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NEW ARCTIC FORAMINIFERA COLLECTED BY
CAPT. R. A. BARTLETT FROM FOX BASIN
AND OFF THE NORTHEAST COAST
OF GREENLAND

(WITH TWO PLATES)

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NEW ARCTIC FORAMINIFERA COLLECTED BY
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During the course of his expeditions to the Arctic and sub-Arctic regions in the past seven years, 1925-1932, Capt. Robert A. Bartlett has obtained, in addition to other extensive collections of marine invertebrates, considerable numbers of bottom samples which have been examined for foraminifera. A paper has been completed containing 46 genera and nearly 100 species of foraminifera from the collections from off the northeast coast of Greenland and from Fox Basin, Baffin Land. Ten of these forms that are apparently new are here described and figured so that they may be available while awaiting publication of the larger paper which will carry full station data for these species.

Genus **URNULA** Wiesner, 1931

Urnula Wiesner, Deutsche Südpolar Exped., vol. 20, Zool., p. 82, 1931.

Genotype.—*Urnula quadrupla* Wiesner.

Test attached, in young stage similar to *Webbinella*, later adding chambers and each becoming polygonal in outline, whole test plano-convex, rounded, base with a thin chitinous layer, dorsal side with a fine arenaceous covering; aperture in adults rounded, one near the middle of each chamber. Recent, Arctic and Antarctic.

This genus has been recently described by Wiesner from material collected in the Antarctic. Another species probably belonging to this genus was also collected in the Antarctic and should be known as *Urnula depressa* (Heron-Allen and Earland). The present new species extends the range of this genus to the Arctic.

URNULA ARCTICA, n. sp.

Plate I, figs. 1, 2

Test attached, plano-convex, dorsal side somewhat rounded and convex, ventral side conforming to the surface of attachment; chambers four to eight in number, rather uniformly arranged, those tests having four chambers with the whole test in a circle divided by sutures

nearly at right angles, those with more chambers usually arranged about the central one with the sutures radiating, chambers apparently in communication with one another, distinct, slightly inflated on the dorsal side; sutures distinct, somewhat thickened, depressed on the dorsal side; wall very finely arenaceous, with much yellowish-brown cement, the wall on the attached side very thin and translucent, apparently of chitin and only the bases of the walls between the chambers marked by arenaceous material; apertures indistinct. Diameter, 0.35-0.40 mm; thickness, 0.10 mm.

Holotype.—U.S.N.M. No. 26153, from 7 fathoms, Shannon Island, off NE. Greenland.

This peculiar small species has occurred at several stations in the Greenland material and holds its characters very well. It occurs as follows: 10-35 fathoms, Shannon Island, NE. Greenland; 10-35 fathoms, off Clavering Island, NE. Greenland. The specimens apparently may easily become detached, as most of them were found in that condition. This form is distinguished from *Sorosphaera* in its attached form and definitely polygonal chambers.

It is interesting to note that Heron-Allen and Earland have described a very similar species from the Antarctic as *Sorosphaera depressa* Heron-Allen and Earland, which in its characters should belong to this new genus. It may, therefore, be known as *Urnula depressa* (Heron-Allen and Earland). Their species is more irregular in form and has more chambers than the Arctic one, so far as we have seen. It also has accidental openings similar to those shown in our figures.

QUINQUELOCULINA FUSCA H. B. Brady var. GROENLANDICA, n. var.

Plate 1, fig. 4

Variety differing from the typical in the much smoother test with a much larger proportion of cement of a light gray color, and the test usually more compressed.

Holotype of variety.—U.S.N.M. No. 26151, from between Shannon Island and Hochstetter Foreland, NE. Greenland.

When seen with the typical form of the species, this variety is very distinctive.

QUINQUELOCULINA ARCTICA, n. sp.

Plate 1, figs. 3a-c

Test short and stout, very slightly longer than broad; chambers angled, periphery truncate, sides with definite angles; sutures distinct,

slightly depressed; wall smooth; aperture not projecting above the general outline of the test, large, semicircular, with a very small bifid tooth. Length, 0.50-0.65 mm; breadth, 0.40-0.50 mm; thickness, 0.20-0.30 mm.

