

## NEW VICKSBURG (OLIGOCENE) MOLLUSKS FROM MEXICO

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By C. WYTHE COOKE

*Geologist, United States Geological Survey*

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The fossil mollusks described in the following pages were obtained in November, 1920, by Dr. T. Wayland Vaughan from the Alazan clay at and near the type locality on Rio Buena Vista, in Vera Cruz, Mexico. It was intended to include the descriptions, which were written in 1921, in a comprehensive account of the stratigraphy and paleontology of the area covered by Doctor Vaughan's investigations, but as some of the papers by other authors that were to have been included in that report are not yet written this contribution is published in advance of the others. Thanks are due to the officers of the Aguila Oil Co., who presented the collections to the United States National Museum and who have generously given permission to publish all the scientific results of Doctor Vaughan's expedition, and to the Director of the United States Geological Survey for permission to study this collection as part of the writer's official duties.

The illustrations are from photographs made by Mr. W. O. Hazard and retouched by Miss Frances Wieser.

The Alazan clay was originally described by Dumble<sup>1</sup> as follows:

Whether the fossiliferous shales at Alazan are an integral part of the lower hard blue shales or are unconformable upon them has not yet been fully determined, but they are probably later and are certainly upper Eocene.

The type locality of the Alazan shales is on the Buena Vista River at the crossing of the road between Alazan and Moyutlan.

At this place the stream has cut down to the blue shales and exposed that formation along its western bank and in the bed of the river for a distance of more than half a mile. Overlying the shales to the west is a hill of yellowish clay, probably Oligocene. On the east side of the river there is a broad valley covered to a depth of 20 feet or more with recent deposits.

The general body of the blue shale seems to have been but little disturbed; for the most part it is smooth and evenly bedded and has a low dip to the southeast. Three hundred yards below the crossing there is a limited area which shows the surface of the shale more or less disturbed and broken, and it is here that the fossils occur. In places it appears as if small basins or

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<sup>1</sup> Dumble, E. T., *Geology of the northern end of the Tampico Embayment area: California Acad. Sci., Proc., ser. 4, vol. 8, pp. 141-142, 1918.*

potholes 8 to 10 feet in diameter had been eroded in the underlying shale and the fossil-bearing blue clays laid down in them. At other places the fossiliferous beds seem broken and piled together in every direction. The entire fossil-bearing area is not more than 200 feet in length, and a few hundred yards below this the main body of shales ends abruptly as though faulted, and the water plunges into a deep pool.

The material in which the fossils occur is very similar to that of the main body of the shales, but the fossils here are entirely confined to the disturbed and eroded area, and not a single fossil was found elsewhere in this exposure, and none at all was found in the main body of shale.

The fossils are fragile and, while abundant in this limited locality, are hard to separate from the shale.

The fossils from the Alazan shales were submitted to Dr. R. E. Dickerson, who reports that they are of upper Eocene age, containing some forms characteristic of the Tejon of California and others of the upper Eocene of the Gulf coast.

Although the Alazan clay has heretofore been correlated with upper Eocene deposits, study of the fossil mollusks has convinced the writer that the beds from which they came are of Vicksburg (Oligocene) age.<sup>2</sup> As the overlying Meson formation has been correlated with the Glendon formation, the Alazan doubtless is equivalent to the Mint Spring marl member of the Marianna limestone. No characteristic Eocene species were recognized. The species in the following list are common to the Alazan clay and the Vicksburg group of Mississippi:

<i>Gemmula rotaedens</i> (Conrad)	<i>Polynices (Euspira) byramensis</i> Cooke
<i>Pleuroliria cochlearis</i> (Conrad)?	<i>Sinum mississippiense</i> Conrad
<i>Pleurofusua</i> aff. <i>P. servata</i> (Conrad)	<i>Architectonica trilirata vicksburgensis</i> (Dall)
<i>Drillia tantula</i> (Conrad)	<i>Cassia caelatura</i> Conrad var.?
<i>Drillia</i> cf. <i>D. caseyi</i> Aldrich	<i>Pecten poulsoni</i> Morton?
<i>Latirus protractus</i> (Conrad)?	<i>Macrocallista (Chionella) sobrina</i> (Conrad)
<i>Latirus perexilis</i> (Conrad)	<i>Corbula laqueata</i> Casey
<i>Distorsio crassidens</i> Conrad	<i>Corbula engonata</i> Conrad
<i>Phos mississippiensis</i> (Conrad)	
<i>Turritella mississippiensis</i> Conrad	

