

EOCENE SPECIES OF THE GENERA *BULIMINA* AND
BULIMINELLA FROM CUBA

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ABSTRACT

Ten species of *Bulimina* and two of *Buliminella* from the Eocene of Cuba are described and figured. These include five new species and two new varieties.

In studying the Eocene faunas of Cuba it was found that the genera *Bulimina* and *Buliminella* were present in abundance. It is believed that the species here recorded will prove of value in the working out of the stratigraphy of the region. This aspect of the problem will be presented in a later paper when the faunas have been more completely studied.

Acknowledgments.—Thanks are due the Grants-in-Aid Committee of the National Research Council for financing the making of the drawings, and to Dr. Joseph A. Cushman for putting the facilities of his laboratory at our disposal and giving many valuable suggestions. The drawings were made by Ann Shepard.

SYSTEMATIC DESCRIPTIONS

Genus *BULIMINA* d'Orbigny, 1826

BULIMINA TUXPAMENSIS Cole

Plate 58, figures 1a-c

Bulimina tuxpamensis COLE, 1928, Bull. Am. Paleontology, vol. 14, no. 53, p. 212 (12), pl. 1, fig. 23.—NUTTALL, 1932, Jour. Paleontology, vol. 6, p. 20.

Our specimens closely resemble Cole's species, although there is often a slight roughening of the wall of the lower part of the test which Cole does not mention. It is interesting to note the close relationship of this species to *Bulimina incisa* Cushman from the Cretaceous of Mexico.

The figured specimen is from 4.5 kilometers west of Guanajay on the road to Mariel, Pinar del Rio Province, Cuba.

BULIMINA JARVISI Cushman and Parker

Plate 58, figures 2a-c

Bulimina jarvisi CUSHMAN and PARKER, 1936, Cushman Lab. Foram. Research, Contr., vol. 12, p. 39, pl. 7, figs. 1a-c.

Only one specimen referable to this species was found. It occurs at Alturas de Almendares quarry, Havana, Cuba, and is here figured.

BULIMINA SEMICOSTATA Nuttall

Plate 58, figures 3a-c

Bulimina semicostata NUTTALL, 1930, Jour. Paleontology, vol. 4, pp. 274, 285, pl. 23, figs. 15, 16.—CHURCH, 1931, California State Mineralogist, Rept., pl. B, figs. 4-6.

Our specimens appear to be identical with Nuttall's species from the Guayabal formation of Mexico.

The figured specimen is from El Husillo, Puentes Grandes, Havana, Cuba.

BULIMINA SEMICOSTATA Nuttall var. *CRASSICOSTA* Parker and Bermudez, n. var.

Plate 58, figures 4a-c

Variety differs from the typical form in its larger size and the presence of fewer and heavier costae. Length 0.44 to 0.80 mm.; diameter 0.24 to 0.38 mm.

Remarks.—We have numerous specimens in a poor state of preservation. Further study of better specimens may reveal this form to be a separate species, but its basic resemblance to *Bulimina semicostata* Nuttall seems to point to a varietal difference only.

Type.—Holotype of variety (Cushman Coll., no. 23334) from Alturas de Almendares quarry, Havana, Cuba.

BULIMINA ALAZANENSIS Cushman

Plate 58, figures 5a-c

Bulimina alazanensis CUSHMAN, 1927, Jour. Paleontology, vol. 1, p. 161, pl. 25, fig. 4.

Our specimens closely resemble Cushman's species although they are slightly larger.

The figured specimen is from the upper beds, Cantera Tejar "Consuelo" Cerro, Havana, Cuba.

BULIMINA TARDA Parker and Bermudez, n. sp.

Plate 58, figures 6a-c

Test small, tapering, the last-formed whorl forming a third or more of the test; chambers few, four to five whorls, those of the last whorl inflated; sutures fairly distinct, very slightly depressed, showing as dark lines with occasional small, incised areas; wall smooth, coarsely perforate; aperture loop-shaped with a slight lip. Length 0.30 to 0.35 mm.; diameter 0.21 to 0.23 mm.