Holotype.—U.S.N.M. No. 26152, from 10-35 fathoms, off Clavering Island, NE. Greenland.

This species has been found common in the Bartlett collections. It shows some variation in the chambers, and at certain stations the outer angles of the chamber become considerably rounded. It may be that this is the same species as that figured by Parker and Jones in 1865 (pl. 15, figs. 36a-c), and recorded by them as "*Quinqueloculina ferussacii* d'Orbigny." It is, however, very different from d'Orbigny's species. Their specimens were from off Hunde Islands, Davis Strait, 30-70 fathoms. This species occurs at the following localities in the Bartlett material: 7 fathoms, Shannon Island, NE. Greenland; 7 fathoms, fiord between Clavering Island and Homes Foreland, near glacier, NE. Greenland; Labrador; bight of Shannon Island, NE. Greenland; 67 fathoms, off camp, Cape David Gray, Shannon Island, NE. Greenland; 10-35 fathoms, Shannon Island, NE. Greenland; between Shannon Island and Hochstetter Foreland, NE. Greenland; and 50-57 fathoms, off Clavering Island, NE. Greenland.

Genus GORDIOSPIRA Heron-Allen and Earland, 1932

Gordiospira Heron-Allen and Earland, Journ. Roy. Micr. Soc., vol. 52, p. 254, 1932.

Genotype.—*Gordiospira fragilis* Heron-Allen and Earland.

Test free, early coils in varying planes, later planispiral and nearly involute; wall calcareous, imperforate; aperture somewhat triangular, terminal. Recent, Arctic and Antarctic.

This genus has recently been described from the Antarctic *Discovery* material. It is interesting, therefore, to record another species of the genus from the Arctic.

GORDIOSPIRA ARCTICA, n. sp.

Plate I, figs. 5-7

Test planispiral, partially involute, the coils few in number, rounded; suture decidedly depressed; wall calcareous, smooth except for numerous heavy varices of growth which give an irregular appearance to the surface; aperture formed by the open end of the tube.

Holotype.—U.S.N.M. No. 26147, from bight of Shannon Island, NE. Greenland.

The thinness of the wall gives a very different appearance from that of the chalky white opaque wall of typical *Cornuspira*. It is found in the Greenland collections at the following localities: NE. Greenland; off camp, Cape David Gray, Shannon Island, NE. Greenland; 67 fathoms, off camp, Cape David Gray, Shannon Island, NE. Greenland; and 10-35 fathoms, off Clavering Island, NE. Greenland.

ELPHIDIUM GROENLANDICUM, n. sp.

Plate 1, figs. 10a, b

Test large, close coiled, completely involute, the periphery subacute; chambers numerous, 15 or more in the final coil in the adult, of uniform shape throughout and increasing only slightly in size, the last chambers occasionally very slightly inflated; sutures distinct, very slightly if at all depressed, with a sigmoid curve and numerous retral processes, often 15 or more along a single suture; wall smooth, very finely perforate, polished, the umbilical region often with a clear area; aperture consisting of numerous pores along the base of the apertural face of the last-formed chamber. Diameter, up to 1.00 mm.

Holotype.—U.S.N.M. No. 26141, from Bass Rock, NE. Greenland.

This is a large fine species, occurring only in the Bartlett collection from Greenland and not appearing in the collections from Fox Basin. It has occurred at numerous stations and is often common as follows: off Clavering Island, near glacier, NE. Greenland; 7 fathoms, Shannon Island, off NE. Greenland; 7 fathoms, fiord between Clavering Island and Homes Foreland, NE. Greenland; off camp, Cape David Gray, Shannon Island, NE. Greenland; 7 fathoms, near glacier, between Clavering Island and Homes Foreland, NE. Greenland; near Shannon Island, NE. Greenland; 67 fathoms, off camp, Cape David Gray, Shannon Island, NE. Greenland; Koldenian Sound, NE. Greenland; 7 fathoms, off Cape Stosch, Gotthaab Island, Hudson Land, NE. Greenland; and Wollaston Foreland, 5 miles off Cape Borlase Warren, NE. Greenland. It holds its characters very well throughout the different stations. This may possibly be the species referred by authors to "*Polystomella subnodosa*" from Arctic material.

ELPHIDIUM BARTLETTI, n. sp.