The following species are described as new in this paper:

<i>Gemmula alazana</i> Cooke	<i>Turritella ceibana</i> Cooke
<i>Gemmula mexa</i> Cooke	<i>Natica alazana</i> Cooke
<i>Gemmula mexa</i> var. <i>mexita</i> Cooke	<i>Polynices (Lunatia) lacrimans</i> Cooke
<i>Pseudotoma alazana</i> Cooke	<i>Polynices (Euspira) byramensis</i> Cooke
<i>Scobinella prionota</i> Cooke	<i>Ampullina vaughani</i> Cooke
<i>Glyptotoma rhombica</i> Cooke	<i>Dentalium ovale</i> Cooke
<i>Borsonia aguila</i> Cooke	<i>Dentalium alazanum</i> Cooke
<i>Ancilla (Ancillina) alazana</i> Cooke	<i>Amussium alazanum</i> Cooke
<i>Protonema bartschi</i> Cooke	<i>Pecten ceibanus</i> Cooke

The species named in the preceding lists probably include only a small part of the total number of mollusks in the Alazan clay. Al-

<sup>2</sup> This correlation was announced Dec. 27, 1923; see Geol. Soc. Amer. Bull., vol. 35, pp. 853, 856, 1924.

most as many more species are represented in the available collections by specimens which, although good enough to identify, are too imperfect to serve as types in view of the probability that more and better specimens will be found in the not distant future.

Characteristic specimens of *Anadara lesueurii* (Dall), a little ark that is very abundant in the Byram marl of Mississippi and rare in the Glendon formation, have been found in the Meson formation at Topila, Mexico.

The following descriptions of the localities at which the fossils were obtained are based upon memoranda furnished by Doctor Vaughan.

## STATIONS M. 47 V., M. 48 V., M. 49 V., CROSSING OF THE ALAZAN-MOYUTLA ROAD

The exposures are a short distance south of (below) the road crossing over the river west of Alazan. The strata are much disturbed by minor crumpling. A thickness of 70 to 80 feet is exposed. Stations 48 and 49 represent actually or nearly the same bed, which is at the stratigraphically lowest part of the exposure. Station 47 is probably about 25 feet higher stratigraphically than station 48.

## STATIONS M. 52 V., M. 53 V., M. 54 V., LA CEIBA CROSSING

This locality is on the east side of Rio Buena Vista, 9.8 kms. in a straight line above Tumbadero. A description of the exposure follows:

*Section at La Ceiba crossing*

Quaternary:	Feet
5. River silt, light grayish fawn colored.....	10
4. Coarse gravel and cobbles at base of river deposit.....	2 to 4
Unconformity.	
Oligocene: Alazan clay:	
3. Silty clay, originally light gray, weathers to medium fawn colored; collection M. 52 V.....	4
2. Fine to medium grained, light lead to dark fawn colored, soft sandstone; grains not well rounded; collection M. 53 V.....	0 to 1
1. Light lead colored clay; collection M. 54 V.....	1

On the slope along the eastern side of Rio Buena Vista 50 feet above the base of the exposure described above and separated from it by fluvial deposits there is an outcrop of a yellowish foraminiferal limestone composed largely of *Lepidocyclina undosa* var. *tumida* Vaughan, a Meson species of *Operculina*, and other larger Foraminifera. As there is no indication of local faulting, it appears that the foraminiferal limestone occurs stratigraphically about 45 feet higher than bed No. 3 of the exposure on the river. Whether an unconformity or disconformity intervenes between the top of the Alazan and the base of the Meson can not be determined from these



exposures, but exposures elsewhere suggest stratigraphic gradation without the intervention of an erosion interval. As the Meson is at least approximately the equivalent of the Glendon formation of the eastern Gulf States, the stratigraphy indicates that the typical Alazan corresponds to a part of the Oligocene older than the Glendon.

#### DESCRIPTION OF SPECIES

##### GEMMULA ALAZANA, new species

###### Plate 1, Figure 1

Shell polished, apical angle about  $28^{\circ}$ ; nucleus of four or five convex whorls, the first two apparently smooth, others with close-set axial costae; later whorls carinated, carina very slightly anterior to the middle, crenulated; posterior slope concave, with one spiral thread close to the suture and several very faint threads; anterior slope slightly concave, steeper, with several threads of variable fineness and one coarser thread adjacent to the suture; anterior end of body whorl with two coarse threads and many finer threads; aperture about one-third the length of the shell; canal straight; anal sinus at the carina; inner lip enameled. Length of specimen with six and one-half postnuclear whorls, 15 mm.; breadth, 6.1 mm.

