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**UPPER CRETACEOUS AMMONITES
FROM HAITI**

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UPPER CRETACEOUS AMMONITES
FROM HAITI

BY
JOHN B. REESIDE, JR.

Shorter contributions to general geology, 1947
(Pages 1-11)



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UPPER CRETACEOUS AMMONITES FROM HAITI

By JOHN B. REESIDE, Jr.

ABSTRACT

Ammonites of the genera *Baculites*, *Parapuzosia*?, *Pachydiscus*, *Texanites*, and *Paralenticeras* are described from Haiti. Two new species of *Pachydiscus* are proposed. The age of the fauna is interpreted as late lower Senonian.

GENERAL STATEMENT

In recent work in the Republic of Haiti Messrs. W. P. Woodring and L. S. Gardner, of the Geological Survey, made a collection of Upper Cretaceous ammonites that seems worthy of record. From the neighboring Dominican Republic Gabb (1873, p. 87) long ago reported an ammonite and a dubious baculite, but the writer knows of no other published report of such fossils from the island of Hispaniola.

Dr. Woodring has kindly supplied the following statement:

The ammonites were collected from boulders of weathered, relatively soft calcareous sandstone, containing pebbles and granules of basalt, at two localities in Rivière Corail, a south-eastward-flowing stream entering Grand Rivière about 8 miles north of Jacmel. The country rock is basalt, part of an extensive area of basalt in the interior of the Southern Peninsula. About 6 miles to the west-northwest limy sediments interbedded with the basalt and including basalt pillows contain caprinids indicating late Lower Cretaceous age (Aptian-Albian). The fossiliferous boulders found on Rivière Corail may represent sediments interbedded with the basalt, or an Upper Cretaceous formation overlying the basalt, or may have been derived from conglomerate at the base of Eocene limestone, which overlies the basalt at localities examined.

The precise location of the two finds is as follows:

U. S. Geological Survey Mesozoic locality 18723. Petite Rivière (or Rivière Corail), about 2 miles northwest of junction with Grande Rivière de Jacmel, Arrondissement of Jacmel, southern part of the Republic of Haiti.

U. S. Geological Survey Mesozoic locality 18724. Same as 18723 but 200 feet northwest of junction.

THE FOSSILS AND THEIR CORRELATION

The ammonites contained in this collection are as follows:

Baculites sp.
Parapuzosia? sp.
Pachydiscus ("Parapachydiscus") *gardneri* Reeside

Pachydiscus ("Parapachydiscus") *woodringi* Reeside
Paralenticeras sieversi (Gerhardt)
Texanites ("Mortoniceras") cf. *T. cañaensis* (Gerhardt)

The nearest recorded occurrence of Upper Cretaceous ammonites in the West Indies is that in Jamaica reported by Spath (1925). From Providence, near Port Antonia, in shales underlying a limestone with *Rudistae* and rather low in the sequence, were described *Epigonicerases* sp., *Parapachydiscus* aff. *P. stallauensis* (Imkeller), *Parapachydiscus* aff. *P. gollevillensis* (D'Orbigny), *Glyptoxoceras* cf. *G. rugatum* (Forbes), and *Baculites* sp. This fauna is assigned by Spath to the upper Senonian (Campanian-Maestrichtian).

From Jamaica also Trechmann (1936) reported the occurrence of an ammonite in "probably the lowest known fossiliferous shales, 800 feet below a *Barrettia* limestone," that was identified by Spath as *Nowakites* aff. *N. paillettei* (D'Orbigny). This form is said to suggest a "Senonian (upper Coniacian or lower Santonian) age."

The next nearest occurrence of Upper Cretaceous ammonites is that in central Puerto Rico recorded by Meyerhoff (1932), who reports identifications by Reeside of *Barroisicerases* aff. *B. haberfellneri* (Von Hauer) and *Parapuzosia* aff. *P. corbarica* (Grossouvre) from tuffaceous deposits. These were assigned to the lower Senonian (Coniacian).

A third occurrence is that recorded by Rutten (1936, pp. 35, 36), who lists apparently preliminary identifications by Jaworski of ammonites from three localities in the central part of Santa Clara Province, Cuba. These are reported as from limestones intercalated in the tuff series, which underlies the Habana formation, of Maestrichtian age. The forms found at the three localities are as follows: (1) *Austinicerases* *dibleyi* Spath, *Pachydiscus* cf. *P. colligatus* Binckhorst, *Peroniceras* aff. *P. tricarinatum* (Frič) Burckhardt, *P.* cf. *P. ezörrigi* (Redtenbacher); (2) *Peroniceras cocchi* Meneghini, *P.* aff. *P. tricarinatum*, *Crioceras* sp.; and (3) *Austinicerases dibleyi* Spath, *Barroisicerases* sp. This fauna is assigned to a Turonian-Emscherian (Coniacian) age.