Remarks.—This form somewhat resembles *Bulimina tuxpamensis* Cole but is much smaller, more rapidly tapering, and has a smoother wall. The two have enough in common, however, to indicate that this species may be the ancestral form.

Type.—Holotype (Cushman Coll., no. 23337) from Loma Principe, cut between F and Avenida de los Presidentes Streets,

20 meters west of José M. Gómez monument, Havana, Cuba.

BULIMINA IMPENDENS Parker and Bermudez, n. sp.

Plate 58, figures 7a-c, 8a-c

Test small, about one and one-third times as long as broad, very slightly tapering; chambers few, three to four whorls, distinct in last whorl only, those of each whorl overhanging those previously formed to give a distinct collared effect; sutures distinct in last whorl, slightly depressed, previous ones obscured by surface ornamentation; wall spinose or fluted at the lower edge of the last two whorls, the remainder of the test completely covered by short irregular spines; aperture loop-shaped with a slight lip. Length 0.20 to 0.45 mm.; diameter 0.20 to 0.35 mm.

Remarks.—This species differs from *Bulimina curtissima* Cushman and Siegfus in being very much more spinose, in having more chambers, and in the very marked overhang of the chambers.

Type.—Holotype (Cushman Coll., no. 23335) from Alturas de Almendares quarry, Havana, Cuba.

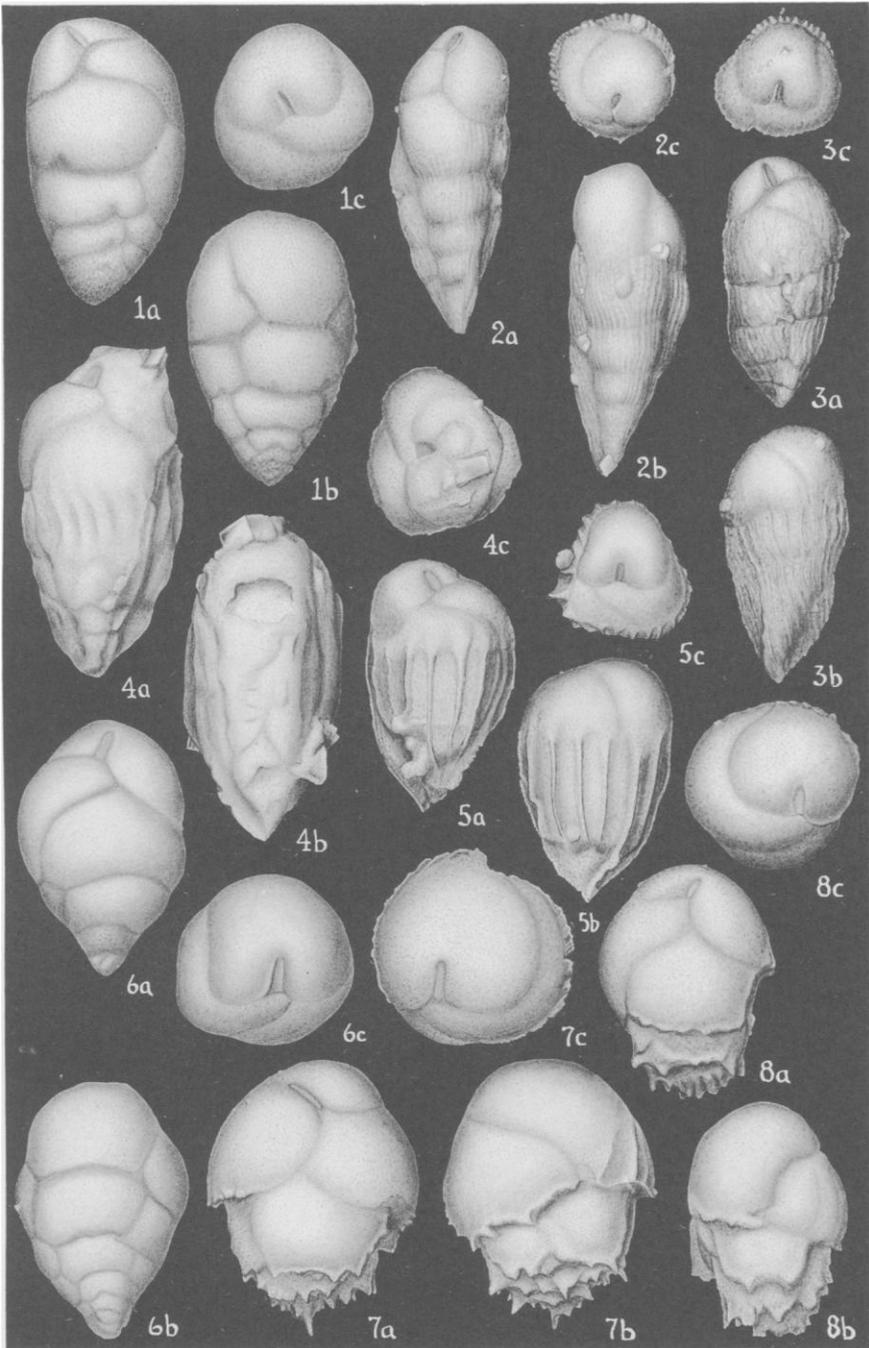
BULIMINA PALMERAE Parker and Bermudez, n. sp.