*Gemmula alazana* closely resembles *G. mexa*, but is more slender, lacks the double threads on the carina, and has a shorter nucleus.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista, west of Alazan, Mexico. (M. 49 V.)

*Type*.—Cat. No. 352695, U.S.N.M.

##### GEMMULA MEXA, new species

###### Plate 1, Figures 2, 3

Shell polished, apical angle about  $35^{\circ}$ ; nucleus of five and one-half or six convex whorls, the first two very small, smooth, others decorated with close-set axial costae; later whorls carinated; carina slightly anterior to the middle, crenulated, with two adjacent nodular threads, the posterior threads somewhat more strongly nodular than the other; posterior slope concave, with a faint thread near the suture; anterior slope concave; anal sinus deeply reentrant at the carina. Body whorl broken in type; in very young shells the canal is short and straight, and the anterior end of the body whorl is set with spiral threads. Length of nucleus and five and one-fourth subsequent whorls, measured to carina, 8.6 mm.; maximum diameter, 6 mm.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista west of Alazan. (M. 49 V.)

*Type*.—Cat. No. 352693, U.S.N.M.

**GEMMULA MEXA** var. **MEXITA**, new variety

Plate 1, Figure 4

Variety *mexita* differs from typical *G. mexa* in having three threads on the anal fasciole and several faint threads on the posterior slope.

*Occurrence*.—With the preceding. (M. 49 V.)

*Type*.—Cat. No. 352694 U.S.N.M.

**PSEUDOTOMA ALAZANA**, new species

Plate 1, Figure 5

Shell obese, apical angle about  $62^\circ$ ; nucleus smooth, of two and one-half convex whorls; subsequent whorls medially carinated, loosely appressed, ornamented with close low corrugations marking growth stages and many fine revolving threads; posterior slope concave; anterior slope nearly straight to the suture; base of body whorl concave to the sutural band; anal sinus shallow, situated between the suture and the carina. Length of nucleus and three and one-half postnuclear whorls, measured to the carina, 9 mm.; breadth, 9 mm.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista, west of Alazan, Mexico. (M. 49 V.)

*Type*.—Cat. No. 352697, U.S.N.M.

**SCOBINELLA PRIONOTA**, new species

Plate 1, Figures 6, 6a

Shell polished, slender, apical angle about  $35^\circ$ , whorls appressed, peripheral outline serrate; tip of nucleus obtuse, with about three and one-half convex whorls, smooth except last one-fourth whorl, which is axially ribbed; subsequent whorls, 7 in type, coronated; posterior half of whorl concave to a strong antesutural thread; middle of concavity occupied by a nodular thread which marks the deepest reentrant of the anal sinus; coronal band divided by a groove which on the earlier whorls is medial but on the later whorls is anterior to the nodes on the corona; nodes of corona blunt, serrate, twelve on the seventh whorl; suture bordered by nodular threads, the anterior being stronger than the posterior; base of body whorl cancellated, axial outline serrate; aperture rather narrow, less than half the length of the shell; canal straight; outer lip broken, inner lip with two principal columellar folds and three or four faint secondary folds. Length (anterior tip broken), 15.5 mm.; breadth, 6 mm.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista, west of Alazan, Mexico. (M. 48 V.)

*Type*.—Cat. No. 352696, U.S.N.M.

## GLYPTOTOMA RHOMBICA, new species

Plate 1, Figures 7, 7a

Shell small, outline rhombic, stout, apical angle about  $57^\circ$ ; nucleus blunt, with two convex polished whorls, smooth except the last one-fourth whorl or less, which has three faint axial riblets; four subsequent whorls with a broad antesutural band having two strong spiral threads, next, an equally broad, slightly concave band with one fine thread, next, a peripheral band of the same width with two strong threads; base of body whorl set with alternating coarse and fine threads; entire surface except nucleus and anterior tip cancellated by close threads parallel to the growth lines; anal sinus deeper than broad, coinciding with the peripheral band; aperture broad, a little more than half as long as the shell; outer lip internally lirate, inner lip with two very high columellar folds; canal straight, flaring at the tip. Length, 6 mm.; breadth, 3.2 mm.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista west of Alazan, Mexico. (M. 49 V.)

