PLIOCENE *VOORTHUYSENIELLA* (PROBLEMATICA) FROM THE TEXAS CONTINENTAL SHELF

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A ditch sample obtained from a well located in the High Island area of offshore Texas yielded an unusual form of *Voorthuyseniella* Szczechura (1969), which, because of its morphologic character and the bathymetric implications of the associated fauna is deemed worthy of description. This sample (approximately 10 ml of dry residue) is composed predominantly of shale, with subsidiary quartz and minor pyrite. The foraminiferal fauna in the sample consists of 38 benthic species with over 200 individuals and 12 planktonic species with over 600 specimens. The sparse associated fauna is composed of mollusk fragments and echinoid spines. A Pliocene age, Zone N.19 of Blow (1969), is evidenced by the fossil assemblage, which also indicates a middle bathyal (1500'-3000' water depth) environment of deposition.

While some attention has been paid to the occurrence of the genus *Voorthuyseniella* in the Gulf of Mexico (Keij, 1970; Haman and Kohl, 1976a), the taxon has generally been neglected. Consequently, it is believed advisable to publish this note in order to generate interest in this organism, to illustrate the unusual morphology and discuss the paleobathymetric implications indicated by this occurrence.

To date, *Voorthuyseniella* occurrences in the Gulf of Mexico have been noted by Keij (1970) from the Recent of offshore Texas and by Haman and Kohl (1976a) from the Pleistocene of offshore Texas. This new occurrence would extend the stratigraphic range of this problematic genus into the Pliocene of this area. The geographic and stratigraphic extent of *Voorthuyseniella,* as known to date in the Gulf Coast province, is tabulated below.

It is known from personal observations that this taxon also occurs in the late Neogene of Louisiana. These Louisiana occurrences will be reported on at a future date.

A number of authors, Huang (1962); Keij (1964); Kummerle and Gunawardena (1967); Szczechura (1969); Keij (1970); Willems (1972, 1975); and Haman and Kohl (1976a, 1976b) have either indicated from direct observation of Recent occurrences, or inferred by interpretation of the fossil occurrences, that the habitat of *Voorthuyseniella* is in a shallow water environment. The middle bathyal water depth indicated by the fauna associated with the Pliocene specimen of *Voorthuyseniella* discussed in this article suggests that this genus is not restricted to shallow water environments but is more cosmopolitan in habit. The foraminiferal fauna associated with this specimen of *Voorthuyseniella* is considered, by analogy with the data of Phleger (1951); Parker (1954); and Murray (1973); to be indigenous to the indicated middle bathyal depths. Foraminifera characteristic of more shallow depths are not present in the fauna and this indicates that the possibility of downslope displacement of this specimen can be discounted. Further, the borehole conditions preclude the possibility of this form being a contaminant from a higher stratigraphic level in the well. In general, the forms of *Voorthuyseniella* associated with a shallow water environment possess a test that is globular or elongate-globular (hemispherical) in nature (see Keij, 1970; Hantzchel 1975). The distinctly compressed type of test described herein has not been reported to date. It is suggested that the morphocharacter of this specimen is possibly related to the bathymetric parameter.

The advisability of using a ditch sample for an age or paleobathymetric interpretation may be questioned, but the planktonic suite unquestionably places this sample in the normal time framework. In addition, the papers by LeRoy and Levinson (1974) and LeRoy and Hodgkinson (1975) lend

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	TEXAS	MISSISSIPPI	ALABAMA
Recent	Keij (1970)		
Pleist.	Haman and Kohl (1976a)		
Plio.	This report		
Mio.			
Olig.		Keij (1970)	Keij (1970)
			Haman and Kohl (1976b)
Eoc.			Haman and Kohl (1976b)

TABLE 1

Known distribution of *Voorthuyseniella* in the Gulf Coast province.

credence to the paleobathymetric interpretation based on the infaunal association of the sample.

As only a single specimen of this taxon was retrieved, no attempt has been made to name the form. The purpose of this report is simply to record the occurrence by description and indicate the paleobathymetric habitat of the organism.

Test orientation, morphologic terms and measurement terminology is standardized and based on Haman and Kohl (1976b, text-figure 2).

VOORTHUYSENIELLA sp.
Plate 1, figs. 1-3; Plate 2, figs. 1-3.

Description: Test calcareous, unilocular, as high as wide, tapering from base of camera to porta, camera almost cone shaped in side view. Camera extends laterally (0.27 mm) to either side of the median line between the lateral apertures. Camera indicates compression when viewed from above (Pl. 1, fig. 3) so that ovate camera is situated transverse to tubus. Test is widest just below the middle. Tubus reasonably flat, slightly narrower at the middle compared to the ends (*i.e.*, towards the lateral apertures) (Pl. 1, fig. 2). Parallel sided furrow present on tubus running longitudinally along it, extending the entire length of the camera (Pl. 1, fig. 2). Porta elliptical (0.06 mm x 0.03 mm), situated in a slightly bevelled depression and surrounded by an elliptically shaped worn area (0.15 mm x 0.09 mm) (Pl. 2, fig. 3). Elliptical porta orientated transverse to median line between apertures. Tubus pore subcircular to elliptical (0.03 mm x 0.02 mm), situated between the lateral apertures and in line with them. Tubus pore does not extend beyond the tubus furrow. Lateral aperture A is circular to subcircular (Pl. 2, fig. 1). Lateral aperture B is broken but is evidently subcircular (Pl. 2, fig. 2). No septa are evident. Test surface under light microscope examination appears striate and punctate but with SEM examination the striae are shown to be the effect of differential solution on the camera, and the punctae are elongate depressions or dimples in the test wall, not true punctae. The shallow elongate depressions (av. 0.01 mm x 0.005 mm) are restricted to the camera and are arranged concentrically around the porta (Pl. 1, fig. 3). Solution effects are

PLATE 1
VOORTHUYSENIELLA sp.
Bar = 100 microns

Figure

1 Side view
2 View to tubus, tubus pore, and tubus furrow
3 View to porta. Note erosion around porta and depressions arranged concentrically around porta.

