

**A SUPPLEMENT TO THE MONOGRAPH OF THE
FORAMINIFERAL FAMILY VERNEUILINIDAE**

By
JOSEPH A. CUSHMAN

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Since the publication in 1937 of the Monograph of the Foraminiferal Family Verneuilinidae (Special Publication No. 7, Cushman Laboratory for Foraminiferal Research), there have been many additions to the literature of this group. To bring the work up to date this publication has been prepared to give additional references to the species and varieties included in the original monograph and to give figures and descriptions of the many new species and varieties since the publication of that monograph. Notes as to age and location are also given with each reference.

Family VERNEUILINIDAE

Genus VERNEUILINA d'Orbigny, 1840

VERNEUILINA MAURITII *Torres*

Verneuilina mauritii BARTENSTEIN and BRAND, Abhandl. Senck. Nat. Ges., No. 439, 1937, p. 183, pl. 1A, fig. 22. (Lias - Germany)

VERNEUILINA FAVA *Bartenstein* (Pl. 1, fig. 1)

Verneuilina favus BARTENSTEIN, in BARTENSTEIN and BRAND, Abhandl. Senck. Nat. Ges., No. 439, 1937, p. 183, text fig. 18. (*Verneuilina pulchra*—*constructa* n. sp. in expl. of fig. 18)

Test slender, triangular in section, the angles more or less rounded, chambers regularly 3 to a whorl; increasing gradually in height as added; sutures slightly depressed; wall finely arenaceous, surface smooth; aperture on the inner margin of the last-formed chamber. Length 0.47 mm.; breadth 0.08 mm.—Translation.

The types are from the Jurassic-Dogger, *Aspidoides* beds, Ziegelei Temme, Hildesheim, Germany.

VERNEUILINA NEOCOMIENSIS *Mjatliuk*

Verneuilina neocomiensis Mjatliuk, Trans. Geol. Oil-Prospect. Institut., ser. A, fasc. 120, 1939, p. 50, pl. 1, figs. 12, 13.

The types are from the Lower Cretaceous, Neocomian, of the Middle Volga region, U. S. S. R.

The original has not been available for figures and description.

VERNEUILINA SCHIZEA *Cushman and Alexander*

Verneuilina schizea CUSHMAN, Foraminifera, 3rd Ed., 1940, Key, pl. 7, fig. 21. (Lias)

Cretaceous - Texas)—Loso, Amer. Midland Nat., vol. 31, 1944, p. 550, pl. 3, fig. 6.
(Lower Cretaceous - Texas).

VERNEUILINA ORNATA Cushman

Verneuilina limbata CUSHMAN (not TERQUEM, 1882), Special Publ. 6, Cushman Lab. Foram. Res., 1936, p. 2, pl. 1, fig. 2; Special Publ. 7, 1937, p. 12, pl. 1, fig. 21; pl. 2, figs. 1-5.

Verneuilina ornata CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 28.

A new name was given to this species from the Cretaceous of Europe, *V. limbata* already having been used by Terquem.

VERNEUILINA KURTI Jennings (Pl. 1, fig. 2)

Verneuilina kurti JENNINGS, Bull. Amer. Pal., vol. 23, No. 78, 1936, p. 12, pl. 1, fig. 4.

"Test small, pyramidal, almost equidimensional, triangular in cross-section, margins rounded; early chambers flush, later chambers slightly inflated; early sutures almost invisible, later ones somewhat depressed; wall finely arenaceous, smooth, with much cement; aperture an arched opening in the center of the base of the last chamber. Length, to 0.45 mm.; width, 0.40 mm.

"This form differs from *V. bronni* in the greater rounding of the margins and in the inflated character of the later chambers. Also the upper surface and aperture are more arched."

The types are from the Upper Cretaceous, Navesink marl, of New Jersey.

VERNEUILINA POLYSTROPHA Reuss

Verneuilina polystropha PAUL, Mitteil. Badischen Geol. Landes., vol. 12, pt. 1, 1938, p. 41. (Oligocene - Bruchsal, Germany)—CUSHMAN, Foraminifera, 3rd Ed., 1940, Key, pl. 7, fig. 22. (Cretaceous - Trinidad)—DE WITT PUYT, Geol. Pal. Besch. Umgehung von Ljubuski, Hercegovina, Utrecht, 1941, p. 46, pl. 1, fig. 11. (Eocene, FLYSCH - Hercegovina).

VERNEUILINA PINARENSIS Cushman and Bermúdez

Verneuilina pinarensis BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 12, 1938, p. 25. (Eocene - Cuba).

VERNEUILINA BROWNI Finlay (Pl. 1, figs. 4, 5)

Verneuilina browni FINLAY, Trans. Roy. Soc. New Zealand, vol. 69, 1939, p. 91, pl. 14, figs. 72, 73.

"Shell large, triangular, with sharp angles and many chambers; usually tapering fairly regularly to a sharp posterior point, but often with greatest width one-third of length from aperture, thence with a curved posterior taper and a much slighter anterior one; built of fine sandgrains in much cement. About 12 chambers on each side meeting in a zigzag central line between keels, which are sharp over the whole shell with practically flat surfaces between. Posterior ends of chambers form small backwardly pointing serrations along keels. Sutures inconspicuous, ter-

minimal three chambers angularly flattened at top. Aperture a small sub-circular opening with a narrow rim, situated in a small depression at junction of the three chambers. The general appearance is very like that of *Gaudryina proreussi*, but it lacks the biserial stage and has a different aperture.

"Length, 1.7 mm.; width 0.7 mm. to almost 1 mm. (microspheric)."

The types are from Kakanui limestone of middle Oligocene age in New Zealand.

VERNEUILINA FUSIFORMIS *Telmachoff* (Pl. 1, fig. 3)

Verneuilina fusiformis *TOLMACHOFF*, *Annals Carnegie Mus.*, vol. 23, 1934, p. 291, pl. 40, figs. 4, 5.

"Test free, bipyramidal, three-serial, the apical end rounded more bluntly than the basal one which is rather acute. The height and width are about equal, thus making outlines of the test rhombic, or the height is a little greater than the width. Transverse section triangular with rounded corners and somewhat inflated sides. Aperture, which could not be well observed, is apparently terminal and rounded. Surface smooth. Test is apparently calcareous through and through." Height 0.50-0.60 mm.; width 0.40-0.50 mm.

The types are from the Miocene, Atrato Valley, about 30 km. E. of Quibdo, Colombia.

The figure and description make it uncertain whether this is a *Verneuilina*, or may belong in the *Buliminidae*.

VERNEUILINA *sp.* *Telmachoff*

Verneuilina *sp.* *TOLMACHOFF*, *Annals Carnegie Mus.*, vol. 23, 1934, p. 292, pl. 40, figs. 6, 7. (Miocene - Colombia).

VERNEUILINA *sp.* *Cushman and Hobson*

Verneuilina *sp.* *CUSHMAN* and *HOBSON*, *Contr. Cushman Lab. Foram. Res.*, vol. 11, 1935, p. 56, pl. 8, fig. 6. (Tertiary - California).

VERNEUILINA *sp.* *Ishizaki*

Verneuilina *sp.* *ISHIZAKI*, *Taiwan Tigaku Kizi*, vol. 10, No. 4, 1939, p. 112, pl. 8 (1), fig. 16. (Miocene - Japan).

VERNEUILINA *sp.* *Cole*

Verneuilina *sp.* *COLE*, *Bull.* 19, *Florida State Geol. Survey*, 1941, p. 21, pl. 1, fig. 14. (Eocene - Florida).

The following species have been recorded as *Verneuilina*, and notes on their relationships are added.

Verneuilina cushmani *Weinzierl* and *Applin* [See *Eggerella* *colina* *sp.* (*Weinzierl* and *Applin*)]

Verneuilina mexicana *Nuttall* [See *Karrieriella mexicana* (*Nuttall*)]

Verneuilina propinqua H. B. Brady [See *Eggerella propinqua* (H. B. Brady)]

Verneuilina scabra (Williamson), var. *inornata* Rhumbler [See *Eggerella scabra* (Williamson), var. *inornata* (Rhumbler)]

Verneuilina triquetra (Münster) (=?)

Genus TRITAXIA Reuss, 1860

TRITAXIA PYRAMIDATA Reuss

Tritaxia pyramidata CUSHMAN, Foraminifera, 3rd Ed., 1940, pl. 11, fig. 16; Key, pl. 7, fig. 23. (Cretaceous - Trinidad).

TRITAXIA PLUMMERAE Cushman

Tritaxia plummerae LOZO, Bull. Amer. Assoc. Petr. Geol., vol. 27, 1943, p. 1066 (list). (Lower Cretaceous, Duck Creek formation - Texas)—TAPPAN, Journ. Pal., vol. 17, 1943, p. 487, pl. 78, figs. 17-21. (Lower Cretaceous, Duck Creek formation - Oklahoma and Texas).

TRITAXIA ELLISORAE Cushman

Tritaxia ellisorae CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 20, 1944, p. 3, pl. 1, fig. 6. (Upper Cretaceous, Pecan Gap chalk member of Taylor marl - Texas).

TRITAXIA sp. Silvestri

Tritaxia sp. SILVESTRI, Pal. Ital., vol. 32, suppl. 4, 1939, p. 58, pl. 6, fig. 3. (Eocene - Somaliland).

Genus BARBOURINA Bermúdez, 1939 (See BARBOURINELLA Bermúdez, 1940)

Genus BARBOURINELLA Bermúdez, 1940

Genoholotype, *Barbourina atlantica* Bermúdez

Barbourinella BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 14, 1940, p. 410.

Barbourina BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 13, 1939, p. 9.—CUSHMAN, Foraminifera, 3rd Ed., 1940, p. 117.

Test triserial throughout, triangular in section; wall arenaceous; aperture terminal, in terminal face of the last-formed chamber, rounded or elliptical with a short neck and slightly thickened lip.—Tertiary and Recent.

BARBOURINELLA ATLANTICA (Bermúdez) (Pl. 1, figs. 6-8)

Barbourina atlantica BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 13, 1939, p. 10, pl. 1, figs. 1-4.—PALMER, l. c., vol. 14, 1940, p. 118.—CUSHMAN, Foraminifera, 3rd Ed., 1940, Key, pl. 43, fig. 7.

Barbourinella atlantica PALMER, Mem. Soc. Cubana Hist. Nat., vol. 15, 1941, p. 303.

Test elongate, stout, surface of large sand grains; triserial in transverse section, acute at the initial end and truncate at the apertural end which is the widest part of the test; angles subacute with a tendency to become keeled; chambers numerous, of uniform size, increasing in size as added, distinct; slightly limbate sutures, depressed, six chambers visible on the lateral surface; aperture in the center of the terminal face,

circular, with a slightly raised, projecting border. Length 1.5 mm.; breadth 0.70 mm.—Translation.

The types are from off Cuba and it has also been recorded from the Oligocene of Cuba.

BARBOURINELLA BERMUDEZI Palmer (Pl. 1, fig. 9)

Barbourinella bermudezi PALMER, Bull. Amer. Pal., vol. 29, No. 115, 1945, p. 23, pl. 1, fig. 1.

"Test of medium size for the genus, elongated, triserial and triangular in cross section throughout; broadest in the middle, narrowing to the bluntly pointed apex and truncated apertural extremities; angles acute; sutures very slightly depressed and inconspicuous; aperture a short tube in the apertural face of the final chamber, removed from the margin; surface finely arenaceous with much cement."

"Length of holotype, 0.7 mm.; maximum diameter, 0.38 mm."

The types are from the Miocene, Bowden marl, of Jamaica.

"The species differs from *B. atlantica* (Bermúdez) in having only slightly depressed sutures and smoothly finished surface with much cement."

BARBOURINELLA NIPEENSIS Kellner (Pl. 1, fig. 10)

Barbourinella nipeensis KEIJZER, Outline geol. eastern part Prov. Oriente, Cuba, Utrecht, 1945, p. 189, pl. 1, fig. 9.

"Test finely arenaceous, triserial throughout, triangular in cross-section. Initial end bluntly pointed, then gradually tapering. Sides slightly convex in the middle and becoming concave toward the angles. Chambers only little overlapping. Sutures raised and curved. Aperture on a short neck, somewhat above the base of the face of the last chamber. Length up to 1.20 mm.; width up to 0.80 mm."

The types are from the Oligocene or Miocene of Cuba.

"The species differs from *B. atlantica* (Bermúdez) in the larger number of chambers, less limbate sutures and smoother finish."

BARBOURINELLA sp. Kellner (Pl. 1, fig. 11)

Barbourinella sp. KEIJZER, Outline geol. eastern part Prov. Oriente, Cuba, Utrecht, 1945, p. 189, pl. 1, fig. 10. (Oligocene-Miocene - Cuba).

Genus GAUDRYINA d'Orbigny, 1839

GAUDRYINA SUBCRETACEA Cushman

Gaudryina subcretacea LOZO, Bull. Amer. Assoc. Petr. Geol., vol. 27, 1943, p. 1066 (dist.) (Lower Cretaceous, Duck Creek formation - Texas).—TAPPAN, Journ. Pal., vol. 17, 1943, p. 490, pl. 78, figs. 28, 29. (Lower Cretaceous, Duck Creek formation - Oklahoma and Texas).

GAUDRYINA ALEXANDERI Cushman

Gaudryina alexanderi TAPPAN, Journ. Pal., vol. 17, 1943, p. 488, pl. 78, figs. 22-27. (Lower Cretaceous, Duck Creek formation - Oklahoma and Texas).

GAUDRYINA CUSHMANI Tappan (Pl. 1, fig. 18)

Gaudryina cushmani TAPPAN, Journ. Pal., vol. 14, 1940, p. 99, pl. 15, fig. 6.

"Test large, conical, expanding rapidly from the small base, early portion triserial, and slightly inflated and triangular, later portion biserial; chambers low but broad and wide; sutures fairly distinct, slightly depressed, wall coarsely arenaceous; aperture a low arch at the base of the last chamber, color white. Length of holotype, 0.83 mm.; breadth, 0.55 mm.; width 0.40 mm."

The types are from the Lower Cretaceous, Grayson formation, of Texas.

GAUDRYINA RUGOSA d'Orbigny

Gaudryina rugosa ALBRITTON and PHLEGER, Journ. Pal., vol. 11, 1937, p. 350. (Upper Cretaceous, Corsicana marl - Texas)—LOETTERLE, Nebraska Geol. Survey, 2d ser., Bull. 12, 1937, p. 19, pl. 1, fig. 2. (Upper Cretaceous, Niobrara formation - Kansas, Nebraska, and South Dakota)—THALMANN, Amer. Midland Nat., vol. 28, 1942, p. 463. (Recent - Pacific)—CRISPIN, Bull. 9 (Pal. Ser. No. 4), Commonwealth of Australia, Min. Res. Survey, (mimeographed), 1943, p. 79 (list). (Miocene to Pliocene - Victoria, Australia).