*Type*.—Cat. No. 352698, U.S.N.M.

## BORSONIA AGUILAE, new species

Plate 1, Figures 8, 8a

Apical angle about  $35^\circ$ ; nucleus of two or three whorls, apparently smooth; posterior half of postnuclear whorls concave to a rounded antesutural collar which becomes obsolete on mature whorls, smooth except for faint spiral lines and growth lines; anterior half of whorls with distinct spiral threads continuing to tip of body whorl, but only four visible on whorls of spire; periphery angular; cut by short round costae about as high as wide, nine costae on sixth whorl; canal straight; aperture nearly half as long as the shell; outer lip broken, inner lip carrying one strong columellar fold with a much weaker fold in front of it; anal sinus semilunate, deepest part midway between the periphery and the suture. Length, 12.5 mm.; breadth, 5 mm.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista west of Alazan, Mexico. (M. 48 V. and M. 49 V.)

*Type*.—Cat. No. 352699 U.S.N.M.

## ANCILLA (ANCILLINA) ALAZANA, new species

Plate 1, Figures 9, 9a

Shell small, subulate; nucleus conical, of about three convex whorls, scarcely separable from the subsequent whorls; postnuclear whorls barrel-shaped; suture bordered posteriorly and nearly concealed by a band of enamel which extends backward from the aperture and gives the earlier whorls a medially constricted appearance; aperture



narrow; canal short; basal notch shallow; basal fasciole narrow, marked by two grooves. Length, 7 mm.; breadth, 2.8 mm.

Some specimens of this species preserve traces of the original color. The shell appears to have been light brown with a darker line at the suture and a nearly white band of enamel behind the suture.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista west of Alazan, Mexico. Abundant. (M. 48 and M. 49 V.)

*Type*.—Cat. No. 352700, U.S.N.M.

#### PROTONEMA, new genus

Melanellids having the nuclear whorls spirally threaded.

*Genotype*.—*Protonema bartschi*, new species.

#### PROTONEMA BARTSCHI, new species

Plate 1, Figures 10, 10a

Shell robust, apical angle about  $28^\circ$ ; suture impressed; nucleus of about four whorls, dextral, first whorl very minute, others convex, with three spiral threads; later whorls polished and smooth except for faint axial growth lines; first and second postnuclear whorls globular, later whorls flattened; fifth and subsequent whorls constricted in front of the suture, giving rise to an antesutural collar; parietal wall free from callus; outer lip broken in all the specimens at hand. Length, 5 mm.; diameter, 2 mm. Another specimen attained a length of 7 mm. and a diameter of 3 mm.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista at La Ceiba Alazan, Mexico. (M. 49 V.)

*Type*.—Cat. No. 352701, U.S.N.M.

#### TURRITELLA CEIBANA, new species

Plate 1, Figures 11, 12

Shell long, slender, apical angle  $12^\circ$  to  $14^\circ$ ; suture deeply impressed; whorls decorated with two pairs of raised beaded threads adjacent to the suture and one lower beaded thread in the depressed medial region. Length of a broken specimen of nine whorls, 33.5 mm.; diameter at larger end, 8.75 mm.; diameter at smaller end, 3 mm.

This species somewhat resembles *T. praezellens* Brown and Pilsbry, but lacks the fine riblets and differs in other details of sculpture.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista at La Ceiba road crossing, Vera Cruz, Mexico (M. 53 V.); Antigua, B. W. I., Cat. No. 167006 U. S. National Museum.

*Type*.—Cat. No. 352702, U.S.N.M.

## NATICA ALAZANA, new species

Plate 2, Figures 1, 1a, 1b

Shell small, thick; whorls four and one-half, smooth except for deep grooves that extend forward from the suture almost to the periphery; suture well marked; aperture asymmetrically semilunate, wider in front than behind; inner lip contiguous to the whorl for half its length; umbilicus with one strong rib. Length, 6 mm.; breadth, 5 mm.

*Natica alazana* closely resembles *Natica "canrena"* from the Chipola formation of Florida, but its whorls are more convex than those of the Florida species.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista west of Alazan, Mexico. (M. 49 V.)

*Type*.—Cat. No. 352704, U.S.N.M.