Plate 1, figs. 9a, b

Test almost completely umbilicate but leaving a slight uncoiled portion at the umbilical area, periphery broadly rounded; chambers dis-

tinct, slightly inflated, especially in the latter half of the last-formed coil, 10 to 12 or more in number; sutures distinct, usually depressed, occasionally with a slightly beaded appearance in the early portion, retral processes numerous and very short, often hardly visible; wall smooth, very finely perforate, polished; aperture formed by numerous small pores along the base of the apertural face of the chamber. Length, 0.90 mm; thickness, 0.35 mm.

Holotype.—U.S.N.M. No. 26142, from Labrador.

This species is well developed at several stations as follows: off camp, Cape David Gray, Shannon Island, NE. Greenland; 7 fathoms, near glacier, between Clavering Island and Homes Foreland, NE. Greenland; near Shannon Island, NE. Greenland; 10-35 fathoms, Shannon Island, NE. Greenland; and Fox Basin, latitude $66^{\circ}43'$ N. It somewhat resembles the young stages of *E. arcticum*, but seems to be distinct from that species. It is named in honor of Capt. Robert A. Bartlett, whose collections have added much to the knowledge of Arctic foraminifera.

ELPHIDIUM FRIGIDUM, n. sp.

Plate 1, figs. 8a, b

Test usually completely involute, periphery rounded, sides flattened; chambers distinct, slightly inflated, the last ones distinctly so, final chambers often enlarged and projecting beyond the general contour of the test; sutures distinct, depressed, with very numerous short retral processes; wall thin, very distinctly perforate, the last-formed chambers often having distinct elongate markings; aperture consisting of numerous fine pores at the base of the apertural face of the last-formed chamber. Length, 0.90 mm; thickness, 0.25 mm.

Holotype.—U.S.N.M. No. 26143, from 25 fathoms, center of Fox Basin.

Except for one station off Greenland, 10-35 fathoms, near Shannon Island, the species has been found only in the stations from Fox Basin as follows: 34-37 fathoms, SE. corner of Fox Basin, latitude $66^{\circ}46'$ N., longitude $69^{\circ}15'$ W.; and Fox Basin, latitude $66^{\circ}43'$ N., longitude $80^{\circ}7'$ W., where it is often common. It shows considerable variation in the shape of the last-formed chamber, which is much expanded in the adult and often longer than the others so that it projects beyond the general outline of the test. The apertural face of the chamber often has a peculiar overlapping border at the base extending out somewhat beyond the base of the chamber both along the median line and also toward the umbilical ends. The peculiar arrangement of

the pores in the last-formed chambers gives a striate appearance to the basal portion of those chambers.

SPIRILLINA ARCTICA, n. sp.

Plate 2, figs. 1, 2

Test small, forming a low hollow cone, the proloculum very distinct, in the megalospheric form often projecting above the other coils prominently, second undivided, close coiled, overlapping very slightly on the dorsal side leaving a depressed hollow cone as it revolves; suture distinct, very slightly depressed; wall very finely perforate, nearly transparent; aperture formed by the open end of the tube. Diameter, up to 0.50 mm.

Holotype.—U.S.N.M. No. 26149, from the Fox Basin, latitude 67° 41' N., longitude 79° 9' W., in 38 fathoms.

This peculiar, small, conical species is fairly abundant in the Fox Basin material, but was not found in any of the collections from off the coast of Greenland. It occurs at the following localities: 25-31 fathoms, Fox Basin; 34-37 fathoms, SE. corner of Fox Basin, latitude 66° 46' N., longitude 69° 15' W.; and Fox Basin, latitude 66° 43' N., longitude 80° 7' W.

Parker and Jones figured a small *Spirillina* from 60-70 fathoms off the Hunde Islands, Davis Strait, but only one view of this is given and it is important to see whether it belongs to this new species. Their short note on it does not reveal its characters. Brady also records the species from the sounding in 72 fathoms at latitude 83° 19' N., from the British North-Polar Expedition. These records of Parker and Jones and of Brady being so near the Fox Basin area, it would seem that they refer to the same species we have here described.

DISCORBIS BARTLETTI, n. sp.