GAUDRYINA FAUJASI (Reuss)

Gaudryina faujasi CUSHMAN and DEADERICK, Contr. Cushman Lab. Foram. Res., vol. 18, 1942, p. 53, pl. 9, fig. 14. (Upper Cretaceous, Brownstown marl - Arkansas).

GAUDRYINA CRETACEA (Karrer)

Gaudryina cretacea CUSHMAN, Amer. Journ. Sci., vol. 242, 1944, p. 607, pl. 1, fig. 1. (Upper Cretaceous - Austria).

GAUDRYINA LAEVI GATA Franke

Gaudryina laevigata TOULMIN, Journ. Pal., vol. 15, 1941, p. 572, pl. 78, figs. 4, 5. (Wilcox Eocene, Salt Mountain limestone - Alabama)—CUSHMAN and HEDBERG, Contr. Cushman Lab. Foram. Res., vol. 17, 1941, p. 84, pl. 21, fig. 8. (Upper Cretaceous - Colombia)—LEROY, Colorado School Mines Quart., vol. 39, No. 3, pt. 1, 1944, p. 15, pl. 8, figs. 50, 51. (Miocene - Sumatra).

GAUDRYINA BENTONENSIS (Carman)

Gaudryina bentonensis CUSHMAN and DEADERICK, Contr. Cushman Lab. Foram. Res., vol. 18, 1942, p. 52, pl. 9, figs. 12, 13. (Upper Cretaceous, Brownstown marl - Arkansas).

GAUDRYINA RUDITA Sandidge

Gaudryina rudita CUSHMAN and TODD, Contr. Cushman Lab. Foram. Res., vol. 19, 1943, p. 51, pl. 9, fig. 4. (Upper Cretaceous, Corsicana marl - Texas)—CUSHMAN, l. c., vol. 20, 1944, p. 84. (Upper Cretaceous, Mooreville tongue of Selma chalk - Mississippi)—CUSHMAN and DEADERICK, Journ. Pal., vol. 18, 1944, p. 329, pl. 50, figs. 9, 10. (Upper Cretaceous, Marlbrook marl - Arkansas).

GAUDRYINA RUDITA Sandidge, var. DIVERSA Cushman and Goudkoff (Pl. 1, fig. 19)

Gaudryina rudita SANDIDGE, var. *diversa* CUSHMAN and GOUDKOFF, Contr. Cushman Lab. Foram. Res., vol. 20, 1944, p. 55, pl. 9, fig. 6.

"Variety differing from the typical in the somewhat larger size, slightly smoother test, and less tapering form."

The types are from the Upper Cretaceous, 4451-ft. depth in Ohio Oil Willard No. 1 A well, in sec. 18, T. 20 N., R. 2 W., Glenn Co., California.

GAUDRYINA NEBRASCENSIS Loetterle (Pl. 1, fig. 14)

Gaudryina nebrascensis LOETTERLE, Nebraska Geol. Survey, 2d ser., Bull. 12, 1937, p. 20, pl. 1, fig. 3.

"Test elongate, narrow, compressed, subquadrate in end view, greatest width near apertural end, biserial portion tapering uniformly to the triserial stage, at which point there is a pronounced offset in most specimens; chambers numerous, closely appressed, those of the biserial stage with a definite shoulder below which the surface is concave and above which it is strongly convex, provided also with longitudinal extensions of variable development at the peripheral angles forming irregular ridges down the test; sutures rather strongly oblique in the early stage, less so in the final few chambers, depressed in the biserial portion; aperture a low slit at the base of the final chamber, with a strongly developed, curved, lobular projection of the chamber at each side; wall rather coarsely arenaceous but quite smoothly finished. Length of holotype, 1.10 mm.; breadth, .42 mm.

"This interesting form will probably not be confused with any previously described species. It bears some resemblance to *G. laevigata* Franke var. *pyramidata* Cushman but is much more elongate and slender, and has a more reduced and more sharply delimited triserial stage. In addition, the chambers of *G. nebrascensis* are more inflated and much higher."

The types are from the Upper Cretaceous, Fort Hays limestone, of Nebraska.

GAUDRYINA CANADENSIS Cushman (Pl. 1, fig. 22)

Bigennerina angulata CUSHMAN, Trans. Roy. Soc. Canada, 3d Ser., vol. 21, sec. 4, 1927, p. 131, pl. 1, fig. 10.

Gaudryina canadensis CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 19, 1943, p. 28, pl. 6, figs. 7, 8.

"Test elongate, earliest portion triserial, becoming biserial early in the development and in some specimens tending to become uniserial; chambers distinct, inflated, 10 to 16 in the adult biserial portion, very gradually increasing in size as added; sutures distinct, depressed; wall arenaceous with a large proportion of cement, easily contorted in fossilization; aperture enlarged at the base, tending to become terminal and more rounded in the uniserial chambers. Length 0.80-1.25 mm.; breadth 0.22-0.25 mm.

"The wall has an abundance of brownish cement, apparently chitinous, and was apparently flexible so that in fossilization very few specimens kept their original shape.

"The species is evidently related to *Gaudryina bearpawensis* Wicken- den but that species has a much greater proportion of triserial chambers and the biserial stage much shorter with no apparent tendency to be- come uniserial."

The types are from the Lower Cretaceous of well samples of western Canada.

GAUDRYINA QUADRANS Cushman

Gaudryina quadrans CUSHMAN and DRADERICK, Journ. Pal., vol. 18, 1944, p. 330, pl. 50, figs. 11, 12. (Upper Cretaceous, Marlbrook marl - Arkansas).

GAUDRYINA WHANGAIA Finlay

Gaudryina whangai FINLAY, Trans. Roy. Soc. New Zealand, vol. 69, 1939, p. 311, pl. 25, figs. 29-31.

"Small, elongate, slender, whitish, of fine sandgrains in excess cement, surface smoothed. Triserial part a third or more of length, sides a little concave, angles at first sharp, rapidly blunted by globose chambers (5 distinct); biserial part twisted, chambers 4-5 pairs (last flatly globose), little increasing, sutures subhorizontal, shallow but distinct, end face at about 40° with very small round aperture at base. Size, 1.2 mm."

The types are from the Upper Cretaceous, Campanian, of New Zea- land, and it is recorded as "always present in two forms, smaller (meg- alo) only half size or less, with fewer triserial chambers and blunter apex, otherwise same as larger."

GAUDRYINA HEALYI Finlay

Gaudryina healyi FINLAY, Trans. Roy. Soc. New Zealand, vol. 69, 1939, p. 311, pl. 25, figs. 34, 35.

"Coarsely arenaceous, much cement, but rough surface. Triserial part about one-third of length, sides faintly concave, angles a little blunted. Biserial chambers about 3 pairs, convex, with posterior blunt angle, anteriorly flatly rounded and smoother, sutures furrowed but not distinct. Terminal face sloping at 45°, the basal elongate-oval aperture one third as wide and half as high, with surrounding blunt angulation. Size, 1.4 mm."

The types are from the Upper Cretaceous, Santonian, of New Zealand.

GAUDRYINA ASIATICA Bykova

Gaudryina asiatica BYKOVA, Trans. Petrol. Geol. Prospect. Instit., ser. A, No. 121, 1939, p. 20, pl. 1, figs. 15, 16, text fig. 2.

The types are from the Upper Cretaceous, Ferghana, U. S. S. R.

The original has not been available for figures and description.

GAUDRYINA BELSQUA Finlay

Gaudryina reliqua FINLAY, Trans. Roy. Soc. New Zealand, vol. 69, 1939, p. 311, pl. 25, figs. 32, 33.

"Same general type as *healyi*, but smaller, much more quadrate, with flatter sides, shallow sutures, and shorter chambers, much flattened anteriorly; terminal face much shorter, at angle of 30°; aperture short, narrow. Size, 1 mm."

The types are from the lowest middle Eocene, perhaps lower Eocene, of New Zealand.

GAUDRYINA QUADRILATERA Cushman

Gaudryina? quadrilatera DE WITT PUTT, Geol. Pal. Bechr. Umgebung von Ljubuski, Hercegovina, Utrecht, 1941, p. 47, pl. 1, fig. 12. (Eocene, Flysch - Hercegovina).

GAUDRYINA GEOMETRICA Howe (Pl. 1, fig. 16)

Gaudryina geometrica HOWE, Geol. Bull. 14, Louisiana Geol. Survey, 1939, p. 33, pl. 2, figs. 6, 7.—CUSHMAN and TODD, Contr. Cushman Lab. Foram. Res., vol. 21, 1945, p. 11.

"Test small, elongate, triangular in side view, subquadrangular in end view, early chambers triserial, the triserial portion comprising slightly less than one half the length, later portion biserial; sutures distinct, but only faintly depressed; wall coarsely arenaceous; apertural end broad, smooth, and nearly flat; aperture a small arched slit at the base of the apertural face."

Holotype, length 0.56 mm.; greatest breadth 0.34 mm.

The types are from the Eocene, Cook Mountain formation, of Louisiana, and a questionable young specimen has been recorded from the Eocene, Lisbon formation, of Alabama.

GAUDRYINA GARDNERAE Cushman

Gaudryina gardnerae HOWE, Journ. Pal., vol. 16, 1942, p. 267 (list). (Oligocene, Glendon formation - Alabama)—FRANKLIN, l. c., vol. 18, 1944, p. 306, pl. 44, fig. 23. (Oligocene, Carapita formation - Venezuela).

GAUDRYINA SUBQUADRATA Cushman

?*Gaudryina subquadrata* PARR, Journ. Roy. Soc. W. Australia, vol. 24, 1937-38, p. 90. (Eocene - Australia).

GAUDRYINA CONVEXA Cushman, var. SANDEGENSIS Cushman and M. A. Hanna

Gaudryina convexa CUSHMAN, var. *sandiegensis* ISRAELSKY, Proc. 6th Pac. Sci. Congress, 1939, p. 572, pl. 1, fig. 3. (Eocene - California).

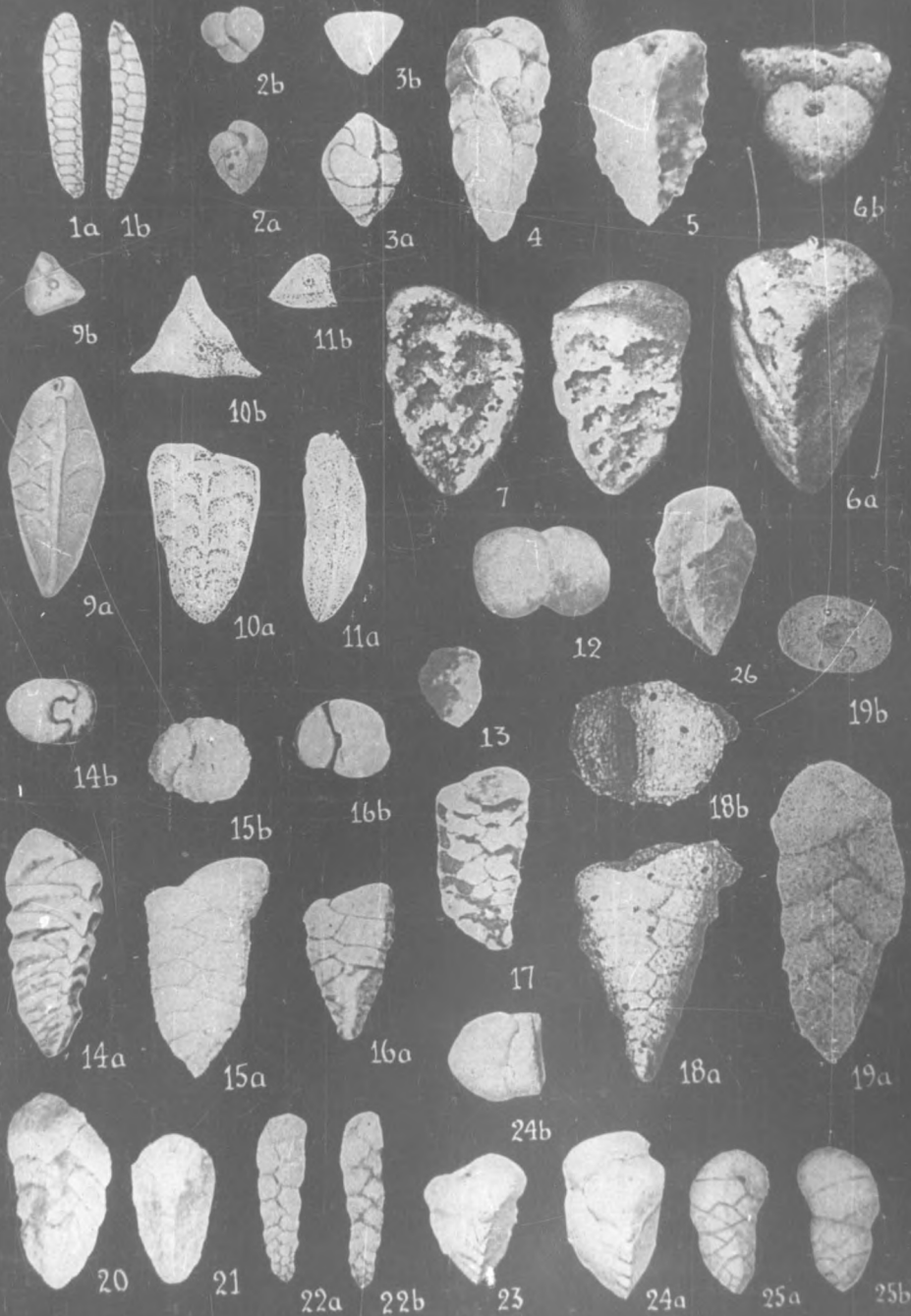
Gaudryina sandiegensis MARTIN, Stanford Univ. Publ., Univ. Ser., Geol. Sci., vol. 3, No. 3, 1943, p. 10 (list). (Eocene, Lodo formation - California).

GAUDRYINA TRINITATENSIS Nuttall

Gaudryina trinitatensis BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 12, 1938, p. 9. (Eocene - Cuba)—KLEINFELL, Miocene Stratig. Calif., 1938, p. 192. (Miocene - California)—RENZ, Proc. 8th Amer. Sci. Congress, 1942, p. 541 (list). (Eocene, San Fernando formation - Trinidad).