## POLYNICES (LUNATIA) LACRIMANS, new species

Plate 2, Figures 2, 2a, 2b

Shell small, globular, spire moderately high; whorls rounded, smooth except for antesutural corrugations which become obsolete on the body whorl; aperture large, semilunate; callus half filling the umbilicus, set with a medial bump resembling a teardrop and separated from the rest of the callus by shallow depressions. Length, 8.5 mm.; breadth, 7.2 mm.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista west of Alazan, Mexico. Abundant. (M. 47, 48, 49 V.)

*Type*.—Cat. No. 352705, U.S.N.M.

## POLYNICES (EUSPIRA) BYRAMENSIS, new species

Plate 2, Figures 3, 3a, 3b

*Lunatia* sp. g., COOKE, U. S. Geological Survey Prof. Paper 129, p. 84, 1922.

Spire rather low, sides flattened; whorls, five, constricted in front of the suture; body whorl large; aperture semilunate; umbilicus large, with a broad, low, rounded, spirally striated rib continuous with the callus of the inner lip and bordered anteriorly by a shallow sulcus; callus of inner lip thin. Length, 13.4 mm.; breadth, 12.7 mm.

The umbilical rib is very inconspicuous in all the specimens examined except the type.

This species is rather rare at Vicksburg and Byram, Miss. The specimens from Mexico are small and broken, but seem to have no specific differences from the Mississippi forms.

*Occurrence*.—Oligocene, Byram marl, Vicksburg, Miss. (type, station 3722) and Byram, Miss. (station 6454); Alazan clay, Rio Buena Vista west of Alazan, Mexico. (M. 49 V.)

*Type*.—Cat. No. 352706, U.S.N.M.



## AMPULLINA VAUGHANI, new species

Plate 2, Figures 4, 4a, 4b

Shell small, globose, of about four whorls, spire low; aperture elliptical, posterior half of inner lip thickened and callous; basal fasciole raised, smooth, curved, sharply set off from the remainder of the body whorl and from the umbilicus; umbilicus large, open anteriorly, partly covered posteriorly by the callous inner lip. Length, 5.2 mm.; breadth, 5 mm.

This species is described from a unique specimen which may be young but which appears to show the characteristics of mature shells.

*Occurrence.*—Oligocene, Alazan clay, Rio Buena Vista west of Alazan, Mexico. (M. 49 V.)

*Type.*—Cat. No. 352707, U.S.N.M.

## DENTALIUM OVALE, new species

Plate 2, Figure 5

Shell large, covered with many close-set subequal ribs, those on the concave side a little finer than the others; transverse outline elliptical, the shorter axis in the plane of curvature of the shell; shell thick, concave side thicker than the convex. Length of fragment, 18 mm.; maximum diameter at larger end, 5.5 mm.; minimum diameter, 4.8 mm.

*Occurrence.*—Oligocene, Alazan clay, Rio Buena Vista west of Alazan, Mexico. (M. 49 V.)

*Type.*—Cat. No. 352708, U.S.N.M.

## DENTALIUM (DENTALIUM) ALAZANUM, new species

Plate 2, Figures 6, 6a

Shell moderately large, curvature slight; sculpture, near the tip, of 16 longitudinal ribs, increasing in number toward the aperture by intercalation, all attaining nearly equal size; entire surface covered with elevated transverse riblets, unequally spaced and of unequal size.

This species is known only from fragments, the largest being 16 mm. long and 3.5 mm. in diameter. Of living eastern American species, *Dentalium alazanum* most closely resembles *D. carduus* Dall, but its sculpture is much coarser and more irregular. I know of no comparable fossil species.

*Occurrence.*—Oligocene, Alazan clay, Rio Buena Vista west of Alazan, Mexico. (M. 48, 49 V.)

*Type.*—Cat. No. 352709 U.S.N.M.

## AMUSSIUM ALAZANUM, new species

## Plate 2, Figures 7, 7a

Shell small, thin, suborbicular, nearly equilateral, somewhat tumid medially but compressed laterally, surface smooth except for very faint growth lines and *Camptonectes* striations; apical angle about  $115^{\circ}$ ; ears large, subequal; internal sculpture of ten strong, round, threadlike ribs extending from the umbo, where they are covered by a thin layer of shell, nearly to the margin and ending in flattened nodes. Height, 7.8 mm.; width, 7.6 mm.