A pertinent fauna is found in Venezuela. Gerhardt (1897, pp. 70-84) recorded an Upper Cretaceous ammonite fauna from western Venezuela, giving the source of

the material as a blue-black bituminous limestone near Rubio, between Caña and Amarillo, State of Táchira. The species recorded are: *Mortoniceras texanum* (Roemer), *M. cañaense* Gerhardt, *Gauthiericeras lenti* Gerhardt, *G. margae* (Schlüter), *Amaltheus sieversi* Gerhardt, and *Lenticeras andii* Gerhardt. These were assigned to the lower Senonian (Coniacian-Santonian). Liddle (1928, p. 168) assigned Gerhardt's locality to the Colón shale, to include the La Luna limestone as that term was used by Liddle. He also cited from the lower part of the Colón shale at a locality on the road between San Cristóbal and Cúcuta, in the State of Táchira, *Amaltheus sieversi* and *Lenticeras andii*, and from a locality on Quebrada La Luna, in the District of Perijá, State of Zulia, *Mortoniceras texanum*, *Amaltheus sieversi*, and *Gauthiericeras lenti*. At both these localities other species also are cited. Liddle (p. 169) says of the sequence in the vicinity of Rubio, hence near Gerhardt's locality:

To the west and southwest of Rubio there are good sections of the Colon shales exposed. Limestone nodules and lentils carry a good ammonite fauna. The few thin limestone beds, which are intercalated with the shales, are very poorly fossiliferous. Most of the ammonites come from a cherty, nodular horizon near the base of the shales.

Kehrer (1937, pp. 48-51) describes the La Luna limestone near Colón, Táchira, as including black and gray cherts above and dark well-bedded limestone below. The overlying Colon shale is said to be dark shale with some intercalated limestones. It would seem that Gerhardt's locality and Liddle's locality in Táchira are in the upper part of the La Luna limestone of present usage. Hedberg and Sass (1937, p. 80) refer Liddle's locality in Perijá also to the La Luna.

The ammonites from Haiti seem to have little in common with those from Jamaica, for the species of *Pachydiscus* present are not closely related, and there is still less in common with the ammonites listed from Puerto Rico and Cuba. On the contrary, the fauna reported by Gerhardt from southwestern Venezuela appears to be closely related. Gerhardt's list includes both a Coniacian species, *Gauthiericeras margae*, and a Santonian species, *Mortoniceras texanum*. *Mortoniceras cañaense* is most like *M. bourgeoisi* (D'Orbigny) (Grossouvre, 1894, p. 73), which is assigned to the uppermost Coniacian and lower Santonian by Grossouvre. However, Gerhardt did not report *Pachydiscus* from Venezuela, nor did Liddle, and the Haitian species of *Pachydiscus* seem nearest to, though certainly not identical with, forms that have been referred to a post-Santonian age. The La Luna limestone contains at some localities, presumably in the lower beds, definitely Turonian ammonites (Hedberg and Sass, 1937, p. 80) and, presumably at other horizons, Coniacian forms. Hedberg and Sass interpret the Foraminifera of the Colon shale to suggest equivalence to the Taylor marl

of Texas, that is, Campanian. To the present writer it seems most likely that the Haitian ammonites are to be placed as approximately Santonian, that is, late lower Senonian.

DESCRIPTION OF SPECIES

Genus **BACULITES** Lamarck

Baculites sp. indet.

Plate 3, figures 1-6

Three small fragments of an apparently smooth species of baculite with broad-ovate cross section and simple suture were found. One specimen measures 3.1 mm. in greatest diameter and 2.8 mm. in least diameter; the second is very nearly the same; the third is smaller but is much crushed. As these specimens are juvenile it is not profitable to make comparisons, and they are recorded and illustrated for what they are worth.

Figured specimens: U. S. N. M. 104163.

Occurrence: U. S. G. S. 18723.

Genus **PARAPUZOSIA** Nowak

Parapuzosia? sp.

Plate 3, figures 7-10

A single, very young specimen that retains parts of the shell differs from all others of similar size in the collection.

The shell is compressed. Cross section of whorl oval, higher than wide, flanks and venter evenly rounded. Umbilical moderately wide, with low but distinct umbilical wall; umbilical shoulder rounded. Measurements in millimeters and percentage of diameter: Diameter, 11.7; height of outer whorl, 4.6, 39; thickness of outer whorl, 4.1, 35; width of umbilicus, 3.4, 29.