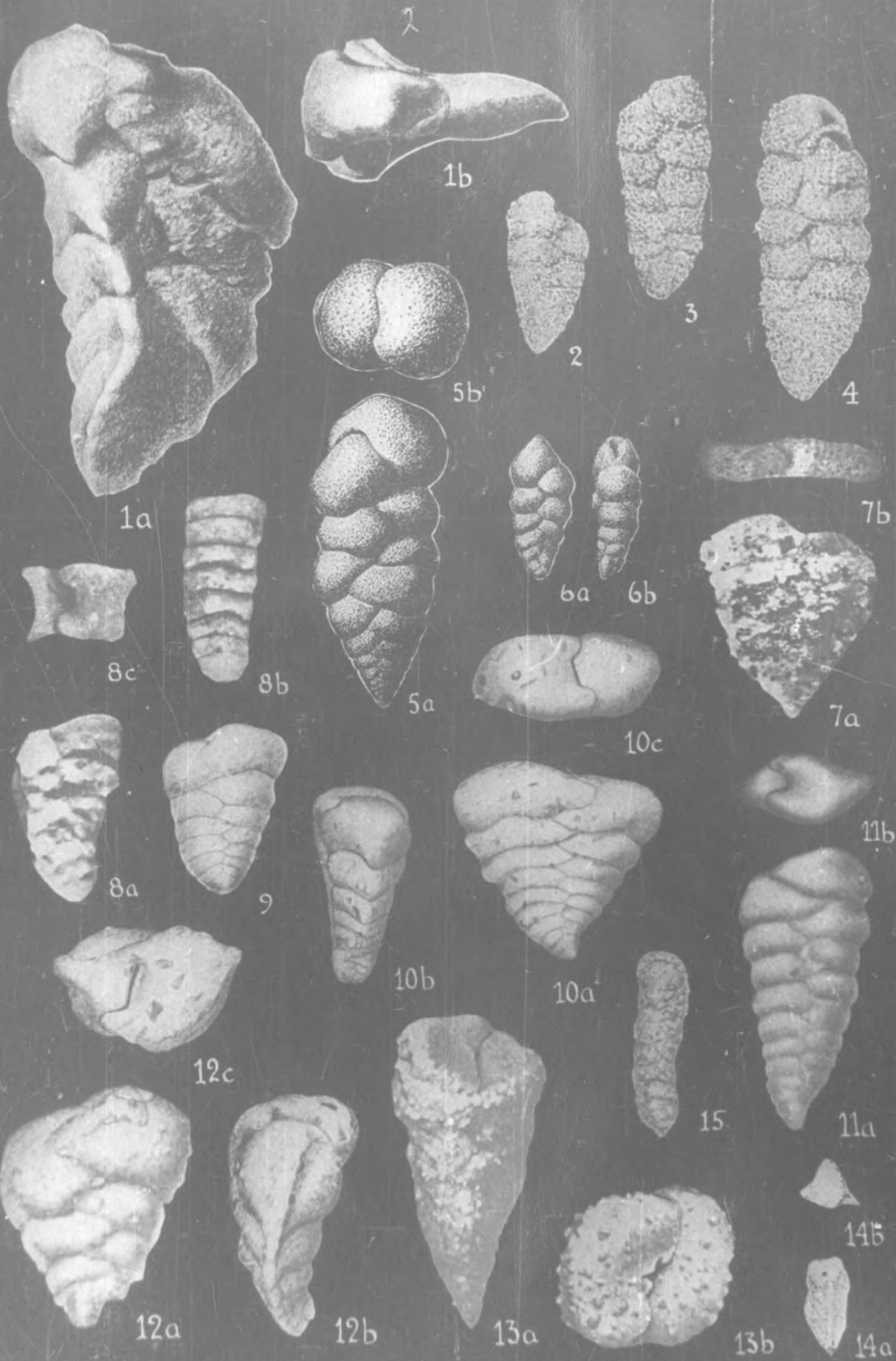
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GAUDRYINA TORREI Bermúdez. (Pl. 1. fig. 15)

Gaudryina torrei BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 11, 1937, p. 138, pl. 16, figs. 4, 5.

Test large, early portion triserial, triangular in section; remainder of test biserial, rounded in section; sutures deep, more visible in water or canada balsam; surface distinctly arenaceous, formed of large calcareous sand grains; color white; aperture small, in the center of the border of the last-formed chamber, in a slight depression with a projection at each side. Length 1.5 mm.; diameter 0.6 mm.—Translation.

The types are from the Eocene, just north of Grua 9, Ramal Juan Criollo of Central Jatibonico, Province of Camaguey, Cuba.

GAUDRYINA GUANAJAYENSIS Bermúdez (Pl. 1. figs. 23, 24)

Gaudryina guanajayensis BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 11, 1937, p. 139, pl. 16, figs. 9-11; vol. 12, 1938, p. 9.

Test stout, somewhat longer than broad, triserial portion relatively large with three or four whorls, three chambers to a whorl, two or four chambers in the biserial portion, angles acute and distinct; chambers distinct, arranged alternately in a zig-zag form; sutures slightly depressed, wall distinctly arenaceous, the last two chambers rounded and ornamented with a more or less regular reticulation, visible when the test is moist; aperture a low opening at the junction of the last two chambers. Length 1.5 mm.; diameter 0.9 mm.—Translation.

The types are from the Eocene, Noroña, north of Guanajay, Province of Pinar del Rio, Cuba.

GAUDRYINA CUBANA Cushman and Bermúdez

Gaudryina cubana BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 12, 1938, p. 8. (Eocene - Cuba).

GAUDRYINA SOLDADOENSIS Cushman and Renz (Pl. 2. fig. 1; pl. 3. fig. 2)

Gaudryina sp. CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 16, 1940, p. 53, pl. 9, fig. 5.

Gaudryina soldadoensis CUSHMAN and RENZ, l. c., vol. 18, 1942, p. 4, pl. 1, fig. 2.

"Test somewhat longer than broad, slightly arcuate, early portion triangular and triserial, adult portion biserial, much compressed, the broader faces slightly concave, narrower one deeply so except in the final chamber in the adult; chambers distinct except in the early portion; sutures in the adult strongly depressed; wall finely arenaceous, the exterior slightly roughened; aperture a rounded opening near the inner margin of the last-formed chamber. Length of holotype 1.3 mm.; breadth 0.65 mm.; thickness 0.35 mm."

The types are from the Midway Eocene, Soldado formation, Soldado Rock, Trinidad, B. W. I.

"The species differs from *G. jacksonensis* Cushman in the slightly arcuate form, greater compression, and more concave sides. It is probably the same as that recorded in the above reference from the Midway of Alabama."

GAUDRYINA EOCAENICA van Belen (Pl. 1, figs. 12, 13)

Gaudryina eocaenica VAN BELLEN, Proc. Ned. Akad. Wetenschappen, vol. 44, 1941, p. 997, pl., fig. 2.

"Roughly agglutinated form. Length about 1.5 times breadth. Initial end with three chambers in a whorl. Sutures depressed, often hidden by the agglutination of the test. Chambers may be somewhat inflated or projecting, chiefly in the later, biserial part. Aperture an arch at the base of the last chamber. The triangular section at the initial end is invisible because of the roughness of the test. Sometimes the last chamber is somewhat terminal. Length up to 1 mm., breadth up to 0.7 mm."

The types are from the Eocene of Ricice, near Imotski, eastern Dalmatia, Yugoslavia.

GAUDRYINA PUERTORICANA Galloway and Heminway (Pl. 1, fig. 26)

Gaudryina puertoricana GALLOWAY and HEMINWAY, New York Acad. Sci., Sci. Survey Porto Rico and Virgin Ids., vol. 3, pt. 4, 1941, p. 324, pl. 7, fig. 7.

"Test small, flattened triangular in the early portion, becoming thicker and rounded in the later portion; triserial portion about half the length of the test; two sides flat, the third rounded; angles sharp but not keeled; chambers indistinct, not inflated except the last two; sutures flush with the surface, inconspicuous, thickened with calcite in the triserial portion; wall very finely arenaceous, composed of calcareous grains and calcareous cement, white in color; surface rather smooth; aperture a small, low arch at the base of the last septal face. Length, 0.33 millimeter; width, 0.20 millimeter."

The types are from the Oligocene, San Sebastian formation, of Porto Rico.

GAUDRYINA PSEUDOCOLLINSI Cushman and Stainforth (Pl. 2, figs. 2-4)

Gaudryina pseudocollinsi CUSHMAN and STAINFORTH, Special Publ. 14, Cushman Lab. Foram. Res., 1945, p. 17, pl. 2, figs. 1-3.

"Test large for the genus, elongate, about 2½ times as long as broad, periphery rounded, sides in the adult nearly parallel, base subacute; chambers numerous, as many as 8 to 10 pairs in the adult, earlier ones indistinct, later ones inflated, increasing gradually in height in the later portion, earlier ones triserial, forming a rounded point at the base; sutures indistinct except in the later portion where they are depressed; wall distinctly arenaceous, surface roughened; aperture arched, at the

inner margin of the last-formed chamber. Length 1.75-2.35 mm.; breadth 0.80-0.87 mm."

The types are from the Oligocene, Cipero formation, Cipero Coast, Trinidad, B. W. I.

"This species much resembles *G. collinsi* Cushman from the Miocene of Australia but differs in the early triserial portion which is greatly reduced and not triangular as in that species, and in the greater amount of inflation in the adult chambers."

GAUDRYINA KARRERIANA Cushman

Gaudryina karreriana GALLOWAY and HEMINWAY, New York Acad. Sci., Sci. Survey Porto Rico and Virgin Ids., vol. 3, pt. 4, 1941, p. 324, pl. 7, fig. 6. (Upper Oligocene to lower Miocene, Ponce and Quebradillas formations - Porto Rico).

GAUDRYINA GRACILIS Cushman and Lelming

Gaudryina gracilis KLEINPELL, Miocene Stratig. Calif., 1938, p. 191. (Miocene - California).

GAUDRYINA ASPERITA Cushman and Barbat

Gaudryina atlantica (BAILEY), var. *asperita* KLEINPELL, Miocene Stratig. Calif., 1938, p. 191. (Miocene - California).

GAUDRYINA COLLINSI Cushman

Gaudryina collinsi CRESPIN, Bull. 9 (Pal. Ser. No. 4), Commonwealth of Australia, Min. Res. Survey, (mimeographed), 1943, p. 79 (list). (Miocene - Victoria, Australia).

GAUDRYINA THALMANNI Cushman and Renz (Pl. 2, fig. 6)

Gaudryina thalmanni CUSHMAN and RENZ, Contr. Cushman Lab. Foram. Res., vol. 17, 1941, p. 7, pl. 1, fig. 14.

"Test of medium size, usually more than twice as long as broad, gradually tapering throughout, somewhat compressed, periphery rounded, slightly lobulate, triserial stage short; chambers comparatively few, inflated, rapidly increasing in size and height as added, in the adult stage becoming higher than broad; sutures distinct, earlier ones oblique, later nearly at right angles to the elongate axis, straight; wall finely arenaceous, smoothly finished; aperture a high, narrow opening in a depression of the inner face of the last-formed chamber in the median line. Length 0.80-1.00 mm.; breadth 0.45 mm.; thickness 0.35 mm."

The types are from the lowermost Miocene, lower Agua Salada formation, from Pozon, 27.0 km. southeast (103°) of Pueblo Jacura, District Acosta, State Falcon, Venezuela.

"This species differs from *G. trinitatensis* Nuttall in its more tapering form, less compressed test, more inflated and higher chambers, and more depressed sutures."

GAUDRYINA LEUZINGERI Cushman and Renz (Pl. 2, fig. 5)

Gaudryina leuzingeri CUSHMAN and RENZ, Contr. Cushman Lab. Foram. Res., vol. 17, 1941, p. 6, pl. 1, fig. 13.

"Test large, elongate, about 2½ times as long as broad, rounded in transverse section, early triserial portion rapidly tapering, adult biserial portion of nearly uniform diameter, periphery in the adult lobulate; chambers distinct, inflated, strongly so in the adult, increasing in height as added, in the adult about as high as broad; sutures depressed, strongly so in the adult, nearly at right angles to the elongate axis; wall distinctly arenaceous, but smoothly finished; aperture a low, arched opening in a depression at the base of the apertural face in the median line. Length 2.00-2.30 mm.; breadth 0.90-1.00 mm.; thickness 0.55-0.60 mm."

The types are from the Miocene, Agua Salada formation, from Isidro, 34.9 km. east (81°) of Pueblo Piritu, District Zamura, State Falcon, Venezuela.

"This species differs from *G. trinitatensis* Nuttall in the less compressed, more elongate test, with more inflated chambers and more depressed sutures."

GAUDRYINA SOLIDA Schwager

Gaudryina solida LEROY, Colorado School Mines Quart., vol. 36, No. 1, pt. 2, 1941, p. 69, pl. 2, figs. 6, 7. (Miocene or Pliocene - Dutch East Indies)—GLAESSNER, Proc. Roy. Soc. Victoria, vol. 55 (n. ser.), pt. 1, 1943, p. 69 (list). (Miocene - Indo-Pacific).

GAUDRYINA FLINTII Cushman

Gaudryina flintii KLEINFELL, Miocene Stratig. Calif., 1938, p. 191. (Miocene - California) —RENZ, Proc. 8th Amer. Sci. Congress, 1942, p. 548 (list). (Oligocene, Cipero formation - Trinidad)—CRESPIN, Bull. 9 (Pal. Ser. No. 4), Commonwealth of Australia, Min. Res. Survey, (mimeographed), 1943, p. 79 (list). (Miocene - Victoria, Australia)—CUSHMAN and STAINFORTH, Special Publ. 14, Cushman Lab. Foram. Res., 1945, p. 16, pl. 1, fig. 23. (Oligocene, Cipero formation - Trinidad).

This species, as has been noted by Finlay, may be placed in the genus *Migros* on the basis of its nearly terminal aperture.

GAUDRYINA TRIANGULARIS Cushman

Gaudryina triangularis CUSHMAN and LEROY, Journ. Pal., vol. 12, 1938, p. 123, pl. 22, fig. 6. (Miocene - California)—KLEINFELL, Miocene Stratig. Calif., 1938, p. 192, pl. 1, figs. 1, 4. (Miocene - California)—CUSHMAN, Foraminifera, 3rd Ed., 1940, Key, pl. 7, fig. 24. (Miocene - California)—CHAPMAN, Trans. Roy. Soc. So. Australia, vol. 65, 1941, p. 193. (Recent - off Australia)—FRANKLIN, Journ. Pal., vol. 18, 1944, p. 307, pl. 44, fig. 21 (Oligocene, Carapita formation - Venezuela).

GAUDRYINA FENESTRATA Finlay (Pl. 1. fig. 17)

Gaudryina fenestrata FINLAY, Trans. Roy. Soc. New Zealand, vol. 69, 1939, p. 92, pl. 14, fig. 68.

"Shell fairly large, elongate; triangular apical portion with sharp angles, relatively smooth, and of very small extent compared with rest of shell, which is about five times as long. Later part of shell quadrangular-rhombic in section, front and back practically flat, sides with a low

but acute medial angle. From the three initial angles other keels diverge or are intercalated to enclose on front and back a long pointed area which widens more rapidly than shell outline, so that the impression is given of keels converging posteriorly to meet the triangular ones. Another sharp keel runs medially down the sides. All these keels are connected by horizontal ridges outlining the chambers; anteriorly these thicken and widen; on sides they are curved, producing a fenestrate effect. About seven biserial chambers on each side follow the triangular part; they are horizontal with grooved sutures between. Aperture normal, a small rounded opening at base of terminal face, which is flattened and not inflated.