The length and number of internal ribs are variable. Another specimen nearly the same size as the type has 11 ribs, and the ribs extend only about two-thirds the distance to the margin. The distal third is smooth and very thin.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista west of Alazan (M. 49 V.) (type) and at La Ceiba Crossing, 9.8 kms. above Tumbadero (M. 52 V., M. 54 V.).

*Type*.—Cat. No. 352710, U.S.N.M.

## PECTEN CEIBANUS, new species

## Plate 2, Figure 8

Right valve equilateral, moderately inflated; ribs 21, round but slightly grooved distally; interspaces nearly flat, narrower than ribs; submargins narrow, convex; anterior ear with about 3 riblets, broken distally; byssal notch apparently shallow; posterior ear oblique, with about 6 riblets; finer sculpture nearly obliterated in type but traces of close-set scabrous sculpture which probably originally covered entire shell remain near distal margin.

Height, 28 mm.; width, 32 mm.; diameter of right valve, 8 mm.

*Occurrence*.—Oligocene, Alazan clay, Rio Buena Vista at La Ceiba Crossing, 9.8 kms. above Tumbadero, Vera Cruz, Mexico. (M. 53 V.)

*Type*.—Cat. No. 352711, U.S.N.M.

## EXPLANATION OF PLATES

## PLATE 1

- FIG. 1. *Gemmula alazana* Cooke  
 2. *Gemmula meza* Cooke  
 3. *Gemmula meza* Cooke (apex)  
 4. *Gemmula meza* var. *mevita* Cooke  
 5. *Pseudotoma alazana* Cooke  
 6. *Scobinella prionota* Cooke  
 7. *Glyptotoma rhombica* Cooke  
 8. *Borsonia aguila* Cooke  
 9. *Ancilla (Ancillina) alazana* Cooke  
 10. *Protonema bartschi* Cooke  
 11. *Turritella ceibana* Cooke  
 12. *Turritella ceibana* Cooke

## PLATE 2

- FIG. 1. *Natica alazana* Cooke  
2. *Polynices (Lunatia) lacrimans* Cooke  
3. *Polynices (Euspira) byramensis* Cooke  
4. *Ampullina vaughani* Cooke  
5. *Dentalium ovale* Cooke  
6. *Dentalium (Dentalium) alazanum* Cooke  
7. *Amussium alazanum* Cooke  
8. *Pecten ccibanus* Cooke