Plate 2, figs. 3-6

Test plano-convex, the dorsal side very strongly convex, the ventral side flat, periphery subacute, slightly lobulate; chambers distinct, of rather uniform shape and increasing regularly in size as added, increasing in number until in the adult whorl there are about nine or ten chambers; sutures on the dorsal side distinct, strongly limbate, gently curved, on the ventral side obscured by the peculiar ornamentation of the surface; wall on the dorsal side smooth and polished, very distinctly but finely perforate, ventral side with a very complex secondary growth of shell material forming a vesicular mass over the

entire ventral surface, the outer edge of which extends often slightly beyond the periphery, giving a serrate edge to the test even when viewed from the dorsal side; aperture a low opening between the umbilicus and the periphery at the ventral edge of the last-formed chamber. Diameter, up to nearly 2.00 mm.

Holotype.—U.S.N.M. No. 26145, from 34-37 fathoms, SE. corner of Fox Basin, latitude $66^{\circ}46' N.$, longitude $69^{\circ}15' W.$

This is a very finely ornamented species, and has occurred in great abundance in the Fox Basin material, but did not occur in any of the collections from off the NE. coast of Greenland. The ventral side becomes very ornate even in the youngest specimens. Nearly all of our specimens are megalospheric and the proloculum becomes of very large size in comparison to the size of the test. The species is named after Capt. Robert A. Bartlett, collector of this material. It occurs at the following stations in the Fox Basin: 25-31 fathoms, Fox Basin; Fox Basin, latitude $66^{\circ}43' N.$, longitude $80^{\circ}7' W.$; and 25 fathoms, center of Fox Basin.

CASSIDULINA NORCROSSI, n. sp.

Plate 2, figs. 7a-c

Test biconvex, periphery subacute or even slightly keeled; chambers distinct, generally triangular in side view, those of each set reaching nearly to the umbilicus on both sides; wall smooth, very finely perforate, clear and almost transparent; aperture elongate, in general in the line of coiling. Diameter, 0.40-0.45 mm; thickness, 0.15-0.18 mm.

Holotype.—U.S.N.M. No. 26139, from 7 fathoms, 5 miles off Cape Borlase Warren, NE. Greenland.

This very distinctive species is named for Arthur D. Norcross, of New York City, whose close association and friendly cooperation with Captain Bartlett have enabled him to accomplish so much in the way of Arctic exploration in recent years. It occurs only off the NE. coast of Greenland at but a few stations as follows: 50-57 fathoms, off Clavering Island, NE. Greenland; 7 fathoms, off Cape Stosch, Gott-haab Island, Hudson Land, NE. Greenland; and between Shannon Island and Hochstetter Foreland, NE. Greenland. The chambers at first do not appear to have the usual alternating arrangement, owing to the fact that each one comes nearly to the umbilicus on each side, and the difference in size between the two pairs on the same side is not nearly so well marked as is usual in most species.