Plate 59, figures 1a-c

Test medium, one and one-half times as long as broad, tapering, with a well-developed, blunt, basal spine; chambers distinct, four to six whorls, last-formed

EXPLANATION OF PLATE 58

- FIGS. 1—*Bulimina tuxpamensis* Cole, $\times 53$. a, Front view; b, back view; c, apertural view. (p. 513)
- 2—*Bulimina jarvisi* Cushman and Parker, $\times 47$. a, Front view; b, back view; c, apertural view. (p. 513)
- 3—*Bulimina semicostata* Nuttall, $\times 60$. a, Front view; b, back view; c, apertural view. (p. 513)
- 4—*Bulimina semicostata* Nuttall var. *crassicosta* Parker and Bermudez, n. var., $\times 60$. a, Front view; b, back view, c, apertural view. (p. 513)
- 5—*Bulimina alazanensis* Cushman, $\times 80$. a, Front view; b, back view; c, apertural view. (p. 514)
- 6—*Bulimina tarda* Parker and Bermudez, n. sp., $\times 96$. a, Front view; b, back view, c, apertural view. (p. 514)
- 7, 8—*Bulimina impendens* Parker and Bermudez, n. sp., $\times 80$. Fig. 7, Paratype. Fig. 8, Holotype. aa, Front views; bb, back views; cc, apertural views. (p. 514)



Parker and Bermudez, Eocene Foraminifera

chambers somewhat inflated; sutures distinct, depressed, incised; wall with blunt spines at the edges of the chambers, the base of the larger spines extending up onto the chambers, remainder of wall smooth, perforate; aperture loop-shaped with a well-defined lip. Length 0.48 to 0.80 mm.; diameter 0.32 to 0.56 mm.

Remarks.—This species differs from *Bulimina arkadelphiana* Cushman and Parker, var. *midwayensis* Cushman and Parker in being much larger, having much coarser spines and fewer of them. It differs from *Bulimina stalacta* Cushman and Parker in its more spinose character, lack of costae, and the slight overhang of the chambers.

The form is named for Mrs. Dorothy K. Palmer of Havana, Cuba.

Type.—Holotype (Cushman Coll., no. 23339) from 1 kilometer north of Arroyo Arenas on road to Jaimanitas (water well), Havana Province, Cuba.

BULIMINA CONSANGUINEA Parker
and Bermudez, n. sp.