The shell is apparently nearly smooth throughout. At a diameter of approximately 7 mm., the internal mold shows a clear constriction running from the inner part of the flank across the venter, and bending gently forward on the venter. There are faint indications of two more constrictions on the last whorl, though none were conspicuous on the exterior of the shell itself.

The suture has the first lateral lobe a little longer than the siphonal lobe, with the remaining lobes much inclined to the radial line, and the external saddle unequally bifid. Suture much dissected.

This specimen would appear to belong to either *Parapuzosia* or *Hauericeras*. According to Pervinquier (1907, p. 165) the keel is not present in young *Hauericeras*, and young "*Puzosia* of the *gaudama* group" (*Parapuzosia*) are very close to young *Hauericeras* in form, differing, however, in the details of the suture. The external saddle of *Parapuzosia* is bifid, the first lateral lobe is much longer than the external

lobe, and the outer marginal saddle of the first lateral lobe is much higher in position than the inner marginal saddle, whereas the external saddle of *Hauericeras* is trifid, the first lateral lobe is but little longer than the external lobe, and the outer marginal saddle of the first lateral lobe is lower in position than the inner marginal saddle. Both are compressed, have a moderately wide umbilicus and show constrictions. The present specimen has the required external form and sculpture for either *Parapuzosia* or *Hauericeras*. The external saddle of the suture is not symmetrically bifid, but it does not show the clearly trifid form of *Hauericeras*, the first lateral lobe is only a little longer than the external lobe, and the outer and inner marginal saddles of the first lateral lobe are on the same level. Thus the suture does not clearly place this form in either *Parapuzosia* or *Hauericeras*. The writer assigns it with some doubt to *Parapuzosia*.

Figured specimen: U. S. N. M. 104161.

Occurrence: U. S. G. S. 18723.

Genus *PACHYDISCUS* zittel

(*Parapachydiscus* of many authors)

The writer agrees with Spath (1939) that Grossouvre's selection (1894, p. 176) of *Ammonites neubergicus* Hauer as the type of *Pachydiscus* should be respected and that *Parapachydiscus* Hyatt (1900, p. 570) falls into synonymy. As thus defined, *Pachydiscus* appears to have a compressed to moderately stout shell, with relatively small umbilicus, gently rounded umbilical shoulder, rounded external margin; surface costate, no constrictions, weak or no umbilical nodes, no ventral nodes; costae generally flexuous, including both umbilical and intercalated costae; late stages mostly smooth. Suture much dissected, crowded, with long, slender elements; first lateral lobe the longest, tops of saddles in nearly straight line.

Pachydiscus ("Parapachydiscus") *gardneri* Reeside n. sp.

Plate 1, figures 1, 2, 5-20

This species is represented by half a dozen more or less broken specimens ranging in diameter from 25 mm. to approximately 115 mm. About 30 juvenile specimens belong at least in part to this species.

Shell at all stages moderately stout; cross section of whorl widest about one-third the distance out from the umbilicus to the siphonal line, in the early stages proportionately wider than in the later stages; flanks and venter evenly rounded. Living chamber and aperture not seen. Umbilicus relatively narrow, with definite steep umbilical wall and broadly rounded shoulder. Measurements of holotype and other specimens, in millimeters and percentage of diameter of shell, follow:

	Diameter (millimeters)	Height of outer whorl		Thickness of outer whorl		Width of umbilicus	
		Millimeters	Per cent	Millimeters	Per cent	Millimeters	Per cent
Holotype	79	39	49	36	46	15	19
Do.	134	17	50	15	44	65	19
Do.	115	7.3	49	8.2	55	3.2	21
Paratype 1	29.5	15	51	15	51	52	18
Paratype 2	26	12.7	49	13.7	53	5	19
Paratype 3	9.0	4.6	44	5.2	58	2.0	22
Paratype 4	115	55	48	51	44	19	16

† Estimated.

The whorls of specimens up to about 15 mm. diameter, assumed to belong to this species, are smooth. At about 15 mm. diameter irregularly spaced, rather distant, low, threadlike ribs, gently convex orad appear on the venter and extend down to the middle of the flank. On paratype 1 there appear to be 8 of these ribs on the half whorl ending at 29 mm. diameter. On the holotype, part of the whorl from about 40 mm. diameter to 79 mm. diameter shows proportionately about twice as many ribs per whorl on the venter as does paratype 1, with some of them extending farther down the flank and showing a gentle sinuosity on the flank. The largest specimen, paratype 4, attaining an estimated diameter of 115 mm., is much like the holotype but shows nearly twice as many ribs on the venter, the last quarter whorl having 15. The innermost part of the flank is smooth in all these specimens. On internal molds the ribs are only feebly indicated. No nodes or constrictions are shown by any of the specimens.

The suture has much the same features throughout becoming more dissected with increasing size.