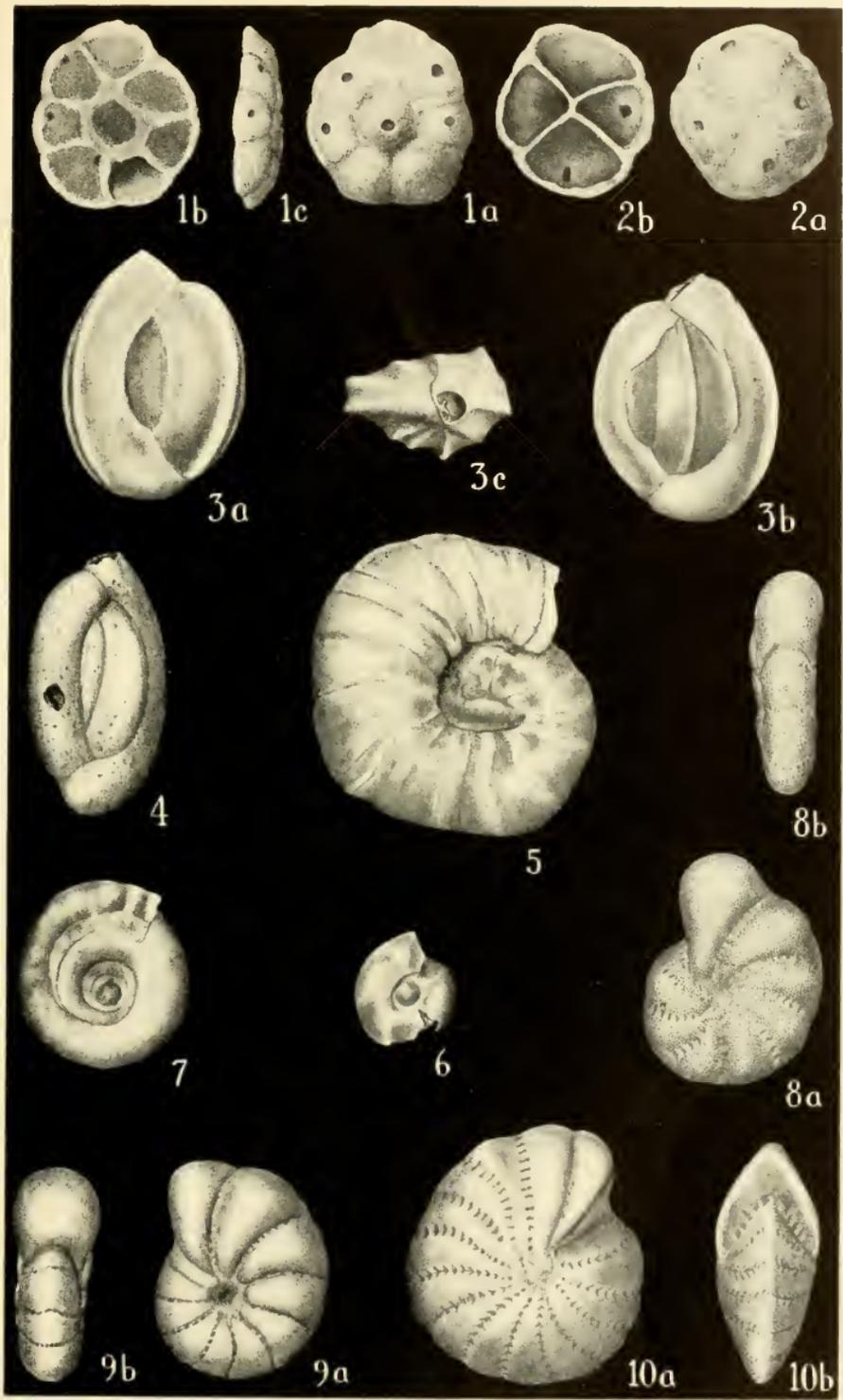
EXPLANATION OF PLATES

PLATE I

- FIGS. 1, 2. *Urnula arctica* Cushman, n. sp. $\times 60$. Fig. 1, holotype. *a*, dorsal view; *b*, ventral view; *c*, peripheral view. Fig. 2, paratype. *a*, dorsal view; *b*, ventral view.
- 3*a-c*. *Quinqueloculina arctica* Cushman, n. sp. $\times 50$. Holotype. *a*, *b*, opposite sides; *c*, apertural view.
4. *Quinqueloculina fusca* H. B. Brady var. *groenlandica* Cushman, n. var. $\times 60$.
- 5-7. *Gordiospira arctica* Cushman, n. sp. $\times 80$. Fig. 5, holotype. Figs. 6, 7, young stages.
- 8*a, b*. *Elphidium frigidum* Cushman, n. sp. $\times 35$. *a*, side view; *b*, peripheral view.
- 9*a, b*. *Elphidium bartletti* Cushman, n. sp. $\times 35$. *a*, side view; *b*, peripheral view.
- 10*a, b*. *Elphidium groenlandicum* Cushman, n. sp. $\times 35$. *a*, side view; *b*, peripheral view.