"Length, reaching up to 1.8 mm.; width, 0.75 mm. Thickness about two-thirds width."

The types are from the lower Miocene of New Zealand; Marsden, 6 miles south of Greymouth, "Blue Bottom."

GAUDRYINA ROBUSTA Cushman

Gaudryina robusta CHAPMAN, Trans. Roy. Soc. So. Australia, vol. 65, 1941, p. 193. (Recent - off Australia).

GAUDRYINA PAUPERATA Earland

Gaudryina pauperata CUSHMAN and McCULLOCH, Allan Hancock Pacific Exped., vol. 6, No. 1, 1939, p. 92, pl. 8, fig. 4. (Recent - eastern Pacific).

GAUDRYINA SUBTENUIS Cushman

Gaudryina tenuis CUSHMAN (not GRZYBOWSKI, 1897), Special Publ. 6, Cushman Lab. Foram. Res., 1936, p. 10, pl. 2, fig. 5; Special Publ. 7, 1937, p. 70, pl. 10, figs. 2, 3. *Gaudryina subtenuis* CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 28.

A new name has been proposed for this Recent species from off the Philippines. It also, as has been noted by Finlay, may be placed in the genus *Migros*.

GAUDRYINA ACCELERATA Natland (Pl. 2, fig. 7)

Gaudryina accelerata NATLAND, Bull. Scripps Instit. Oceanography, Tech. Ser., vol. 4, No. 5, 1938, p. 139, pl. 3, figs. 9, 10.

"Test tapered, thin and slightly twisted, with an obscure, very short, triserial stage followed by a well-defined, long, biserial stage; chambers numerous, rapidly increasing in length as added; periphery slightly lobulate, rounded; walls thin, composed of sand grains neatly held together with greenish gray cement; sutures indistinct, not depressed, slightly curved; aperture a low, arched opening at the inner margin of the last chamber. Length 0.84 mm.; breadth 0.72 mm.; thickness 0.18 mm."

The types are from off the coast of California in 165 meters.

"This unusually accelerated *Gaudryina* with a very short obscure triserial stage has the appearance of a *Textularia*."

GAUDRYINA QUADRATA Natland (Pl. 2, fig. 8)

Gaudryina quadrangularis NATLAND (not BAGG), Bull. Scripps Instit. Oceanography, Tech. Ser., vol. 3, No. 10, 1933, no. 10, line 106 on table.

Gaudryina quadrata NATLAND, l. c., vol. 4, No. 5, 1938, p. 139, pl. 3, figs. 14-16.

Test elongate, with a short, abruptly tapering, triserial stage followed by a long biserial stage, quadrate in cross section, with four almost equilateral slightly concave walls having rather acute margins; sutures indistinct, not depressed; walls arenaceous, rough, held together with light greenish gray cement; aperture an arched orifice at the inner margin of the last chamber. Length 0.53 mm.; breadth 0.27 mm.; thickness 0.27 mm."

The types are from off the coast of southern California and it is also recorded from the Pleistocene of the Los Angeles Basin.

"*G. quadrata* Natland differs from *G. quadrangularis* Bagg, its closest relative, by having concave walls with rather acute margins."

GAUDRYINA SUBGLABRATA Cushman and McCulloch (Pl. 2, figs. 9-11)

Gaudryina subglabrata CUSHMAN and McCULLOCH, Allan Hancock Pacific Exped., vol. 6, No. 1, 1939, p. 92, pl. 8, figs. 5-7.

"Test comparatively small, earliest portion triserial, very early becoming biserial, and very much compressed with one face nearly flat, the other slightly convex, periphery subacute; chambers distinct, slightly inflated, low and broad, increasing in breadth more rapidly than in height as added; sutures distinct, depressed; wall finely arenaceous with much cement, surface smooth; aperture an elongate, low opening in a re-entrant of the inner margin of the last-formed chamber. Length 0.60-1.15 mm.; breadth 0.50-0.60 mm.; thickness 0.30 mm."

The types are from off the coast of California at Arvila Pier in 7 fathoms. It occurs at numerous localities in the eastern Pacific.

"This species differs from *G. arenata* Galloway and Wissler in the more flattened and more flaring test, lower and more numerous chambers, very small proportion of triserial chambers and smoother surface."

GAUDRYINA SUBGLABRATA Cushman and McCulloch, var. (Pl. 2, fig. 12)

Gaudryina subglabrata CUSHMAN and McCULLOCH, var. CUSHMAN and McCULLOCH, Allan Hancock Pacific Exped., vol. 6, No. 1, 1939, p. 93, pl. 8, fig. 8.

"The figured specimen shows an extreme form in which the periphery is carinate and the chambers somewhat higher than in the typical form." It occurs off the coast of Lower California, Mexico.

GAUDRYINA QUADRANGULARIS Bagg, var. ANTILLANA Bermúdez and Acosta (Pl. 2, fig. 13)

Gaudryina quadrangularis BAGG, var. *antillana* BERMÚDEZ and ACOSTA, Mem. Soc. Cubana Hist. Nat., vol. 14, 1940, p. 55, pl. 9, figs. 4, 5.

Variety differing from the typical in its smaller size, less distinct sutures, wall more finely arenaceous, and less compressed test.—Translation.

The types of the variety are from *Atlantis* station 3000, lat. 23° 10' N., long. 81° 29' W., 160 fathoms.

GAUDRYINA sp. *Cushman and Garrett* (Pl. 3, fig. 1)

Gaudryina sp. CUSHMAN and GARRETT, Contr. Cushman Lab. Foram. Res., vol. 15, 1939, p. 78, pl. 13, fig. 3. (Eocene, Wilcox - Alabama).

GAUDRYINA sp. *Israelsky*

Gaudryina sp. ISRAELSKY, Proc. 6th Pac. Sci. Congress, 1939, p. 572, pl. 1, fig. 5; pl. 2, fig. 1. (Eocene - California).

GAUDRYINA sp. *Friszelli* (Pl. 3, fig. 15)

Gaudryina sp. FRIZZELL, Journ. Pal., vol. 17, 1943, p. 340, pl. 55, fig. 9. (Upper Cretaceous, Mal Paso shale - Peru).

GAUDRYINA sp. *Cushman*

Gaudryina sp. CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 20, 1944, p. 19. (Eocene, Aquia formation - Virginia).

GAUDRYINA sp. *A LeRoy* (Pl. 3, fig. 4)

Gaudryina sp. A LEROY, Colorado School Mines Quart., vol. 39, No. 3, pt. 1, 1944, p. 15, pl. 8, figs. 48, 49. (Miocene - Sumatra).

GAUDRYINA sp. *Applin and Jordan*

Gaudryina sp. APPLIN and JORDAN, Journ. Pal., vol. 19, 1945, p. 131 (list). (Paleocene - Florida).

GAUDRYINA sp. *Keijzer* (Pl. 2, fig. 14)

Gaudryina sp. KEIJZER, Outline geol. eastern part Prov. Oriente, Cuba, Utrecht, 1945, p. 189, pl. 1, fig. 11. (Oligocene-Miocene - Cuba).

Subgenus SIPHOGAUDRYINA Cushman, 1935

GAUDRYINA (SIPHOGAUDRYINA) AUSTINANA Cushman

Gaudryina (Siphogaudryina) austinana CUSHMAN and DEADERICK, Contr. Cushman Lab. Foram. Res., vol. 18, 1942, p. 53, pl. 9, figs. 15, 16. (Upper Cretaceous, Brownstown marl - Arkansas)—CUSHMAN, l. c., vol. 20, 1944, p. 84, pl. 13, fig. 2. (Upper Cretaceous, Mooreville tongue of Selma chalk - Mississippi).

GAUDRYINA (SIPHOGAUDRYINA) STEPHENSONI Cushman

Gaudryina (Siphogaudryina) stephensoni CUSHMAN, Foraminifera, 3rd Ed., 1940, Key, pl. 43, fig. 1. (Upper Cretaceous - Texas)—CUSHMAN and DEADERICK, Journ. Pal., vol. 18, 1944, p. 330, pl. 50, figs. 13, 14. (Upper Cretaceous, Marlbrook marl - Arkansas).

GAUDRYINA (SIPHOGAUDRYINA) RECTIANGULA Martin (Pl. 3, fig. 3)

Gaudryina (Siphogaudryina) rectiangula MARTIN, Stanford Univ. Publ., Univ. Ser., Geol. Sci., vol. 3, No. 3, 1943, p. 14, pl. 5, fig. 4.

Test elongate; early portion triangular, later portion rectangular in cross section; triserial at initial end, thereafter biserial, opposite sides

nearly parallel; wall arenaceous, smooth; chambers about twice as long as high, increasing gradually in size as added, oblique; borders of chambers raised along sutures and periphery, particularly on later chambers; sutures straight, slightly depressed; aperture a curved depression at center of base of inner face of last-formed chamber, usually indistinct; entire test somewhat twisted. Length 0.66 mm.; width 0.38 mm.; thickness 0.2 mm."

The types are from the Eocene, Lodo formation, of California.

"This species is similar to *Siphogaudryina austinana* Cushman (1936) from the Cretaceous of Texas but differs in being smaller and in having borders of the chambers raised, less sharp peripheral angles, and a smaller triserial portion."

GAUDRYINA (SIPHOGAUDRYINA) GLABRATA (Cushman), var. MAXIMA

Galloway and Heminway (Pl. 3, fig. 3)

Gaudryina glabrata maxima GALLOWAY and HEMINWAY, New York Acad. Sci., Sci. Survey Porto Rico and Virgin Ids., vol. 3, pt. 4, 1941, p. 323, pl. 7, fig. 2.

"Test large, stout, early triserial portion very short, later biserial portion constituting most of the test; test lozenge shaped in cross section; chambers numerous, quite distinct, with the lower side excavated so that the test has a transversely rugose appearance; early and middle portion without the transverse rugae but with papillae which more or less obscure the sutures; sutures depressed, nearly horizontal or slightly convex toward the aperture in the middle; wall arenaceous with much cement; surface moderately rough; aperture an elongate, low arch at the base of the last septal face. Length of figured specimen, 1.1 millimeters; breadth, 0.7 millimeter; thickness, 0.45 millimeter."

The types are from the upper Oligocene, Cibao formation, of Porto Rico.

"This variety differs from *G. glabrata* (Cushman) in the much larger size and the presence of papillae."

GAUDRYINA (SIPHOGAUDRYINA) YOUNGI Howe

Gaudryina youngi HOWE, Journ. Pal., vol. 16, 1942, p. 267 (list). (Lower Oligocene, Glendon formation - Alabama).

GAUDRYINA (SIPHOGAUDRYINA) VICTORIANA Cushman

Gaudryina (Siphogaudryina) victoriana CRESPIN, Bull. 9 (Pal. Ser. No. 4), Commonwealth of Australia, Min. Res. Survey, (mimeographed), 1943, p. 79 (list). (Miocene - Victoria, Australia).

GAUDRYINA (SIPHOGAUDRYINA) SIPHONIFERA H. B. Brady

Gaudryina (Siphogaudryina) siphonifera THALMANN, Amer. Midland Nat., vol. 28, 1942, p. 463. (Recent - Pacific).

Subgenus PSEUDOGAUDRYINA Cushman, 1936

GAUDRYINA (PSEUDOGAUDRYINA) ELLISORAE Cushman

Gaudryina (Pseudogaudryina) ellisorae CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 20, 1944, p. 84, pl. 13, fig. 3. (Upper Cretaceous, Mooreville tongue of Selma chalk - Mississippi).

GAUDRYINA (PSEUDOGAUDRYINA) PYRAMIDATA Cushman

Gaudryina (Pseudogaudryina) pyramidata CUSHMAN and GOUDKOFF, Contr. Cushman Lab. Foram. Res., vol. 20, 1944, p. 56, pl. 9, figs. 7, 8. (Upper Cretaceous - California).

GAUDRYINA (PSEUDOGAUDRYINA) JACKSONENSIS Cushman

Gaudryina (Pseudogaudryina) jacksonensis HEDBERG, Journ. Pal., vol. 11, 1937, p. 667, pl. 90, fig. 7. (Upper Oligocene - Venezuela)—BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 12, 1938, p. 9. (Eocene - Cuba)—VAN BELLEN, DE WITT PUYT, RUTGERS, and VAN SOEST, Proc. Ned. Akad. Wetenschappen, vol. 44, 1941, p. 1141. (Lower Oligocene - Cuba)—RENZ, Proc. 8th Amer. Sci. Congress, 1942, p. 541 (list). (Eocene, San Fernando formation - Trinidad)—MARTIN, Stanford Univ. Publ., Univ. Ser., Geol. Sci., vol. 3, No. 3, 1943, p. 10 (list). (Eocene, Lodo formation - California)—FRANKLIN, Journ. Pal., vol. 18, 1944, p. 307, pl. 44, fig. 26. (Lower Oligocene, Carapita formation - Venezuela)—CUSHMAN and HERRICK, Contr. Cushman Lab. Foram. Res., vol. 21, 1945, p. 57. (Eocene, McBean formation - Georgia).

**GAUDRYINA (PSEUDOGAUDRYINA) JACKSONENSIS Cushman, var. ABNORMIS
Cushman and Benz (Pl. 3, figs. 6, 7)**

Gaudryina (Pseudogaudryina) jacksonensis CUSHMAN, var. *irregularis* CUSHMAN and RENZ (not *Gaudryina irregularis* HANTKEN), Contr. Cushman Lab. Foram. Res., vol. 17, 1941, p. 6, pl. 1, figs. 11, 12.—RENZ, Proc. 8th Amer. Sci. Congress, 1942, p. 546 (list).

Gaudryina (Pseudogaudryina) jacksonensis CUSHMAN, var. *abnormis* CUSHMAN and RENZ, Contr. Cushman Lab. Foram. Res., vol. 20, 1944, p. 78.

“Variety differing from the typical in the deeply excavated sides, more strongly projecting angles, and deeply depressed sutures.”

This varietal name was proposed for this form from the upper Oligocene, lower Agua Salada formation, from Araurima, 11.6 km. southeast (152° 30') of Pueblo Jacura, District Acosta, State Falcon, Venezuela.

**GAUDRYINA (PSEUDOGAUDRYINA) JACKSONENSIS Cushman, var. COALINGENSIS
Cushman and G. D. Hanna**

Gaudryina coalingensis KELLEY, Bull. Amer. Assoc. Petr. Geol., vol. 27, 1943, p. 8 (list). (Eocene, Anita shale - California)—MARTIN, Stanford Univ. Publ., Univ. Ser., Geol. Sci., vol. 3, No. 3, 1943, p. 10 (list). (Eocene, Lodo formation - California).