The chief characters of the species are its relative stoutness of whorl, with widest part one-third way out on flank; smooth inner part of the flank; flexuous but weak costae on the outer part of the flank and venter; lack of nodes at any stage.

The species most resembles *Pachydiscus ootacodensis* (Stoliczka) (1866, p. 109, pl. 54, figs. 3, 4; pl. 56), particularly as illustrated by Kossmat (1897, p. 98, pl. 16, fig. 1; pl. 17, fig. 1). Both have the inner part of the flank smooth, umbilicus relatively narrow, whorls relatively stout. At the same diameters, however, *P. ootacodensis* is somewhat stouter, has much more regularity of ribbing, fewer ribs per whorl, and the widest part of the whorl nearer the umbilicus.

Types: Holotype, U.S.N.M. 104157; figured paratypes, U.S.N.M. 104169 A-E; unfigured paratypes, U.S.N.M. 104169.

Occurrence: U.S.G.S. locality 18723.

Pachydiscus ("Parapachydiscus") *woodringi* Reeside n. sp.

Plate 2, figures 1-15

This species is represented by 5 specimens ranging in diameter from 25 mm. to 90 mm. Some of the juvenile

specimens noted under *P. gardneri* probably belong to this species but are not definitely assignable.

Shell moderately stout at all stages; cross section of whorl widest about one-fourth the distance out from the umbilicus to the siphonal line; early stages stouter than the later stages, but not as much so as in *P. gardneri*; flanks and venter evenly rounded. Umbilicus relatively narrow, with definite steep umbilical wall and broadly rounded shoulder. Measurements of holotype and other specimens, in millimeters and percentage of diameter of shell, follow:

	Diameter (millimeters)	Height of outer whorl		Thickness of outer whorl		Width of umbilicus	
		Millimeters	Percent	Millimeters	Percent	Millimeters	Percent
Holotype.....	90	42	47	¹ 47	52	17.2	19
Do.....	69	30	45	¹ 34	50	12.3	18
Do.....	39	19	49	¹ 21	54	7.5	19
Do.....	25.8	13.5	52	¹ 14.2	55	5.2	20
Do.....	16.7	8.5	52	10	60	3.1	19
Do.....	11	5.5	50	6.2	55	2.3	20
Paratype 1.....	¹ 31.5	14.5	46	15.4	50	6.8	21
Paratype 2.....	¹ 37	18.2	49	18.7	51	7.1	19

¹ Estimated.

The whorls of specimens up to about 10 mm. diameter appear to be smooth. Then there appear on the flanks faint radial swellings, and, about 20 mm. diameter, these extend across the venter as costae. In all succeeding stages up to 90 mm., the largest available, the surface bears somewhat distant, regularly spaced, narrow, rounded costae that begin on the umbilical shoulder and pass with somewhat flexuous course to the venter, where they form a feeble arcuation forward. There are from 12 to 14 of these primary ribs per whorl. Between each pair are one or more secondary ribs that begin somewhere on the flank and cross the venter parallel to the primary ribs, most of these secondary ribs being weaker than the primary ribs, but an occasional one attaining equal prominence. No nodes or constrictions on any of the specimens. The sculpture is much weaker on internal molds than on the shell itself.

The suture has much the same features throughout, becoming more dissected with age.

The chief characters of the species are its relative stoutness of whorl, with maximum width about one-fourth the way out on the flank; the more or less flexuous costae, with regularly spaced primary ribs extending from the umbilical shoulder over the venter and a few secondary ribs intercalated.

The species resembles in sculpture a form figured by Schlüter (1872, p. 56, pl. 18, figs. 10, 11) as *Ammonites* cf. *A. stobaei* Nilsson but differs sharply in its stouter whorls. It differs from the associated *Pachydiscus gardneri* in having umbilical costae and in its somewhat stouter whorls.

Types: Holotype, U. S. N. M. 104158; paratypes, U. S. N. M. 104159, 104160A-D.

Occurrence: Holotype, U. S. G. S. 18724; paratypes, U. S. G. S. 18723. Both in loose boulders.

Genus *PARALENTICERAS* Hyatt

Whorls compressed, nearly smooth; umbilicus very small; venter narrowly rounded; suture with triangular first lateral lobe near the middle of the flank and two adventitious lobes between the siphonal lobe and the first lateral lobe, second lateral lobe small, all moderately incised.

Resembles *Spheniscoceras* Crick (in Spath, South African Mus. Ann., vol. 12, p. 242, 1921) in form, but differs in having two adventitious lobes instead of one.

Paralenticeras sieversi (Gerhardt)

Plate 3, figures 13-21

1897. *Amaltheus sieversi* Gerhardt, Neues Jahrb., Beilage-Band 11, p. 79, pl. 1, figs. 5a, b.