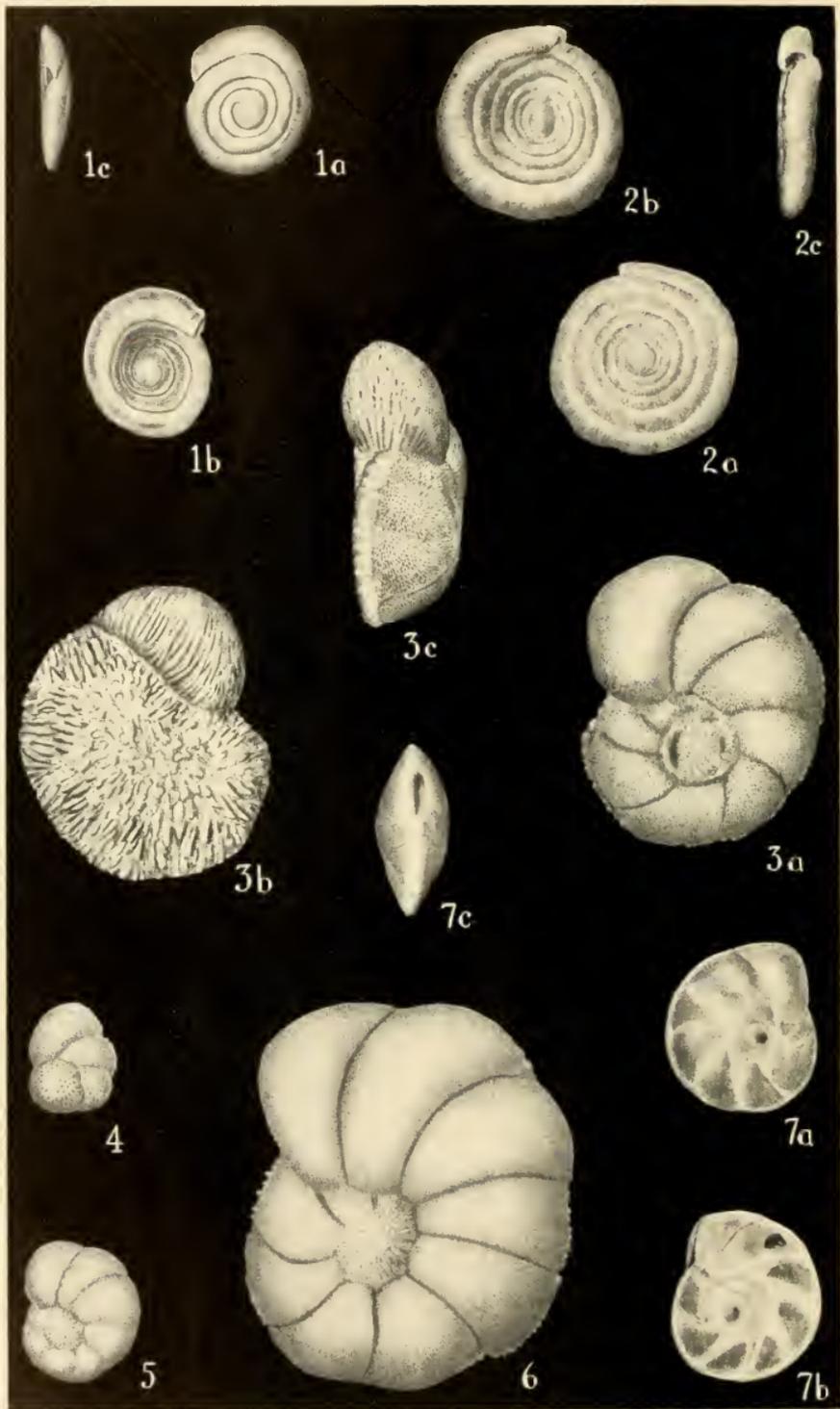
PLATE 2

- FIGS. 1, 2. *Spirillina arctica* Cushman, n. sp. $\times 100$. Fig. 1, holotype. Fig. 2, paratype. *a, a, b, b*, opposite sides; *c, c*, peripheral views.
- 3-6. *Discorbis bartletti* Cushman, n. sp. $\times 35$. Fig. 3, holotype. *a*, dorsal view; *b*, ventral view; *c*, peripheral view. Fig. 4, young four-chambered megalospheric form. Fig. 5, later stage. Fig. 6, adult. Figs. 4-6, dorsal views.
- 7*a-c*. *Cassidulina norcrossi* Cushman, n. sp. $\times 60$. Holotype. *a, b*, opposite sides; *c*, peripheral view.



ARCTIC FORAMINIFERA

(For explanation, see page 8.)



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