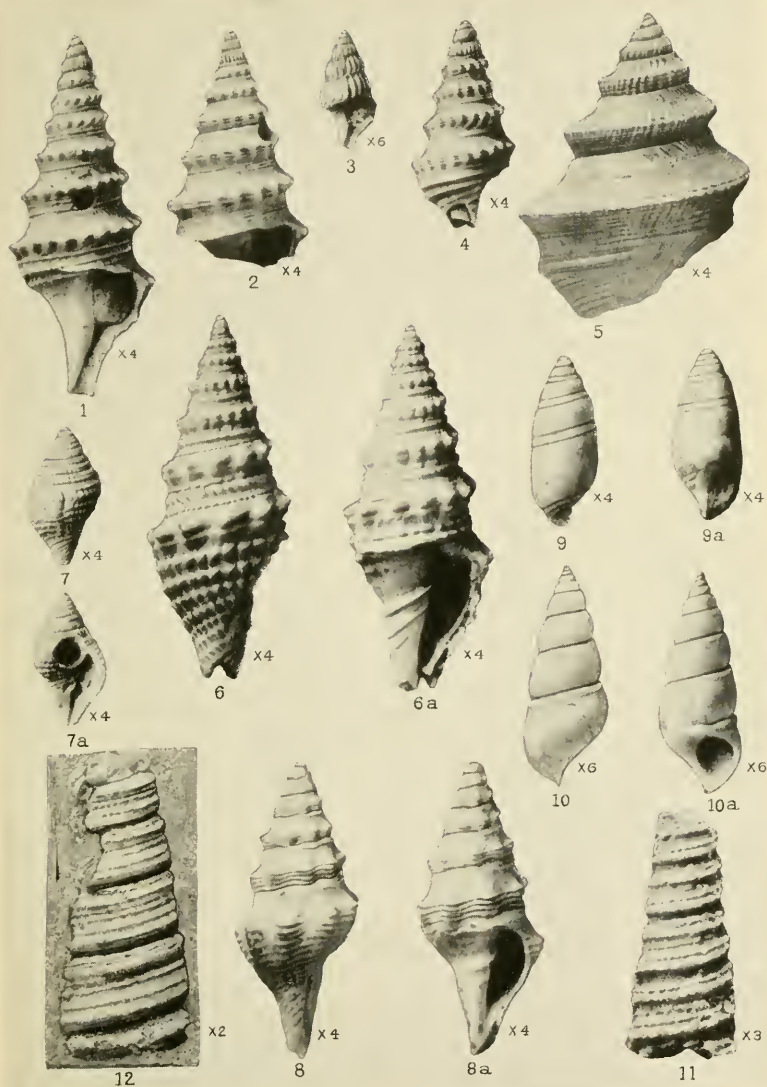


The first part of the book is devoted to a general history of the United States, from the discovery of the continent to the present time. The second part is a history of the individual states, and the third part is a history of the federal government.

The first part of the book is divided into three volumes. The first volume contains the history of the United States from the discovery of the continent to the year 1789. The second volume contains the history of the United States from the year 1789 to the year 1861. The third volume contains the history of the United States from the year 1861 to the present time.

The second part of the book is divided into three volumes. The first volume contains the history of the state of New York. The second volume contains the history of the state of Pennsylvania. The third volume contains the history of the state of Maryland.

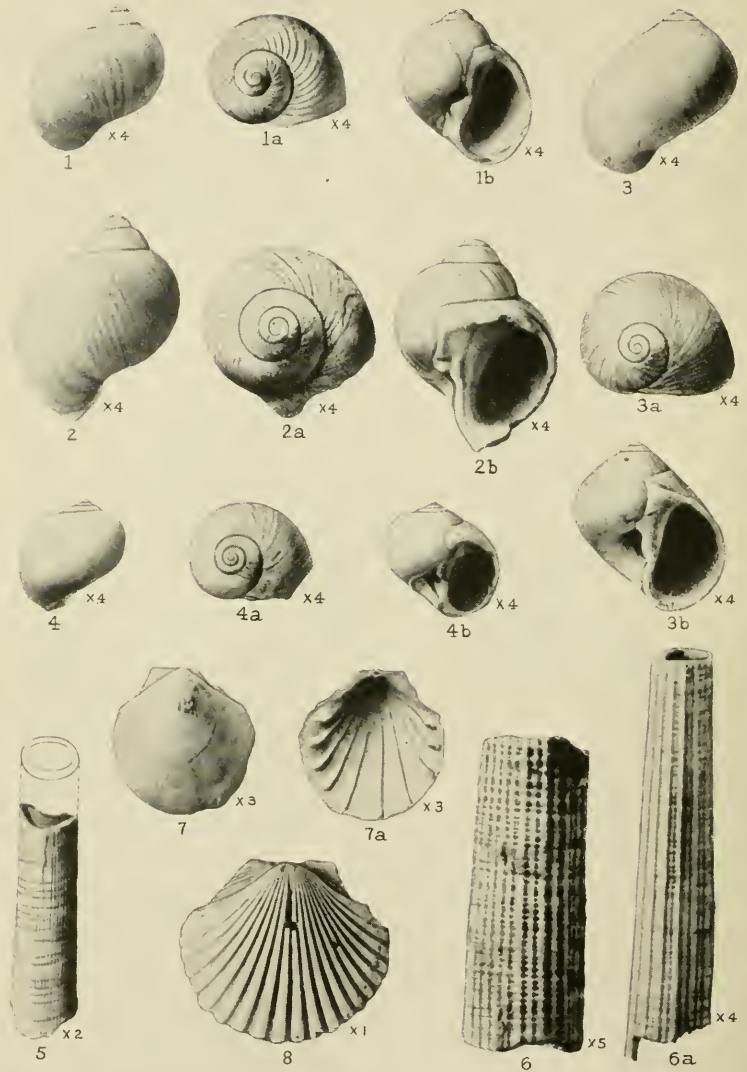
The third part of the book is divided into three volumes. The first volume contains the history of the federal government from the year 1789 to the year 1861. The second volume contains the history of the federal government from the year 1861 to the year 1899. The third volume contains the history of the federal government from the year 1899 to the present time.



VICKSBURG MOLLUSKS FROM MEXICO

Plates have been reduced about 16 per cent

FOR EXPLANATION OF PLATE SEE PAGE 10



VICKSBURG MOLLUSKS FROM MEXICO

Plates have been reduced about 16 per cent

FOR EXPLANATION OF PLATE SEE PAGE 11