Shell flat, disk-shaped; very involute, so that only a narrow umbilicus remains visible. Flanks gently swollen, descending with gentle curvature to the umbilicus, decorated with fine, falcate, undulating striae that are more distinct on the inner third than farther out. External margin intermediate between keeled and rounded. Internal mold smooth.

Shell not preserved on the venter.

Suture line: The saddle within the siphonal lobe has in the middle a semicircular secondary saddle; the external saddle is broad, consisting of three rather strongly incised branches whose anterior ends lie in a curved line such that the innermost branch extends farthest forward. The first lateral saddle may also be conceived as tripartite and is only half as broad and less incised than the external saddle, its base being as broad as high. The second lateral saddle consists of two similar parts separated by a weak middle notch, each of which parts is again divided by a weaker notch. One or two auxiliary saddles follow that lie posterior to the second lateral saddle.

The siphonal lobe is unsymmetrical. The first lateral lobe is the most extensively developed, extending farthest posteriorly, with its base symmetrically tripartite. The second lateral lobe recalls a hand with extended fingers.—Gerhardt, translated.

The Haitian material assigned to this species consists of a well-preserved fragment of a larger whorl representing the shell at a diameter of perhaps 100 mm., a small individual with maximum diameter of perhaps 27 mm., and several fragments of the periphery of a very large whorl. The characters of these specimens, so far as they are shown, agree closely with those indicated by Gerhardt's description and figures of the genotype specimen. Minor differences appear in the sutures, but they seem of no consequence. Gerhardt's specimen as figured is a half whorl with a maximum diameter of 59 mm. It does not show the same stages as either of the Haitian specimens, but no features observable appear to warrant a separation.

Liddle (1928) records the species in several lists from localities in western Venezuela, from which region Gerhardt's specimen came.

Plesiotypes: U. S. N. M. 104167.

Locality: U. S. G. S. 18723.

Genus *TEXANITES* Spath

(Mortoniceras of many authors)

Texanites ("Mortoniceras") cf. *T. cañaensis* (Gerhardt)

Plate 3, figures 24-31

Two small specimens seem clearly referable to *Texanites* and are comparable to such species as *T. cañaensis* (Gerhardt) (1897, p. 73) and *T. bourgeoisi* (D'Orbigny) (Grossouvre, 1894, p. 73). In this group of forms there is in mature stages an umbilical tubercle and a pair of ventrolateral tubercles on each rib.

One of the present specimens represents nearly a half whorl at a diameter of about 23 mm. and retains most of the shell. It is compressed, with the last cross section of the whorl 6 mm. wide and 8.5 mm. high, subquadrate in outline. The umbilicus is moderately wide, about one-third the diameter. The ornamentation consists of a rounded median keel and mainly simple ribs, about 32 per whorl, but with a few ribs per whorl that divide near the umbilicus. The ribs are inclined gently forward and are gently flexuous. Each rib bears on the umbilical shoulder a feeble tubercle and ends on the venter in a transverse node separated from the keel by a furrow. A second node is feebly developed on the ventrolateral shoulder. The suture is simple, with a wide external saddle and first lateral lobe as long as the siphonal lobe. This specimen recalls that figured by Grossouvre as young *T. bourgeoisi* (1894, pl. 14, fig. 4), except that it has more ribs per whorl.

A second specimen is much crushed but indicates some of the features of a later stage than the first. It has a maximum diameter of about 45 mm. On the quarter whorl ending at a diameter of 35 mm. there are 16 ribs corresponding to the 10 umbilical nodes. Both ventrolateral nodes appear to be elongated transverse to the rib. At 45 mm. the ribs appear to have become faint on the flanks, and the nodes are the main sculpture, the umbilical nodes having a conical form and the ventrolateral nodes being transverse. The suture is not observable.

Figured specimens: U. S. N. M. 104166.

Occurrence: U. S. G. S. 18723.

PELECYPODS

Plate 1, figures 3, 4; plate 3, figures 11, 12, 22, 23, 32

Several poorly preserved pelecypods were found in the matrix of the ammonites. One (pl. 3, figs. 22, 23) is a species of *Roudairia* from locality 18724, represented by a single valve and much like *R. intermedia* Brüggen (1910, p. 756, pl. 26, fig. 2). A second form (pl. 3, fig.

32) is represented by a subtriangular internal mold from locality 18723 showing wide, low concentric undulations. It suggests a species of *Ostrea* more than any other genus. A third form (pl. 1, figs. 3, 4; pl. 3, figs. 11, 12) represented by three specimens from locality 18723 may be a venerid, but details are lacking on which to base a significant assignment. These specimens are figured to complete the record.