GAUDRYINA (PSEUDOGAUDRYINA) RUTTENI Cushman and Bermúdez

Gaudryina (Pseudogaudryina) ruttteni BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 12, 1938, p. 9. (Eocene - Cuba).

GAUDRYINA (PSEUDOGAUDRYINA) CRESPIINAE Cushman

Gaudryina (Pseudogaudryina) crespinae CRESPIN, Bull. 9 (Pal. Ser. No. 4), Commonwealth of Australia, Min. Res. Survey, (mimeographed), 1943, p. 79 (list). (Miocene Victoria, Australia).

GAUDRYINA (PSEUDOGAUDRYINA) BULLBROOKI Cushman

Gaudryina (Pseudogaudryina) bullbrooki RENZ, Proc. 8th Amer. Sci. Congress, 1942, pp. 548, 556 (lista). (Oligocene and Miocene - Trinidad).

GAUDRYINA (PSEUDOGAUDRYINA) JARVISI Cushman

Gaudryina (Pseudogaudryina) jarvisi PALMER, Mem. Soc. Cubana Hist. Nat., vol. 14, 1940, p. 119. (Upper Oligocene, Cojimar formation - Cuba)—RENZ, Proc. 8th Amer. Sci. Congress, 1942, p. 556 (list). (Miocene, Brasso formation - Trinidad)—CUSHMAN and TODD, Special Publ. 15, Cushman Lab. Foram. Res., 1945, p. 5, pl. 1, fig. 12. (Miocene - Jamaica).

GAUDRYINA (PSEUDOGAUDRYINA) EXORNATA Cushman and Ellisor (Pl. 3, fig. 5)

Gaudryina (Pseudogaudryina) exornata CUSHMAN and ELLISOR, Journ. Pal., vol. 19, 1945, p. 548, pl. 71, fig. 12.

"Test small, elongate, triserial portion with the sides concave, angles rounded, biserial portion irregularly quadrangular; chambers distinct, the sides concave, raised at the periphery, usually 5 or 6 in the biserial portion, increasing very gradually in size as added; sutures curved; wall composed of very fine sand grains with a large amount of cement, surface fairly smooth; aperture an elongate, narrow opening, the long axis parallel to the inner margin of the chamber, with a very slight neck. Length 0.65-0.90 mm.; breadth 0.30-0.37 mm."

The types are from the Oligocene, *Heterostegina* zone of the Anahuac formation, from well borings in Brazoria Co., Texas.

"The species differs from *Gaudryina (Pseudogaudryina) jacksonensis* Cushman in the smaller size, more depressed chamber walls and raised periphery, and the quadrangular shape of the biserial portion in end view."

GAUDRYINA (PSEUDOGAUDRYINA) ANACHRONS Finlay (Pl. 1, figs. 20, 21)

Pseudogaudryina anachrons FINLAY, Trans. Roy. Soc. New Zealand, vol. 69, 1939, p. 312, pl. 25, figs. 36, 37.

"Very similar to *reussi* Stache, differing only in rougher surface (sandpaper texture instead of smoothed off) and prominent angles, more pinched into ridges and especially continued over whole shell; *reussi* has last 2-3 chambers globose and rounded and normally Gaudryine; *anachrons* has bi-angled terminal chamber and a Verneuiline shape; size, 2.5 mm."

The types are from the upper Oligocene of New Zealand.

GAUDRYINA (PSEUDOGAUDRYINA) ATLANTICA (Balley)

Gaudryina atlantica KLEINFELL, Miocene Stratig. Calif., 1938, p. 191. (Miocene - California)—ISRAELSKY, Proc. 6th Pac. Sci. Congress, 1939, p. 572, pl. 1, fig. 4 (Recent - California)—CUSHMAN and McCULLOCH, Allan Hancock Pacific Exped., vol. 6, No. 1, 1939, p. 93, pl. 8, figs. 9, 10. (Recent - Pacific)—CUSHMAN, Foraminifera, 1941, 1940, Key, pl. 43, fig. 2. (Recent - Atlantic)—CORYELL and RIVERO, J. Paleont., 1941, p. 10, pl. 1, fig. 1.

form differs at sight in the absence of unangled terminal chambers. The aperture is on the whole smaller, though the shell is larger. The suture lines between chambers are usually less distinct and excavated. After this species was distinguished, much better specimens were found at Hampden, and the holotype chosen will be figured later.

"Height, up to 3.5 mm.; width, up to 2.5 mm. (microspheric form). Megalospheric form about three-quarters this size or smaller."

The holotype is from Hampden, 1¼ miles North of Kakaho Creek, upper blue clays, about 5 ft. below top. This is near the top of the Bortonian (Middle Eocene - New Zealand). The subsequently published type figure is reproduced on our plate.

GAUDRYINA (PSEUDOGAUDRYINA) HASTATA Parr

Gaudryina (Pseudogaudryina) hastata CRESPIN, Bull. 9 (Pal. Ser. No. 4), Commonwealth of Australia, Min. Res. Survey, (mimeographed), 1943, p. 79 (list). (Upper Miocene and Lower Pliocene - Victoria, Australia)—PARR, Proc. Roy. Soc. Victoria, vol. 56 (n. ser.), pt. 2, 1945, p. 195. (Recent - Victoria, Australia).

The following species have been recorded as *Gaudryina*, and notes on their relationships are added.

Gaudryina asiphonia Andreae [See *Dorothia asiphonia* (Andreae)]

Gaudryina bradyi Cushman [See *Karrieriella bradyi* (Cushman)]

Gaudryina chilostoma (Reuss) [See *Karrieriella chilostoma* (Reuss)]

Gaudryina filiformis Berthelin [See *Dorothia filiformis* (Berthelin)]

Gaudryina gradata Berthelin [See *Dorothia gradata* (Berthelin)]

Gaudryina lobatula Cushman and Barbat [See *Dorothia lobatula* (Cushman and Barbat)]

Gaudryina pupoides d'Orbigny [See *Dorothia pupoides* (d'Orbigny)]

Gaudryina retusa Cushman [See *Dorothia retusa* (Cushman)]

Gaudryina subrotundata Schwager [See *Dorothia subrotundata* (Schwager)]

Genus MIGROS Finlay, 1939

Genotype, *Gaudryina medwayensis* Parr (as here figured and interpreted)

Migros FINLAY, Trans. Roy. Soc. New Zealand, vol. 69, 1939, p. 312.

Gaudryina PARR, 1935 (part).

"Identical with *Gaudryina* in all respects, except that aperture has entirely migrated into terminal face, but remains connected with base of last chamber by narrow groove-like channel, formed by incomplete closing in of sides. This is already evident in quite young shells, which even in triserial stage show a small, high, rounded aperture unlike true *Gaudryina*. A uniserial stage is approached, but never quite attained.

This is to *Gaudryina* what *Haeslerella* (especially the species *hectori*) is to *Textularia*."

MIGROS MEDWAYENSIS (Parr)

Gaudryina medwayensis PARR, Trans. Roy. Soc. New Zealand, vol. 65, 1935, p. 83, pl. 20, fig. 2.

Migros medwayensis FINLAY, l. c., vol. 69, 1939, p. 312, pl. 25, figs. 38-40.

"Parr described this from the South Island Medway River as an Awa-moan form closely related to *reussi* Stache. But *Bolivinita* and *Massilina subacqualis* (Parr) demonstrate a Taranakian age (probably Tongaporutuan), while the *reussi* line disappeared in the Oligocene and is not related. Parr's poorly preserved type shows (more than does his figure) this apertural migration, the opening and groove being filled with matrix. Better specimens are here figured from G. S. 1342, where it is common; size 1.8 mm. It has not yet occurred below this Tutamoe horizon, but ranges up to Lower Taranakian (3140, etc.). Identification with Parr's species is practically certain, but if any future discrepancy should occur the genotype of *Migros* is to be taken as the Poverty Bay form here figured. The Recent *flintii* Cush. (see Cushman, Cushman Lab. Foram. Res. Special Publ. No. 7, p. 10, figs. 18-20) is congeneric and probably also *tenuis* Cush."

Genus RUDIGAUDRYINA Cushman and McCulloch

Genoholotype, *Rudigaudryina inepta* Cushman and McCulloch

Rudigaudryina CUSHMAN and McCULLOCH, Allan Hancock Pacific Exped., vol. 6, No. 1, 1939, p. 94.—CUSHMAN, Foraminifera, 3rd Ed., 1940, p. 120.

Test in the early stages triserial, at least in the microspheric form, followed by a biserial series as in *Gaudryina* and in the adult with the chambers in an irregular spreading series; wall finely arenaceous, firmly and smoothly cemented; aperture in the adult chambers generally terminal, rounded, often with a slight lip.—Recent.

RUDIGAUDRYINA INEPTA Cushman and McCulloch (Pl. 3, figs. 11-16)

Rudigaudryina inepta CUSHMAN and McCULLOCH, Allan Hancock Pacific Exped., vol. 6, No. 1, 1939, p. 95, pl. 9, figs. 3-10.—CUSHMAN, Foraminifera, 3rd Ed., 1940, Key, pl. 43, figs. 8, 9.

"Test in the earliest stages triserial, at least in the microspheric form, followed by a series of biserial chambers increasing rather rapidly in size and breadth, these in turn in the adult followed by a series of very irregular chambers in a single series or variously placed, usually making up the larger part of the test, later chambers inflated; sutures oblique, not depressed in the earlier portion, often deeply depressed in the adult, ir-

regular portion; wall finely arenaceous, with much cement, smoothly finished; aperture in the adult rounded with a slight neck.

"Length up to 1.00 mm."

The types are from 80-100 fathoms, Tagus Cove, Albemarle Id., Galapagos Ids., and it is also recorded from numerous stations in the eastern Pacific.

Genus SPIROPLECTINATA Cushman, 1927

SPIROPLECTINATA ANNECTENS (Parker and Jones)

Spiroplectinata annectens CUSHMAN, Foraminifera, 3rd Ed., 1940, pl. 11, fig. 19; Key, pl. 7, fig. 20. (Lower Cretaceous - England).

SPIROPLECTINATA JAEKELI (Franke) (Pl. 3, figs. 17, 18; pl. 4, figs. 22-24)

Spiroplecta jaekeli FRANKE, Abhandl. geol.-pal. Inst. Univ. Greifswald, vol. 6, 1925, p. 13, pl. 1, fig. 18; Abhandl. Preuss. geol. Landes., n. ser., vol. 111, 1928, p. 151, pl. 13, fig. 19.

Spiroplectinata jaekeli BROTZEN, Sver. Geol. Under., Ser. C, No. 465, 1945, p. 44, pl. 1, figs. 1, 2.

Test compressed, straight-edged, with almost parallel marginal peripheries, early part rounded. The spiral initial part projects out of the plane of the test and stands almost at right angles to it. The chambers of the following biserial part are most curved, those of the uniserial part continue curved. Sutures weakly incised.

Small specimen 0.5-0.7 mm. long, 0.2-0.25 mm. wide.

That the species may be considerably larger is shown by the illustrated fragment of 1.3 mm. length and 0.4 mm. width.—Translation.

"Franke described this species from the upper Turonian of Lebbin, Pommerania, Germany. This species is typically triserial in the early stage, flattened biserial in the middle stage and uniserial in the adult. On account hereof this species is referable to the genus *Spiroplectinata* Cushman. *Spiroplectinata jaekeli* is distinguished from *Sp. annectens* Parker and Jones by the greater breadth, by the low chambers in the uniserial stage and by the uniserial stage with broad chambers. The chambers of the uniserial stage are not separated by depressed sutures."—Brotzen.

Genus BERMUDEZINA Cushman, 1937

BERMUDEZINA CUBENSIS (Palmer and Bermúdez)

Bermudezina cubensis CUSHMAN, Foraminifera, 3rd Ed., 1940, Key, pl. 43, fig. 3. (Oligocene - Cuba).

Heterostomella cubensis FRANKLIN, Journ. Pal., vol. 18, 1944, p. 307, pl. 44, fig. 22. (Lower Oligocene, Carapita formation - Venezuela).

BERMUDEZINA ELEGANS Kelker (Pl. 4, figs. 2, 25)

Bermudezina elegans KEIJZER, Outline geol. eastern part Prov. Oriente, Cuba, Utrecht, 1945, p. 189, pl. 1, fig. 12.

Heterostomella sp. CORVELL and EMBICH, Journ. Pal., vol. 11, 1937, p. 294, pl. 41, fig. 10.

"Test elongate, often slightly curved, finely arenaceous. Initial portion triangular with indistinct sutures, later portion biserial with up to 12 chambers, which become increasingly inflated. Some specimens show a tendency to become uniserial. Aperture at the end of a short neck. This species cannot be classed as a *Heterostomella*, as the fistulose longitudinal ridges, typical of that genus are lacking, but it is very well in accordance with the definition of *Bermudezina*. *Bermudezina cubana* (Palmer and Bermúdez) is broader in proportion to its length and has a more pronounced triserial portion. Length up to 1.3 mm.; width up to 0.3 mm.; thickness up to 0.25 mm."

The types are from the lower Oligocene of Cuba, and it is also recorded from the upper Eocene of Panama by Coryell and Embich.

BERMUDEZINA HALCONI (Hedberg) (Pl. 4, fig. 3)

Heterostomella (?) *halconi* HEDBERG, Journ. Pal., vol. 11, 1937, p. 667, pl. 90, fig. 9.

"Initial third of test triserial and sharply triangular, changing abruptly to a biserial arrangement and a roughly quadrangular shape. Six to eight chambers in biserial portion. Aperture nearly terminal with a short neck and lip. Wall finely arenaceous. Average length, 0.50 to 0.60 mm."

The types are from the Tertiary, Carapita formation, of Venezuela.

This species, questionably assigned to the genus *Heterostomella*, appears to belong in *Bermudezina*.

BERMUDEZINA PARIANA (Guppy)

Bermudezina pariana PALMER, Mem. Soc. Cubana Hist. Nat., vol. 14, 1940, p. 119, pl. 17, fig. 10. (Upper Oligocene, Cojimar formation - Cuba)—RENZ, Proc. 8th Amer. Sci. Congress, 1942, p. 556 (list). (Miocene, Brasso formation - Trinidad)—PALMER, Bull. Amer. Pal., vol. 29, No. 115, 1945, p. 23. (Miocene, Bowden formation - Jamaica).

BERMUDEZINA JAMAICENSIS Cushman and Todd (Pl. 4, fig. 1)

Bermudezina jamaicensis CUSHMAN and TODD, Special Publ. 15, Cushman Lab. Foram. Res., 1945, p. 5, pl. 1, fig. 13.

"Test elongate, early portion triserial and sharply triangular, faces flattened, the later portion biserial, inequally triangular, the narrower side slightly concave; chambers not inflated, somewhat indistinct; sutures indistinct; wall finely arenaceous, rather smoothly finished; aperture in the adult small, circular, nearly terminal, with a very short, cylindrical neck. Length 0.80-1.00 mm.; breadth 0.35-0.40 mm.; thickness 0.20-0.30 mm."