Plate 59, figures 2a-c

Test large, about one and one-third times as long as broad, tapering evenly, usually with a short, blunt, basal spine; chambers distinct in last-formed whorl only, although frequently distinguishable in portions of the remainder of the test, four to six whorls; sutures distinct in last whorl only, very slightly depressed; wall smooth, perforate in the upper part of the last whorl, the remainder ornamented by longitudinal plate-like costae with jagged edges, six to eight visible from the front of the test; aperture loop-shaped with a lip. Length 0.80 to 1.08 mm.; diameter 0.50 to 0.76 mm.

Remarks.—This species differs from *Bulimina jacksonensis* Cushman in its larger size, more numerous and more jagged costae, and the presence of the broad basal spine.

Type.—Holotype (Cushman Coll., no. 23338) from north side of Elvador in Noroña, north of Guanajay, on R Road, Pinar del Rio Province, Cuba.

BULIMINA cf. PUPOIDES d'Orbigny

Plate 59, figures 3a-c, 4a-c, 5a-c

Bulimina pupoides d'ORBIGNY, 1846, Foram. fossiles vienne, p. 185, pl. 11, figs. 11, 12.—NUTTALL, 1930, Jour. Paleontology, vol. 4, p. 285; 1935, Jour. Paleontology, vol. 9, no. 2, p. 127, pl. 14, fig. 22.

Our specimens are very close to d'Orbigny's species, although they are larger and have a thicker wall. The species is a very variable one, but the relative shapes of the chambers and the position and character of the aperture remain the same. It is interesting to note the close relationship between one variation of this species (pl. 59, figs. 3a-c) and *Bulimina guayabalensis* Cole var. *ampla* Cushman and Parker from the Eocene of California, a form showing very little variation.

Only references to the occurrence of this species in the Eocene of North and South America have been given in the synonymy. Further study may show that Eocene forms which have been called *Bulimina ovata* d'Orbigny should also be included in this group.

The figured specimens are from the locality under Library of Havana University, Havana, Cuba.

Genus BULIMINELLA Cushman, 1911

BULIMINELLA GRATA Parker and
Bermudez, n. sp.

Plate 59, figures 6a-c

Test medium, slightly longer than broad, tapering rapidly; chambers four to a whorl, two to three whorls; sutures distinct, broad, flush with the surface, usually incised giving scalloped effect (especially noticeable when wet); wall smooth, finely perforate; aperture rounded with small narrow radial depressions extending from it. Length 0.24 to 0.46 mm.; diameter 0.18 to 0.38 mm.

Remarks.—This form differs from *Buliminella colonensis* Cushman in the shape of the chambers and aperture and the incised character of the sutures.

Type.—Holotype (Cushman Coll., 23340) from Loma Principe, cut between

F and Avenida de los Presidentes Streets, 20 meters west of José M. Gómez monument, Havana, Cuba.

BULIMINA GRATA Parker and Bermudez var.
SPINOSA Parker and Bermudez, n. var.
 Plate 59, figures 7a-c