Figured specimens: U. S. N. M. 104164, 104165, 104162A-C.

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PLATES 1-3

PLATE 1

[All figures natural size unless otherwise indicated]

FIGURES 1-2, 5-20. *Pachydiscus* ("Parapachydiscus") *gardneri* Reeside, n. sp. (p. 3). Locality 18723.

1, 2. Side and rear views, $\times 3$, of a small paratype (No. 3) retaining the shell and probably representing this species; U. S. N. M. 104169A.

5-7. Side, rear, and front views of paratype 2, an internal mold retaining a little of the shell; U. S. N. M. 104169B.

8, 9. Side and rear views, $\times 2$, of a small paratype (No. 5) retaining the shell and probably representing this species; U. S. N. M. 104169C.

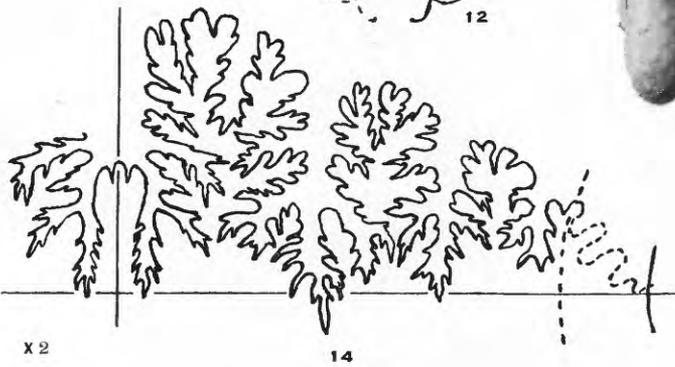
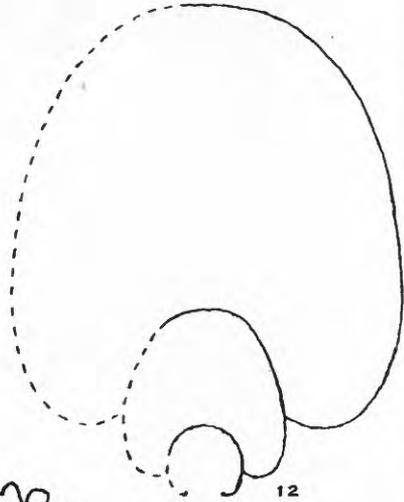
10, 11. Side and rear views of paratype 6, an internal mold; U. S. N. M. 104169D.

12, 13. Restored cross section and side view of largest paratype (No. 4), an internal mold retaining little of the shell; U. S. N. M. 104169E.

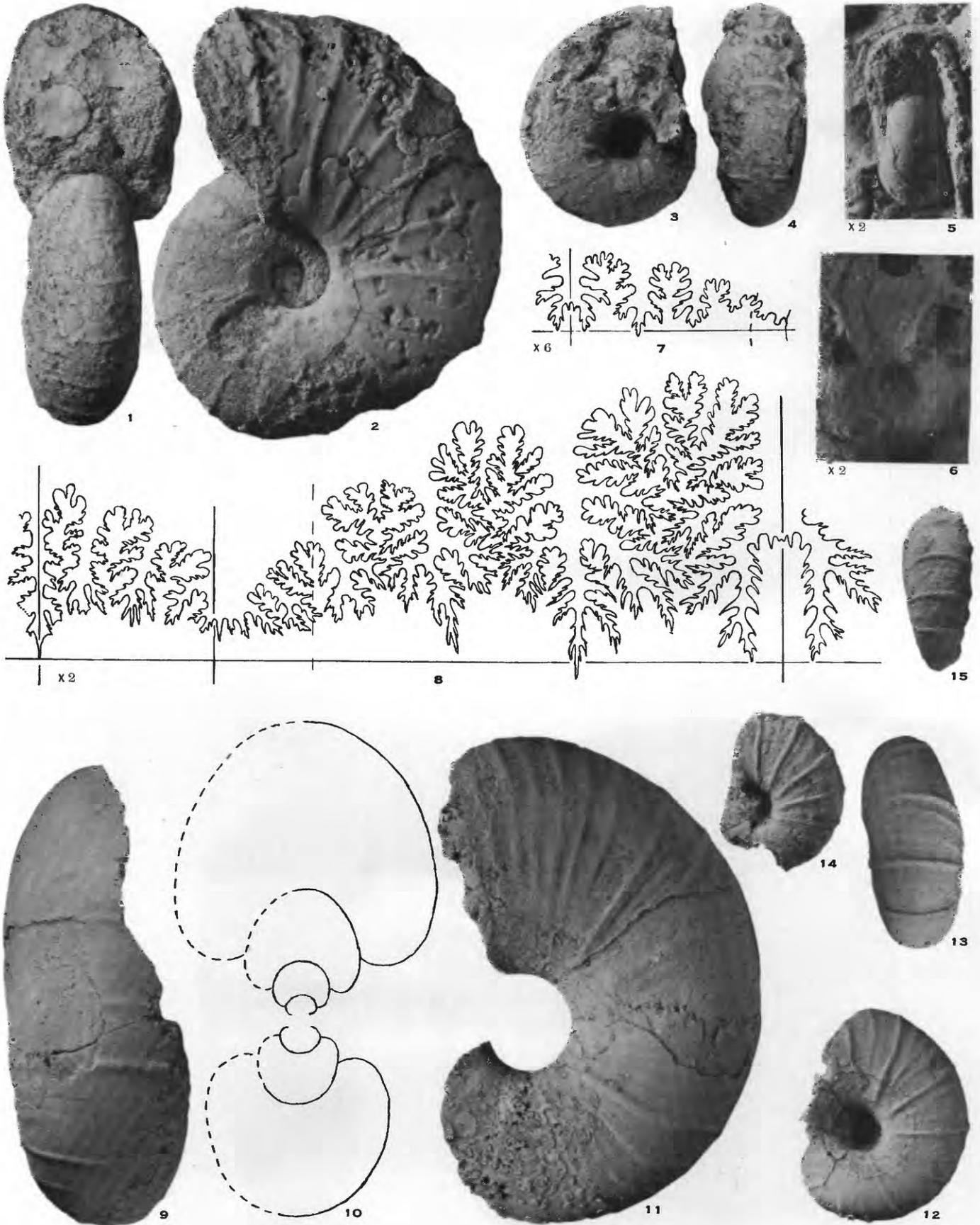
14-17. Suture, $\times 2$, at 53 mm. diameter; side, rear, and front views of the holotype, a specimen retaining part of the shell; U. S. N. M. 104157.