The types are from the Miocene, ½ mile east of Buff Bay, Jamaica.

"This species is common at the type locality and shows little variation. It differs from *B. pariana* (Guppy) in the much more angular test, less inflated last chambers, rectangular end view, and smaller aperture."

Genus GAUDRYINELLA Flemmer, 1931

GAUDRYINELLA DELRIOGENSIS Flemmer

Gaudryinella delrioensis TAPPAN, Journ. Pal., vol. 14, 1940, p. 99, pl. 15, fig. 7. (Lower Cretaceous, Grayson formation - Texas)—CUSHMAN, Foraminifera, 3rd Ed., 1940, pl. 11, fig. 20; Key, pl. 7, fig. 26. (Lower Cretaceous - Texas)—VIEAUX, Journ. Pal., vol. 15, 1940, p. 627 (list). (Lower Cretaceous - Texas)—TAPPAN, l. c., vol. 17, 1943, p. 490, pl. 78, fig. 30. (Lower Cretaceous, Duck Creek formation - Oklahoma and Texas).

GAUDRYINELLA IRREGULARIS Tappan (Pl. 3, figs. 19, 20)

Gaudryinella irregularis TAPPAN, Journ. Pal., vol. 17, 1943, p. 490, pl. 78, figs. 31, 32.

“Test tiny, elongate, very early portion triserial, forming a somewhat globular base, then rapidly becoming loosely triserial and finally uniserial; chambers inflated, globular, later ones becoming somewhat elongate, increasing rapidly in size from the initial portion, then increasing more slowly; sutures distinct, deeply depressed; wall medium to finely arenaceous, smoothly finished; aperture terminal, rounded, at the end of a distinct neck. Length of holotype 0.34 mm., breadth of last chamber 0.08 mm., length of paratype 0.27 mm., breadth of last chamber 0.08 mm.”

The types are from the Lower Cretaceous, Duck Creek formation, of Grayson County, Texas.

GAUDRYINELLA PSEUDOSERRATA Cushman

Gaudryinella pseudoserrata CUSHMAN and TODD, Contr. Cushman Lab. Foram. Res., vol. 19, 1943, p. 51, pl. 9, fig. 5. (Upper Cretaceous, Corsicana marl - Texas).

GAUDRYINELLA CUBANA Cushman and Bermúdez

Gaudryinella cubana BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 12, 1938, p. 9. (Eocene - Cuba).

Genus PSEUDOCLAVULINA Cushman, 1936

PSEUDOCLAVULINA CLAVATA (Cushman)

Pseudoclavulina clavata CUSHMAN, Foraminifera, 3rd Ed., 1940, Key, pl. 43, fig. 4. (Upper Cretaceous - Mexico)—CUSHMAN and DEADERICK, Contr. Cushman Lab. Foram. Res., vol. 18, 1942, p. 53, pl. 9, figs. 17-22. (Upper Cretaceous, Brownstown marl - Arkansas)—CUSHMAN and TODD, l. c., vol. 19, 1943, p. 52, pl. 9, fig. 6. (Upper Cretaceous, Corsicana marl - Texas)—FRIZZELL, Journ. Pal., vol. 17, 1943, p. 340, pl. 55, fig. 14. (Upper Cretaceous, Mal Paso shale - Peru)—CUSHMAN and DEADERICK, l. c., vol. 18, 1944, p. 330, pl. 50, figs. 15-17. (Upper Cretaceous, Marlbrook marl - Arkansas)—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 20, 1944, p. 3, pl. 1, fig. 8. (Upper Cretaceous, Pecan Gap chalk member of Taylor marl - Texas); l. c., vol. 20, 1944, p. 84, pl. 13, fig. 6. (Upper Cretaceous, Mooreville tongue of Selma chalk - Mississippi).

PSEUDOCLAVULINA MOOREVILLENSIS Cushman and Applin (Pl. 4, figs. 9, 10)

Pseudoclavulina moorevillensis CUSHMAN and APPLIN, Contr. Cushman Lab. Foram. Res., vol. 21, 1945, p. 74, pl. 12, figs. 4, 5.

“Test elongate, in the adult about $3\frac{1}{2}$ times as long as broad, early

portion triserial, triangular in section, the angles acute and slightly carinate, adult portion uniserial, circular in transverse section, the periphery with a strong keel at the middle of each chamber and concave between; chambers of the early triserial portion rather indistinct, those of the adult uniserial portion distinct, thickest in the middle with a distinct, raised ridge; sutures depressed in the adult; wall arenaceous, slightly roughened; aperture rounded, terminal, with a slightly thickened lip. Length 1.25-1.60 mm.; diameter 0.35-0.42 mm."

The types are from the Upper Cretaceous, Mooreville tongue of the Selma chalk, 4 feet below top, 5 miles SE. of Boligee on Forkland Road, on hill slopes east of Taylor Creek, Greene Co., Ala.

"This species differs from *Pseudoclavulina egeri* Cushman from the Upper Cretaceous of Germany in the more sharply angular triserial portion, the more distinct uniserial chambers and the distinctive, sharply raised areas of the middle part of the later chambers. This species seems to be an index fossil for the top portion of the Mooreville tongue of the Selma chalk, and is common at this point in the section in wells across Mississippi, Alabama, and Georgia."

PSEUDOCLAVULINA ANGLICA Cushman

Pseudoclavulina aff. *anglica* LeRoy, Colorado School Mines Quart., vol. 36, No. 1, pt. 1, 1941, p. 20, pl. 3, figs. 56, 57. (Miocene or Pliocene - Borneo).

PSEUDOCLAVULINA COLUMBIANA Howe (Pl. 4, fig. 8)

Pseudoclavulina columbiana Howe, Geol. Bull. 14, Louisiana Geol. Survey, 1939, p. 33, pl. 2, figs. 9, 10.

"Test with early chambers triserial, later uniserial, the uniserial portion comprising 4/5ths of the test, the test circular in cross section; chambers fairly numerous, not labyrinthic; sutures indistinct except for the last one which is depressed; wall fairly thick, composed of fine sand grains and minute tests of Foraminifera held together by much cement; aperture terminal, rather indistinct, with a faint neck."

Holotype. Length 1.98 mm.; diameter 0.85 mm.

The types are from the Eocene, Cook Mountain formation, of Louisiana.

PSEUDOCLAVULINA ELONGATA Hussey (Pl. 4, fig. 4)

Pseudoclavulina elongata Hussey, Journ. Pal., vol. 17, 1943, p. 161, pl. 26, figs. 3, 4.

"Test very elongate in well developed specimens, triserial in early stages, subtriangular in transverse section, later greater portion of test uniserial, round in transverse section; chambers fairly distinct in early portion, well defined in uniserial portion, inflated, increase in size as added; sutures fairly distinct, slightly depressed; aperture appears to be

textularian in early stages, later terminal, rounded without a neck or tooth."

Holotype, length 1.85 mm., width 0.40 mm.

"This species occurs in considerable abundance in, and should prove to be a good "marker fossil" for, the greensand section of the Cane River." (Eocene - Louisiana).

PSEUDOCLAVULINA COCOAENSIS Cushman

Pseudoclavulina cocoaensis CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 15, 1939, p. 50, pl. 9, fig. 17. (Eocene - Atlantic core)—MARTIN, Stanford Univ. Publ., Univ. Ser., Geol. Sci., vol. 3, No. 3, 1943, p. 12 (list). (Eocene, Lodo formation - California).

PSEUDOCLAVULINA ALAZANENSIS (Nuttall)

Pseudoclavulina cf. *alazanensis* PALMER, Mem. Soc. Cubana Hist. Nat., vol. 14, 1940, p. 120, pl. 18, figs. 4, 9, 10. (Upper Oligocene, Cojimar formation - Cuba).

PSEUDOCLAVULINA BULLBROOKI Cushman

Pseudoclavulina bullbrooki RENZ, Proc. 8th Amer. Sci. Congress, 1942, p. 557 (list). (Miocene, Brasso formation - Trinidad)—CUSHMAN and TODD, Special Publ. 15, Cushman Lab. Foram. Res., 1945, p. 6, pl. 1, fig. 15. (Miocene - Jamaica).

PSEUDOCLAVULINA HUMILIS (H. B. Brady)

Pseudoclavulina humilis THALMANN, Amer. Midland Nat., vol. 28, 1942, p. 463. (Recent - Pacific).

PSEUDOCLAVULINA MEXICANA (Cushman)

Pseudoclavulina mexicana CORYELL and RIVERO, Journ. Pal., vol. 14, 1940, p. 325, pl. 43, fig. 4. (Miocene - Haiti)—PALMER, Mem. Soc. Cubana Hist. Nat., vol. 14, 1940, p. 120, pl. 18, fig. 11. (Upper Oligocene, Cojimar formation - Cuba); Bull. Amer. Pal., vol. 29, No. 115, 1945, p. 23. (Miocene, Bowden formation - Jamaica)—CUSHMAN and TODD, Special Publ. 15, Cushman Lab. Foram. Res., 1945, p. 5, pl. 1, fig. 14. (Miocene - Jamaica).

‡ **PSEUDOCLAVULINA** sp. *Israelsky* (Pl. 4, fig. 12)

?*Pseudoclavulina* sp. ISRAELSKY, Proc. 6th Pac. Sci. Congress, 1939, p. 572, pl. 1, fig. 6. (Eocene - California).

Genus CLAVULINOIDES Cushman, 1936

CLAVULINOIDES TRILATERA (Cushman)

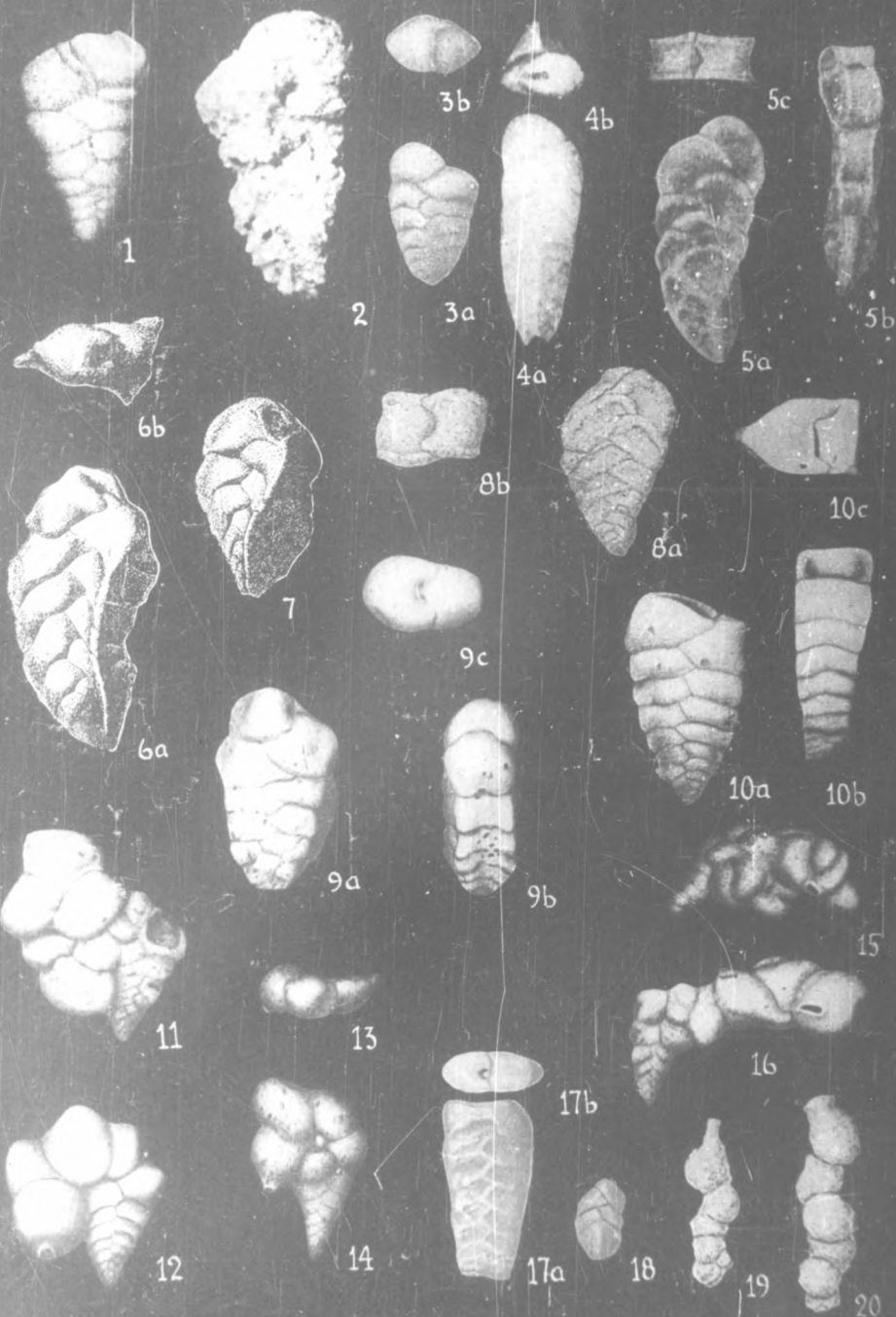
Clavulinoides trilatera CUSHMAN, Foraminifera, 3rd Ed., 1940, Key, pl. 43, fig. 5. (Upper Cretaceous - Arkansas)—CUSHMAN and TODD, Contr. Cushman Lab. Foram. Res., vol. 19, 1943, p. 52, pl. 9, fig. 7. (Upper Cretaceous, Corsicana marl - Texas)—CUSHMAN, l. c., vol. 20, 1944, p. 3, pl. 1, fig. 7. (Upper Cretaceous, Pecan Gap chalk member of Taylor marl - Texas).

CLAVULINOIDES TRILATERA (Cushman), var. *CONCAVA* (Cushman)

Clavulinoides trilatera (CUSHMAN), var. *concava* CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 20, 1944, p. 3, pl. 1, fig. 9. (Upper Cretaceous, Pecan Gap chalk member of Taylor marl - Texas)—CUSHMAN and DEADERICK, Journ. Pal., vol. 18, 1944, p. 330, pl. 50, figs. 18-21. (Upper Cretaceous, Marlbrook marl - Arkansas).

