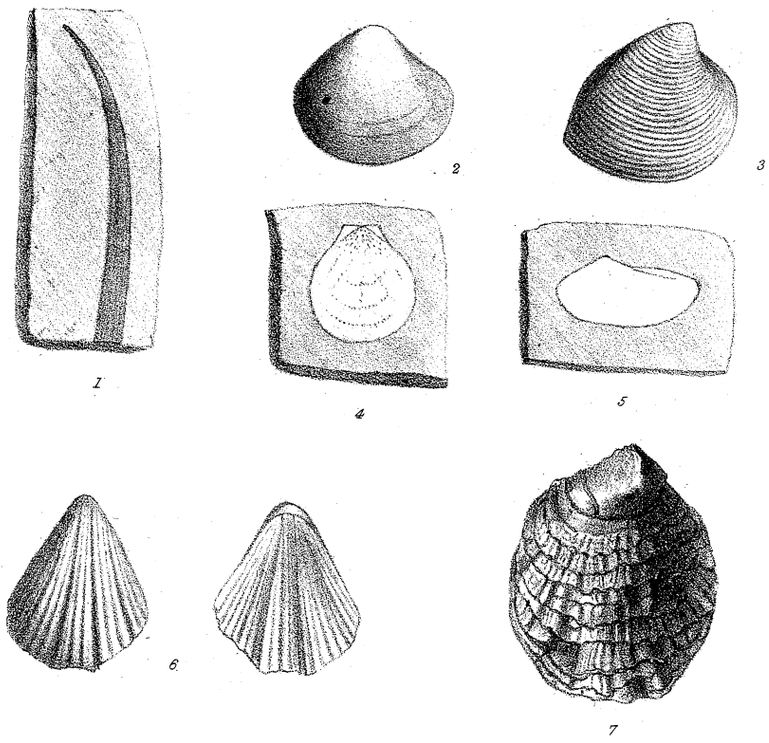
131

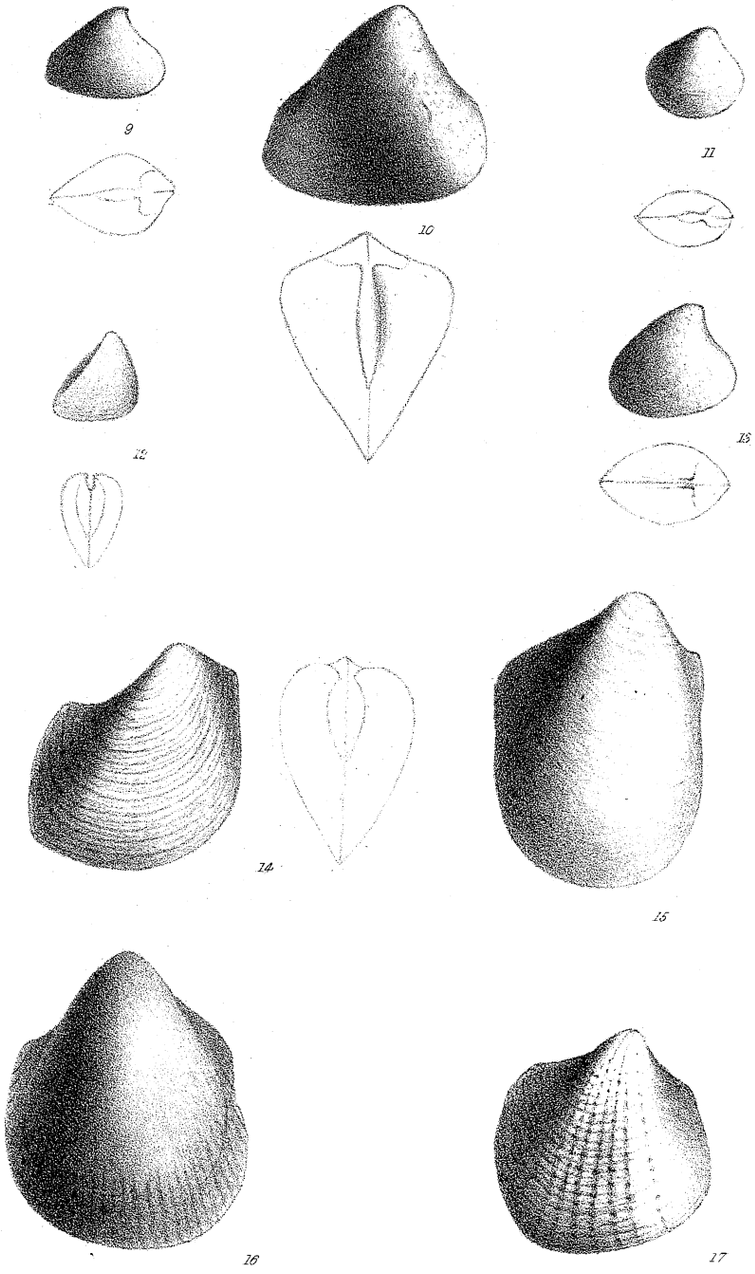
132

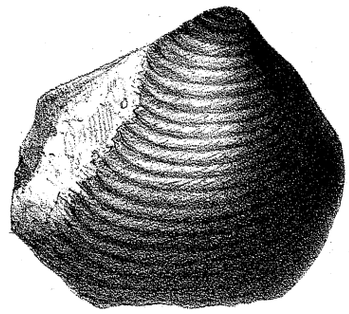


133

Smeeton's Lith. Phil.ª







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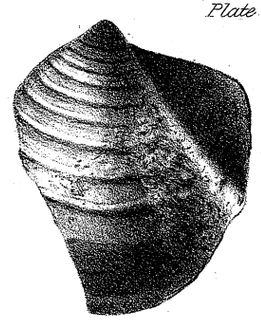

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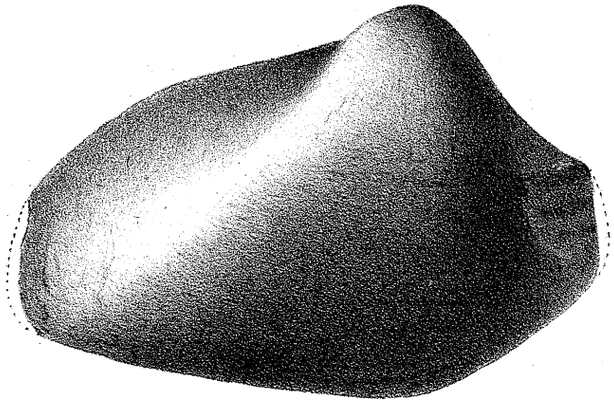

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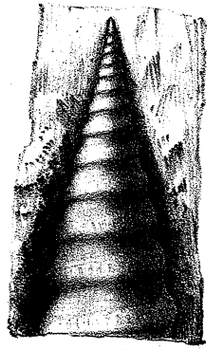

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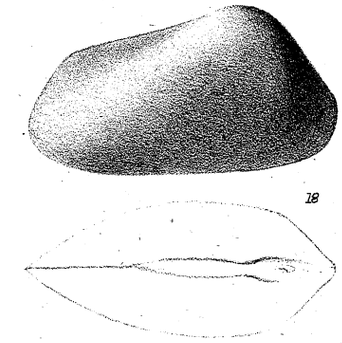

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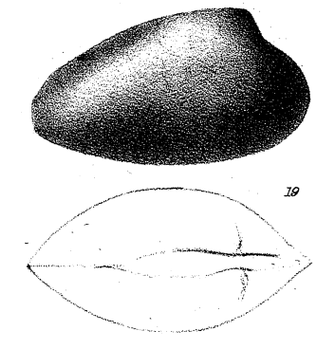

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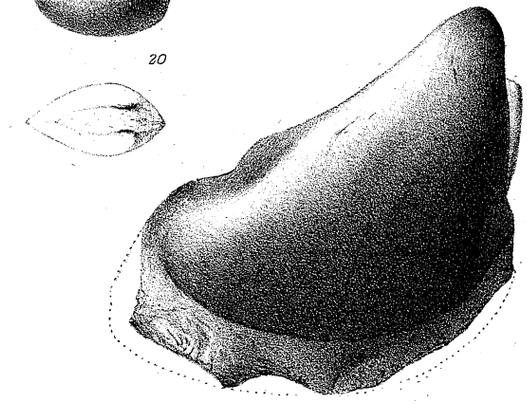

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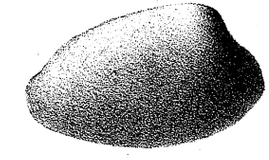

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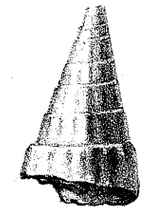

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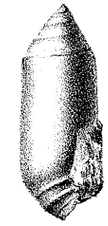

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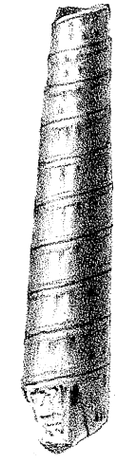

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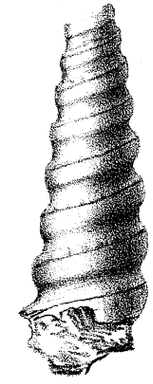

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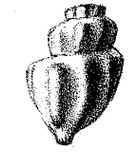

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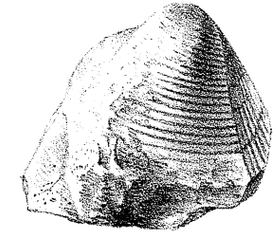

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