18-20. Rear, front, and side views of paratype 1, a specimen retaining much of the shell; U. S. N. M. 104169F.

FIGURES 3, 4. Venerid? pelecypod, locality 18723 (p. 5); lateral and posterior views, $\times 2$, of an internal mold; U. S. N. M. 104162A.



UPPER CRETACEOUS MOLLUSKS.



UPPER CRETACEOUS MOLLUSKS.

PLATE 2

[All figures natural size unless otherwise indicated]

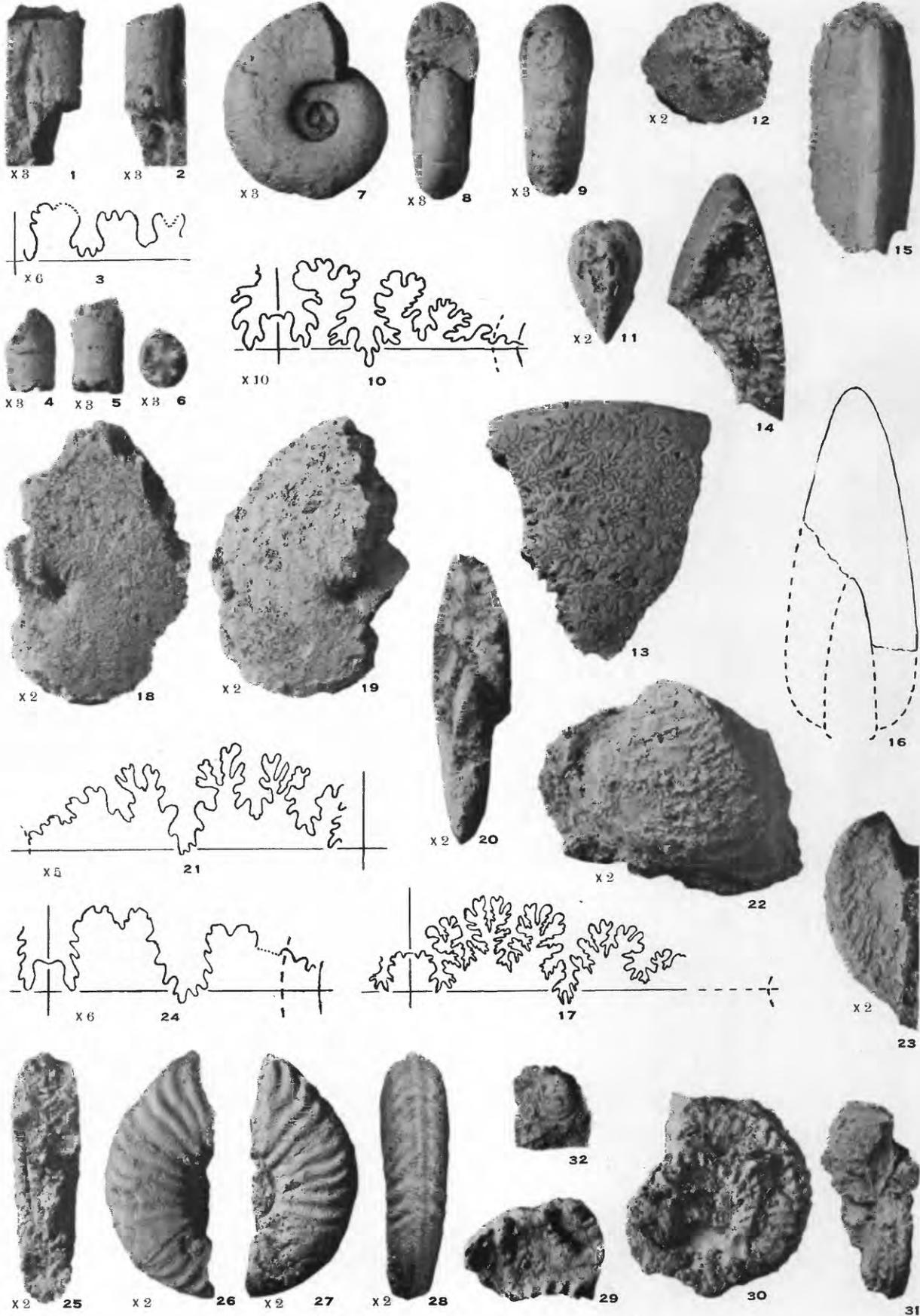
FIGURES 1-15. *Pachydiscus* ("Parapachydiscus") *woodringi* Reeside, n. sp. (p. 3).