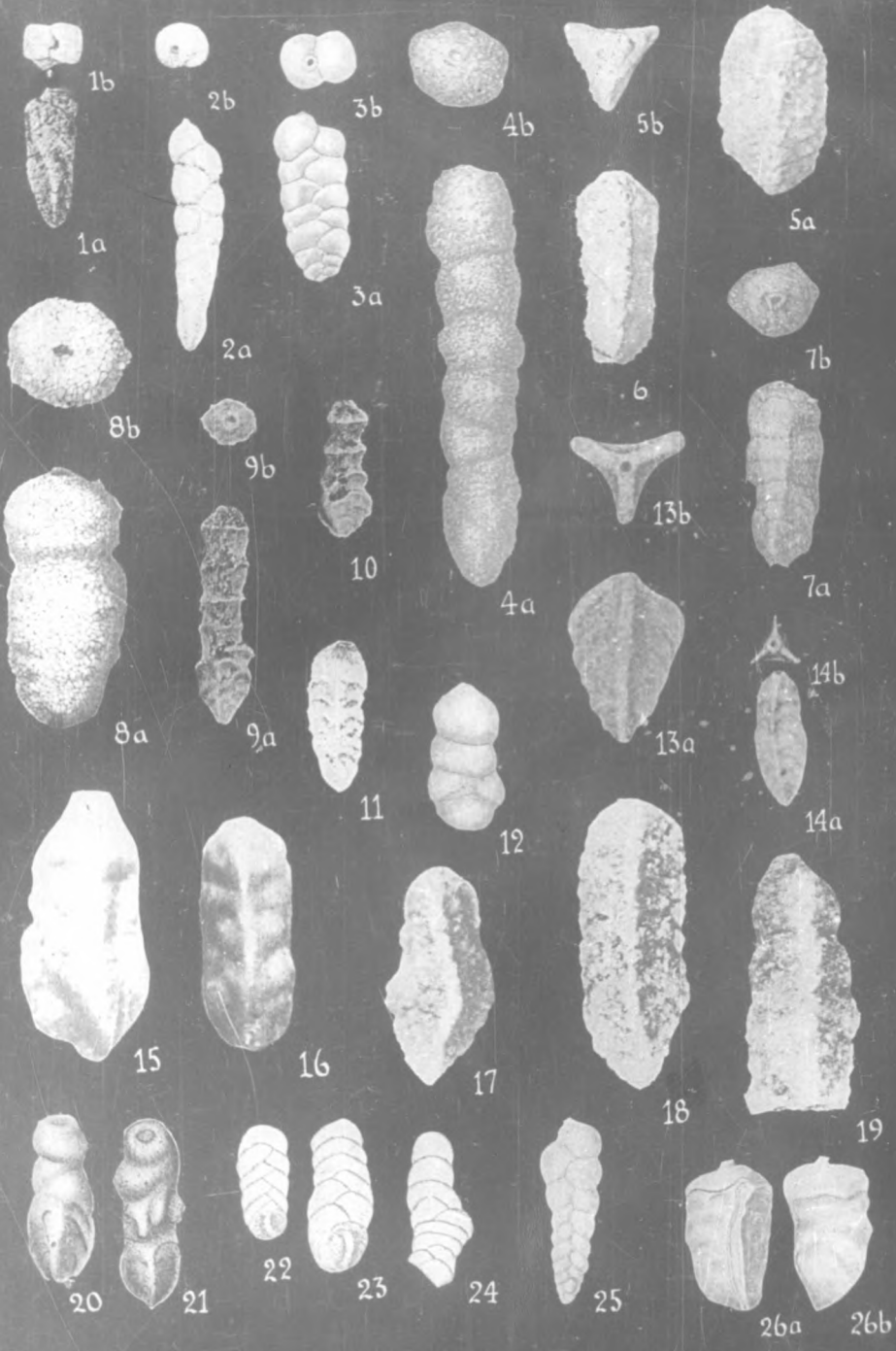
EXPLANATION OF PLATE 3

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CLAVULINOIDES ASPERA (Cushman)

Clavulinoides aspera CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 20, 1944, p. 3, pl. 1, fig. 10. (Upper Cretaceous, Pecan Gap chalk member of Taylor marl - Texas).

CLAVULINOIDES COMPRESSA (Cushman)

Clavulinoides compressa CUSHMAN and TODD, Contr. Cushman Lab. Foram. Res., vol. 19, 1943, p. 52, pl. 9, fig. 8. (Upper Cretaceous, Corsicana marl - Texas).

CLAVULINOIDES INSIGNIS (Plummer)

Clavulinoides insignis CUSHMAN and TODD, Contr. Cushman Lab. Foram. Res., vol. 19, 1943, p. 52, pl. 9, fig. 9. (Upper Cretaceous, Corsicana marl - Texas).

CLAVULINOIDES MIDWAYENSIS Cushman

Clavulinoides midwayensis CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 16, 1940, p. 53, pl. 9, fig. 6. (Eocene, Midway - Alabama)—APPLIN and JORDAN, Journ. Pal., vol. 19, 1945, p. 131 (list). (Paleocene - Florida).

CLAVULINOIDES GUAYABALENSIS (Cole)

Clavulinoides guayabalensis HOWE, Geol. Bull. 14, Louisiana Geol. Survey, 1939, p. 33, pl. 2, figs. 11, 12. (Eocene, Cook Mountain formation - Louisiana).

CLAVULINOIDES CUBENSIS Cushman and Bermúdez

Clavulinoides cubensis BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 12, 1938, p. 1. (Eocene - Cuba)—THALMANN, Stanford Univ. Publ., Univ. Ser., Geol. Sci., vol. 3, No. 1, 1942, p. 9 (list). (Eocene - Borneo)—KELLEY, Bull. Amer. Assoc. Petr. Geol., vol. 27, 1943, p. 8 (list). (Eocene, Anita shale - California).

CLAVULINOIDES EUCARINATUS Cushman and Bermúdez

Clavulinoides eucarinatus BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 12, 1938, p. 1. (Eocene - Cuba)—CUSHMAN and STAINFORTH, Special Publ. 14, Cushman Lab. Foram. Res., 1945, p. 17, pl. 1, figs. 24, 25. (Oligocene, Cipero formation - Trinidad).

CLAVULINOIDES EXCURRENS Cushman and Bermúdez

Clavulinoides excurrens BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 12, 1938, p. 1. (Eocene - Cuba)—CUSHMAN and STAINFORTH, Special Publ. 14, Cushman Lab. Foram. Res., 1945, p. 17, pl. 1, fig. 26. (Oligocene, Cipero formation - Trinidad).

CLAVULINOIDES MARIELINUS Cushman and Bermúdez

Clavulinoides marielinus BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 12, 1938, p. 1. (Eocene - Cuba).

CLAVULINOIDES CAMAGÜEYANUS Bermúdez (Pl. 4, figs. 5, 6)

Clavulinoides camagüeyanus BERMÚDEZ, Mem. Soc. Cubana Hist. Nat., vol. 11, 1937, p. 141, pl. 16, figs. 6-8.

Test large, triangular, early chambers triserial, the remainder uniserial; edges carinate, but disappearing on the last-formed chamber toward the aperture; sutures visible when moistened or mounted in canada balsam; wall distinctly arenaceous, formed of calcareous sand grains, other Foraminifera, or fragments of shells; aperture terminal, without a neck. Length 2.0 mm.; breadth 1.3 mm.—Translation.

The types are from the Eocene, just north of Grua 9, Ramal Juan Criollo of Central Jatibonico, Province of Camagüey, Cuba.

CLAVULINOIDES TRIANGULARIS (Nuttall)

Clavulinoides triangularis GALLOWAY and HEMINWAY, New York Acad. Sci., Sci. Survey Porto Rico and Virgin Ids., vol. 3, pt. 4, 1941, p. 327, pl. 7, fig. 5. (Oligocene or Miocene, Ponce formation - Porto Rico).

CLAVULINOIDES DEPRESSA Cushman and Ellisor (Pl. 4, fig. 13)

Clavulinoides depressa CUSHMAN and ELLISOR, Journ. Pal., vol. 19, 1945, p. 548, pl. 41, fig. 13.

"Test triangular in section throughout, tapering, with the greatest breadth near the apertural end, sides deeply depressed, angles rounded; chambers indistinct, increasing very slightly in height as added; sutures slightly depressed; wall coarsely arenaceous, but the surface fairly smooth; aperture terminal, small, with a slight lip. Length 1.25-1.40 mm.; diameter 0.75-0.95 mm."

The types are from the Oligocene, *Heterostegina* zone of the Anahuac formation, from well borings in Brazoria Co., Texas.

"This species differs from *Clavulinoides triangularis* (Nuttall) in the deeply depressed sides and very rapidly tapering test."

CLAVULINOIDES SZABOI (Hantken)

Clavulinoides szaboi LEROY, Colorado School Mines Quart., vol. 36, No. 1, pt. 1, 1941, p. 20, pl. 1, figs. 55, 56. (Miocene or Pliocene - Borneo)—DE WITTT PUYT, Geol. Pal. - Beschr. Umgebung von Ljubuski, Hercegovina, Utrecht, 1941, p. 47. (Eocene, Flysch - Hercegovina)—GLAESSNER, Proc. Roy. Soc. Victoria, vol. 55 (n. ser.), pt. 1, 1943, p. 69 (list). (Miocene - Indo-Pacific).

CLAVULINOIDES SZABOI (Hantken), var. VICTORIENSIS Cushman

Clavulinoides szaboi (HANTKEN), var. *victoriensis* PARR, Mining and Geol. Journ., vol. 2, 1942, p. 364 (list). (Miocene, Batesfordian - Australia)—CRESPIN, Bull. 9 (Pal. Ser. No. 4), Commonwealth of Australia, Min. Res. Survey, (mimeographed), 1943, p. 78 (list). (Miocene - Australia); Trans. Roy. Soc. So. Australia, vol. 68, 1944, p. 121 (list). (Miocene - Australia).

CLAVULINOIDES OLSSONI Finlay (Pl. 4, fig. 11)

Clavulinoides olssoni FINLAY, Trans. Roy. Soc. New Zealand, vol. 69, 1939, p. 93, pl. 14, fig. 76.

"Shell large, elongate, triangular and with sharp keels over whole length; composed of large and small sand grains set in much cement, giving a coarse but smoothly finished appearance. Initial, triserial part with the usual sharp angles, the surface between them smooth and distinctly hollowed, giving a pinched-in appearance; chambers quite indistinct; at the end of this portion there is a small but distinct twist to the shell; the narrow hollowing ends and is replaced by a broad slightly

concave surface between keels. The latter rapidly increase in strength again and remain high and sharp on to base of last chamber. About six uniserial chambers. Sutures between keels strongly arched and forming shallow excavations, sometimes obscure; their meeting on keels forms downwardly directed corrugations, slightly interrupting keel. Aperture terminal, small, raised above chamber surface by a very slight neck irregularly weakly notched all round.

"Length, up to 2.4 mm.; width 0.8 mm."

The types are from the Hutchinsonian (lower Miocene), Rotokautuku Creek, Poverty Bay, New Zealand.

CLAVULINOIDES INSTAR Finlay (Pl. 4, fig. 16)

Clavulinoides instar FINLAY, Trans. Roy. Soc. New Zealand, vol. 69, 1939, p. 94, pl. 14, fig. 77.

"Smooth triangular forms of *Clavulinoides*, however, occur here in the Tertiary, but are not of much zonal value. One of these is not uncommon in the Ihungian and Tutamoe, and is similar to several of the Cuban Eocene forms described by Cushman and Bermudez (1937, pp. 2-4); from *C. cubensis* it differs in having only three uniserial chambers instead of five and in being smaller (1.5 mm. in length instead of 2 or more); from *eucarinatus* in its sharply keeled early portion; and from *marielinus* in its large aperture—it has much higher, sharper and more compressed keels, with more concave interspaces than any of the Cuban species. There is more similarity indeed to the well-known European early Tertiary *C. szaboi* Hantken, recently well figured by Ostrowsky (1938, p. 352, pl. 24, fig. 7) from the French Marocco, but this has a longer and sharper triserial part. This New Zealand form may be called *Clavulinoides instar* n. sp. (plate 14, fig. 77), the holotype being from G. S. 1342, Waikura Stream, Patutahi S. D., Poverty Bay, "just under Tutamoe boundary"; horizon Tutamoe, i. e., Middle Miocene."

CLAVULINOIDES VIRILIS Finlay (Pl. 4, fig. 15)

Clavulinoides virilis FINLAY, Trans. Roy. Soc. New Zealand, vol. 69, 1939, p. 94, pl. 14, fig. 78.

"Accompanying this species (*C. instar*) is a second much larger form which is most like the Cuban *C. excurrens* Cushman and Bermudez (l. c., p. 3, pl. 1, figs. 14, 15) but differs in having a shorter and more swollen initial portion, the rest of shell tapering to anterior end, and in having moderately sharp angles to keels, especially initially; it is the same size (1.5 mm.) and has also only two uniserial chambers. The name *Clavulinoides virilis* n. sp. (plate 14, fig. 78) may be applied to it, the holotype being from loc. 5373, Weber mudstone, Mangaotero Surv. Dist., Danne-

virke Subdiv., 33 chs. at 64° from trig AK; horizon below Ihungian probably in this case Waitakian, i. e., Uppermost Oligocene."

CLAVULINOIDES PHILIPPINICA (Larvor)

Clavulinoides philippinica LeRoy, Colorado School Mines Quart., vol. 39, No. 3, pt. 2, 1944, p. 75, pl. 1, figs. 1, 2. (Miocene - Java).

CLAVULINOIDES JARVISI Cushman

Clavulinoides jarvisi PALMER, Mem. Soc. Cubana Hist. Nat., vol. 14, 1940, p. 120, pl. 18, fig. 13. (Upper Oligocene, Cojimar formation - Cuba)—RENZ, Proc. 8th Amer. Sci. Congress, 1942, p. 548 (list). (Oligocene, Cipero formation - Trinidad).

CLAVULINOIDES INDISCRETUS (H. B. Brady)

Clavulinoides indiscretus THALMANN, Amer. Midland Nat., vol. 28, 1942, p. 463. (Recent - Pacific).

CLAVULINOIDES POLYGONALIS Galloway and Heminway (Pl. 4, fig. 7)

Clavulinoides polygonalis GALLOWAY and HEMINWAY, New York Acad. Sci., Sci. Survey Porto Rico and Virgin Ids., vol. 3, pt. 4, 1941, p. 327, pl. 7, fig. 4.

"Test small, consisting of a triangular early third, a middle polygonal portion of variable length, and a terminal round portion; chambers closely appressed, about 3 in the middle part and 1 to 3 in the apertural part; sutures obscure, nearly flush with the surface; wall very finely arenaceous with a moderate amount of cement; surface rather smooth but distinctly granular; aperture terminal, polygonal, oval or round, with raised rim. Length, 0.75 millimeter; diameter, 0.3 millimeter."

The types are from the lower Miocene, Quebradillas formation, of - Porto Rico.

"This form resembles Cole's species *C. guayabalensis*, but differs in lacking the concave sides, in having 3 to 6 sides, and in having a round terminal portion."

CLAVULINOIDES TRICARINATUS LeRoy (Pl. 4, fig. 14)

Clavulinoides tricarinatus LeRoy, Colorado School Mines Quart., vol. 36, No. 1, pt. 1, 1941, p. 20, pl. 3, figs. 62, 63; vol. 39, No. 3, pt. 1, 1944, p. 15, pl. 1, figs. 62, 63.