Variety differs from the typical form in its larger size and in the presence

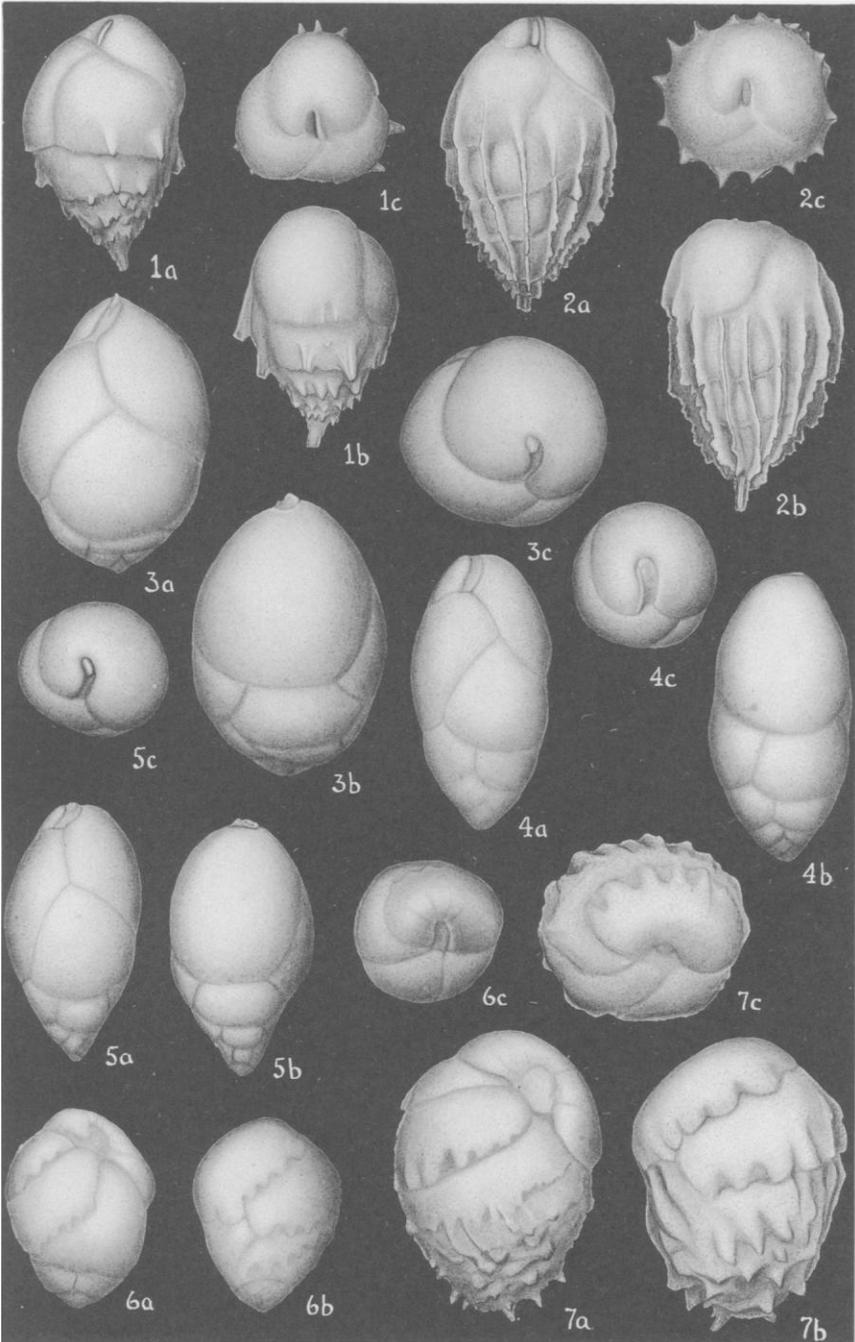
of short, thick, blunt spines in the lower part of the test. In the young forms these blunt spines often cover most of the test. Length 0.48 to 0.78 mm.; diameter 0.40 to 0.66 mm.

Type.—Holotype of variety (Cushman Coll., no. 23341) from north side of Elevador in Noroña, north of Guanajay, on R Road, Pinar del Rio Province, Cuba.

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EXPLANATION OF PLATE 59

- FIGS. 1—*Bulimina palmerae* Parker and Bermudez, n. sp., $\times 60$. *a*, Front view; *b*, back view; *c*, apertural view. (p. 514)
 2—*Bulimina consanguinea* Parker and Bermudez, n. sp., $\times 47$. *a*, Front view; *b*, back view; *c*, apertural view. (p. 515)
 3-5—*Bulimina* cf. *pupoides* d'Orbigny, $\times 47$. *aaa*, Front views; *bbb*, back views; *ccc*, apertural views. (p. 515)
 6—*Buliminella grata* Parker and Bermudez, n. sp., $\times 60$. *a*, Front view; *b*, back view; *c*, apertural view. (p. 515)
 7—*Buliminella grata* Parker and Bermudez, var. *spinosa* Parker and Bermudez, n. var. $\times 54$. *a*, Front view; *b*, back view; *c*, apertural view. (p. 516)



Parker and Bermudez, Eocene Foraminifera