- 1, 2. Front and side views of a somewhat crushed paratype (No. 4) retaining parts of the shell; U. S. N. M. 104160A. Locality 18723.
- 3, 4. Side and rear views of paratype 2, an internal mold retaining parts of the shell; U. S. N. M. 104160B. Locality 18723.
- 5-13. Holotype, a specimen retaining much of the shell; U. S. N. M. 104158. Locality 18724.
 - 5, 6. Front and side views, $\times 2$, of innermost whorls.
 7. Suture, $\times 6$, at 9 mm. diameter.
 8. Suture, $\times 2$, at 75 mm. diameter.
 - 9-11. Rear and side views and restored cross section of outer whorl.
 - 12, 13. Side and rear views of intermediate whorl.
- 14, 15. Rear and side views of paratype 1, a specimen retaining the shell; U. S. N. M. 104160D. Locality 18723.

PLATE 3

[All figures natural size unless otherwise indicated]

- FIGURES 1-6. *Baculites* sp. (p. 2); U.S.N.M. 104163. Locality 18723.
1-3. Lateral and antisiphonal views, $\times 3$, and suture, $\times 6$, of a fragment.
4-6. Siphonal, lateral, and septal views, $\times 3$, of a second fragment.
- FIGURES 7-10. *Parapuzosia?* sp. (p. 2); U.S.N.M. 104161. Locality 18723.
Side, front, and rear views, $\times 3$, and suture, $\times 10$, at a diameter of 75 mm., of an internal mold retaining parts of the shell.
- FIGURES 11, 12. Venerid? pelecypod (p. 5); U.S.N.M. 104162C. Locality 18723. Anterior and lateral views, $\times 2$.
- FIGURES 13-21. *Paralenticeras sieversi* (Gerhardt) (p. 3); U.S.N.M. 104167. Locality 18723.
13-17. Side, rear, and ventral views, restored cross section, and suture, at approximately 100 mm. diameter, of a fragment of a whorl.
18-21. Two side views and front view, $\times 2$, and suture, $\times 5$, at 18 mm. diameter, of a small internal mold.
- FIGURES 22-23. *Roudairia* aff. *R. intermedia* Brügger (p. 5); U.S.N.M. 104164. Locality 18724.
Lateral and posterior views, $\times 2$.
- FIGURES 24-31. *Texanites* ("Mortoniceras") cf. *T. canaensis* (Gerhardt) (p. 5); U.S.N.M. 104166. Locality 18723.
24-28. Suture, $\times 6$, at 23 mm. diameter; two side views, front view, and ventral view, $\times 2$, of a fragmentary specimen retaining the shell.
29. Fragment of a larger crushed specimen showing obsolescence of the ribs on the flank.
30-31. Side and front views of another fragment of the same specimen as figure 29, at a smaller stage and from the opposite side.
- FIGURE 32. *Ostrea?* sp. (p. 5); U.S.N.M. 104165. Locality 18723. Lateral view.



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