"Test elongate, triangular in transverse section, edges parallel to somewhat diverging toward apertural end, initial end bluntly pointed, sides flat to slightly concave; chambers numerous of rather uniform shape, tri-serial stage comprising most of test; sutures moderately distinct, flush with surface to faintly depressed, gently curved downward; wall distinctly though finely arenaceous, smooth, bluish-gray color; aperture distinct, terminal, sometimes slightly extended. Length 0.65 mm."

The types are from the Miocene of Sumatra.

CLAVULINOIDES ORIENTALIS Cushman

Clavulinoides orientalis LeRoy, Colorado School Mines Quart., vol. 39, No. 3, pt. 1, 1944, p. 15, pl. 8, figs. 46, 47. (Miocene - Sumatra).

CLAVULINOIDES sp. Cushman and Siegfus (Pl. 4, figs. 17-19)

Clavulinoides sp. CUSHMAN and SIEGFUS, Trans. San Diego Soc. Nat. Hist., vol. 9, 1942, p. 402, pl. 19, figs. 1-3. (Eocene, Kreyenhagen shale - California).

The following species has been recorded as *Clavulinoides*, and a note on its relationship is added:

Clavulinoides difformis (H. B. Brady) (See *Clavulina difformis* H. B. Brady.)

Genus PSEUDOGAUDRYINELLA Cushman, 1936

PSEUDOGAUDRYINELLA CAPITOSA (Cushman)

Pseudogaudryinella capitosa CUSHMAN, Foraminifera, 3rd Ed., 1940, Key, pl. 43, fig. 6. (Upper Cretaceous - Mississippi)—CUSHMAN and DEADERICK, Contr. Cushman Lab. Foram. Res., vol. 18, 1942, p. 54, pl. 10, figs. 1-5. (Upper Cretaceous, Brownstown marl - Arkansas)—CUSHMAN, l. c., vol. 20, 1944, p. 84, pl. 13, fig. 4. (Upper Cretaceous, Mooreville tongue of Selma chalk - Mississippi).

PSEUDOGAUDRYINELLA COLOMBIANA Cushman and Hedberg (Pl. 4, figs. 20, 21)

Pseudogaudryinella colombiana CUSHMAN and HEDBERG, Contr. Cushman Lab. Foram. Res., vol. 17, 1941, p. 84, pl. 21, figs. 9, 10.

"Test elongate, earliest portion triserial, triangular, with subacute angles, later irregularly biserial, then uniserial in the adult; chambers distinct, later ones strongly inflated, circular in section; sutures of the triserial portion indistinct, later ones distinct and depressed; wall distinctly arenaceous, with much cement, smoothly finished; aperture large, terminal, circular. Length 0.85-1.25 mm.; diameter of adult portion 0.30-0.35 mm."

The types are from the Upper Cretaceous, lower zone of the Colon formation, Quebrada Mito Juan, Colombia.

"This species resembles *P. capitosa* (Cushman), but differs in the smaller size, more symmetrical triserial portion, and less acute angles. This seems to be a characteristic species of the lower zone of the Colon formation, but occurs very sporadically."

Genus HETEROSTOMELLA Reuss, 1865

HETEROSTOMELLA AMERICANA Cushman

Heterostomella americana COLE, Florida Dept. Conservation, Geol. Bull. 16, 1938, p. 34 (list), pl. 3, figs. 11, 12. (Upper Cretaceous, Selma chalk - Florida)—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 20, 1944, p. 3, pl. 1, figs. 11, 12. (Upper Cretaceous - Pecan Gap chalk member of Taylor marl - Texas).

HETEROSTOMELLA RUGOSA (d'Orbigny)

Heterostomella rugosa CUSHMAN, Foraminifera, 3rd Ed., 1940, pl. 11, fig. 18. (Upper Cretaceous).

HETEROSTOMELLA FOVEOLATA Marsson

Heterostomella foveolata CUSHMAN, Foraminifera, 3rd Ed., 1940, Key, Pl. 7, fig. 25. (Upper Cretaceous - Texas).

HETEROSTOMELLA GIGANTICA Subbotina

Heterostomella gigantea SUBBOTINA, Trans. Geol. Oil-Prospect. Institut., ser. B, fasc. 60, 1936, pl. 1, figs. 15, 16.

The types are from the Upper Cretaceous, Northern Caucasus, U. S. S. R. No description was given.

The original has not been available for figures.

HETEROSTOMELLA sp. Dain

Heterostomella sp. DAIN, Trans. Geol. Oil-Prospect. Institut., ser. A, fasc. 43, 1934, p. 13, pl. 1, fig. 2.

The types are from the Lower Cretaceous (Aptian), Temir region, U. S. S. R.

The original has not been available for figures and description.

HETEROSTOMELLA sp. Brotzen (Pl. 4, fig. 26)

Heterostomella sp. BROTZEN, Sver. Geol. Under., Ser. C, No. 396, 1936, p. 39, pl. 2, fig. 1. (Upper Cretaceous - Sweden).

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<i>bradyi</i>	25
<i>canadensis</i> (1)	9
<i>chilostoma</i>	25
<i>coalingensis</i>	22
<i>collinsi</i>	16
<i>convexa sandiegensis</i>	11
<i>cretacea</i>	8
<i>cubana</i>	14
<i>cushmani</i> (1)	8
<i>eocaenica</i> (1)	15
<i>faujasi</i>	8
<i>fenestrata</i> (1)	17
<i>filiformis</i>	25
<i>flintii</i>	17
<i>gardnerae</i>	11
<i>geometrica</i> (1)	11
<i>glabrata maxima</i>	21

<i>gracilis</i>	16
<i>gradata</i>	25
<i>guanajayensis</i> (1)	14
<i>healyi</i>	10
<i>karceriana</i>	16
<i>laevigata</i>	8
<i>leuzingeri</i> (2)	16
<i>lobatula</i>	25
<i>medwayensis</i>	25, 26
<i>nebrascensis</i> (1)	9
<i>pauperata</i>	18
<i>pseudocollinsi</i> (2)	15
(<i>Pseudogaudryina</i>) <i>anachrons</i> (1)	23
<i>atlantica</i>	23
<i>pacifica</i> (3)	24
<i>bullbrookii</i>	23
<i>crespinae</i>	22
<i>ellisora</i>	22
<i>exornata</i> (3)	23
<i>hastata</i>	25
<i>jacksonensis</i>	22
<i>abnormis</i> (3)	22
<i>coalingensis</i>	22
<i>irregularis</i>	22
<i>jarvisi</i>	23
<i>proreussi</i> (1)	24
<i>pyramidata</i>	22
<i>rutteni</i>	22
<i>puertoricana</i> (1)	15
<i>pupoides</i>	25
<i>quadrangularis</i>	19
<i>antillana</i> (2)	19
<i>quadrans</i>	10
<i>quadrata</i> (2)	19
<i>quadrilatera</i>	11
<i>reliqua</i>	11
<i>retusa</i>	25
<i>robusta</i>	18
<i>rudita</i>	8
<i>diversa</i> (1)	8
<i>rugosa</i>	8
<i>sandiegensis</i>	11
(<i>Siphogaudryina</i>) <i>austinana</i>	20
<i>glabrata maxima</i> (3)	21
<i>rectiangula</i> (3)	20
<i>siphonifera</i>	21
<i>stephensoni</i>	20
<i>victoriana</i>	21
<i>youngi</i>	21
<i>soldadocensis</i> (2, 3)	14
<i>solida</i>	17
<i>subcretacea</i>	7
<i>subglabrata</i> (2)	19

var. (2)	19	<i>jamaicensis</i> , Bermudezina (4)	28
subquadrata	11	<i>jarvisi</i> , Clavulinoides	37
<i>subrotundata</i>	25	Gaudryina (Pseudogaudryina)	23
subtenuis	18	karreriana, Gaudryina	16
tenuis	18	kurti, Verneuilina (1)	4
thalmanni (2)	16	laevigata, Gaudryina	8
torrei (1)	14	leuzingeri, Gaudryina (2)	16
triangularis	17	limbata, Verneuilina	4
trinitatensis	11	lobatula, Gaudryina	25
whangai	10	marielinus, Clavulinoides	34
youngi	21	mauritii, Verneuilina	3
Gaudryinella	29	maxima, Gaudryina glabrata	21
cubana	29	Gaudryina (Siphogaudryina)	
delrioensis	29	glabrata (3)	21
irregularis (3)	29	medwayensis, Gaudryina	25, 26
pseudoserrata	29	Migros	26
geométrica, Gaudryina (1)	11	mexicana, Pseudoclavulina	31
gigantica, Heterostomella	39	Verneuilina	5
glabrata maxima, Gaudryina	21	midwayensis, Clavulinoides	34
Gaudryina (Siphogaudryina) (3)	21	Migros	25
gracilis, Gaudryina	16	medwayensis	26
gradata, Gaudryina	25	moorevillensis, Pseudoclavulina (4)	29
guanajayensis, Gaudryina (1)	14	nebrascensis, Gaudryina (1)	9
guayabalensis, Clavulinoides	34	neocomiensis, Verneuilina	3
halconii, Bermudezina (4)	28	nipeensis, Barbourinella (1)	7
Heterostomella (?)	28	olssoni, Clavulinoides (4)	35
hastata, Gaudryina (Pseudogaudryina)	25	orientalis, Clavulinoides	37
healyi, Gaudryina	10	ornata, Verneuilina	4
Heterostomella	38	paciñca, Gaudryina (Pseudogaudryina)	
americana	38	atlantica (3)	24
cubensis	27	pariana, Bermudezina	28
foveolata	38	pauperata, Gaudryina	18
gigantica	39	philippina, Clavulinoides	37
(?) halconii	28	pinarensis, Verneuilina	4
ragosa	38	plummerae, Tritaxia	6
humilis, Pseudoclavulina	31	polygonalis, Clavulinoides (4)	37
indiscretus, Clavulinoides	37	polystropha, Verneuilina	4
inepta, Rudigandryina (3)	26	propinqua, Verneuilina	6
inornata, Verneuilina scabra	6	procusii, Gaudryina	
insignis, Clavulinoides	34	(Pseudogaudryina) (1)	24
instar, Clavulinoides (4)	36	pulchra-constructa, Verneuilina	3
irregularis, Gaudryina (Pseudogaudryina)		Pseudoclavulina	29
jacksonensis	22	alazanensis	31
Gaudryinella (3)	29	anglica	30
jacksonensis abnormis, Gaudryina		bullbrookii	31
(Pseudogaudryina) (3)	22	clavata	29
coalingensis, Gaudryina		cocaoensis	31
(Pseudogaudryina)	22	columbiana (4)	30
Gaudryina (Pseudogaudryina)	22	elongata (4)	30
irregularis, Gaudryina		humilis	31
(Pseudogaudryina)	22	mexicana	31
jacheli, Spiroplecta	27	moorevillensis (4)	29
Spiroplectinata (3, 4)	27	pseudocollinsi, Gaudryina (2)	15

Pseudogaudryina	22	subquadrata, Gaudryina	11
<i>anachron</i>	23	<i>subrotundata, Gaudryina</i>	25
Pseudogaudryinella	38	<i>subtenuis, Gaudryina</i>	18
<i>capitosa</i>	38	<i>szaboi, Clavulinoides</i>	35
<i>colombiana</i> (4)	38	<i>victoriensis, Clavulinoides</i>	35
<i>pseudoserrata, Gaudryinella</i>	29	<i>tenuis, Gaudryina</i>	18
<i>puertoricensis, Gaudryina</i> (1)	15	<i>thalmanni, Gaudryina</i> (2)	16
<i>pupoides, Gaudryina</i>	25	<i>torrei, Gaudryina</i> (1)	14
<i>pyramidata, Gaudryina</i>	22	<i>triangularis, Clavulinoides</i>	35
(Pseudogaudryina)	22	Gaudryina	17
<i>Tritaxia</i>	6	<i>tricarinatus, Clavulinoides</i> (4)	37
<i>quadrangularis antillana, Gaudryina</i> (2)	19	<i>trilatera, Clavulinoides</i>	31
<i>Gaudryina</i>	19	<i>concava, Clavulinoides</i>	31
<i>quadrans, Gaudryina</i>	10	<i>trinitatensis, Gaudryina</i>	11
<i>quadrata, Gaudryina</i> (2)	19	<i>triquetra, Verneuilina</i>	6
<i>quadrilatera, Gaudryina</i>	11	Tritaxia	6
<i>rectiangula, Gaudryina</i>	20	<i>ellisorae</i>	6
(Siphogaudryina) (3)	20	<i>plummerae</i>	6
<i>reliqua, Gaudryina</i>	11	<i>pyramidata</i>	6
<i>retusa, Gaudryina</i>	25	Verneuilina	3
<i>robusta, Gaudryina</i>	18	<i>browni</i> (1)	4
Rudigaudryina	26	<i>cushmani</i>	5
<i>inepta</i> (3)	26	<i>fava</i> (1)	3
<i>rudita diversa, Gaudryina</i> (1)	8	<i>favus</i>	3
Gaudryina	8	<i>fusiformis</i> (1)	5
<i>rugosa, Gaudryina</i>	8	<i>kurti</i> (1)	4
Heterostomella	38	<i>limbata</i>	4
<i>rutteni, Gaudryina</i> (Pseudogaudryina)	22	<i>mauriti</i>	3
<i>sandiegensis, Gaudryina</i>	11	<i>mexicana</i>	5
<i>convexa</i>	11	<i>neocomiensis</i>	3
<i>scabra inornata, Verneuilina</i>	6	<i>ornata</i>	4
<i>schizea, Verneuilina</i>	3	<i>pinarensis</i>	4
Siphogaudryina	20	<i>polystropha</i>	4
<i>siphonifera, Gaudryina</i> (Siphogaudryina)	21	<i>propinqua</i>	6
<i>soldadoensis, Gaudryina</i> (2, 3)	14	<i>pulchra-constructa</i>	3
<i>solida, Gaudryina</i>	17	<i>scabra inornata</i>	6
<i>Spiropecta jaekeli</i>	27	<i>schizea</i>	3
Spiropectinata	27	<i>triquetra</i>	6
<i>annectens</i>	27	<i>victoriana, Gaudryina</i> (Siphogaudryina)	21
<i>jaekeli</i> (3, 4)	27	<i>victoriensis, Clavulinoides szaboi</i>	35
<i>stephensoni, Gaudryina</i>	20	<i>virilis, Clavulinoides</i> (4)	36
(Siphogaudryina)	20	<i>whangaia, Gaudryina</i>	10
<i>subcretacea, Gaudryina</i>	7	<i>youngi, Gaudryina</i>	21
<i>subglabrata, Gaudryina</i> (2)	19	Gaudryina (Siphogaudryina)	21
<i>var., Gaudryina</i> (2)	19		