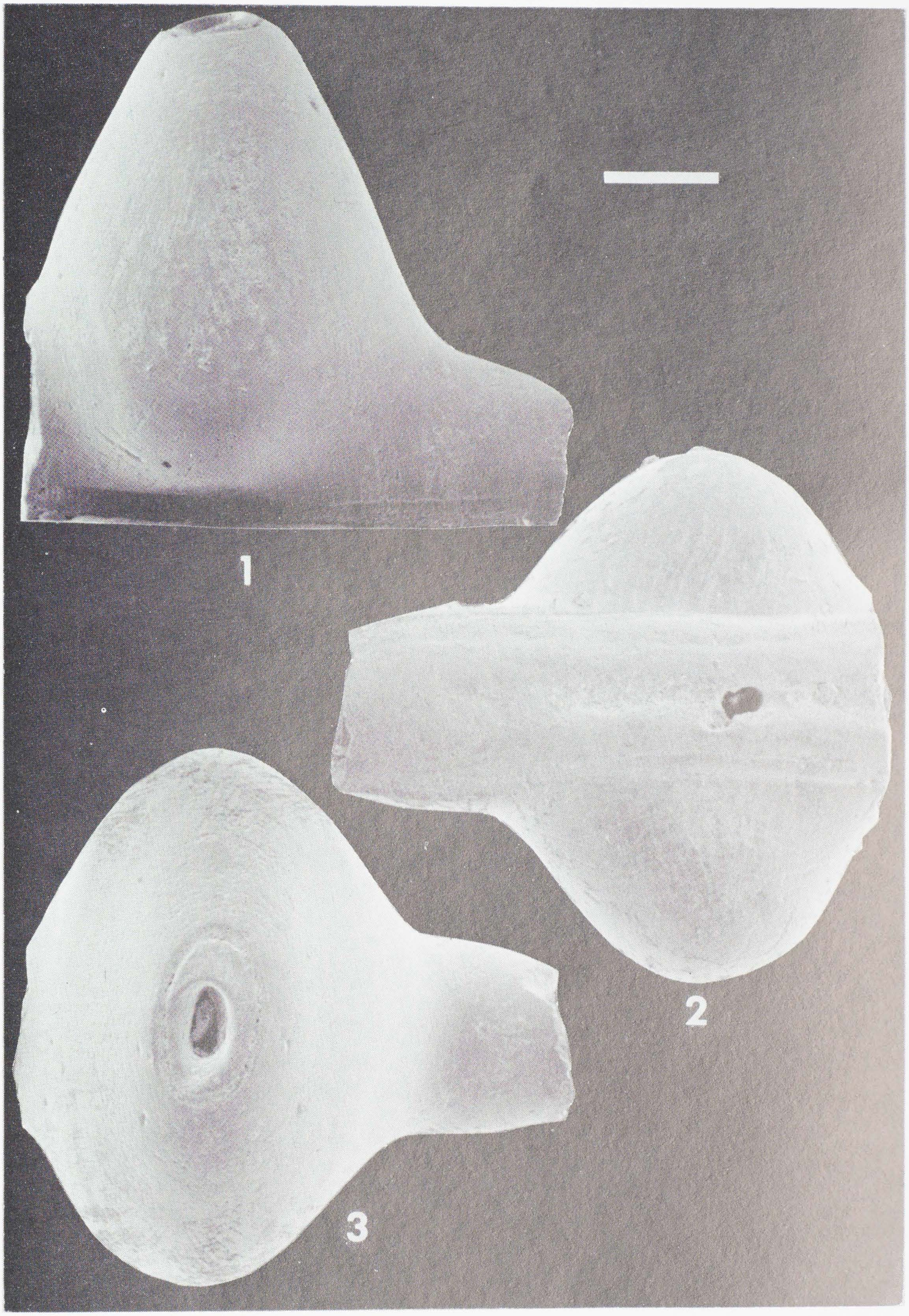

PLATE 1

not restricted to the camera but are evident over camera and tubus alike.

Test Dimensions: Max. length, 0.46 mm (B aperture broken); max. width, 0.44 mm; height, 0.43 mm.

Locality: Well cutting sample outer High Island area, offshore Texas.

Stratigraphic Level: Early Pliocene, Zone N.19 of Blow (1969).

Remarks: Superficial similarity is exhibited between this form and the dimorphic subspecies *Voorthuyseniella cornudensis cruciformis* Keij, 1970, from the Montebello Clay (Tortonian) of Italy. In detail the two forms can be readily differentiated on the nature of cameral inflation, and on the character of the tubus, tubus pore, and porta. *Voorthuyseniella* sp. does not exhibit strong affinities to any other described forms of this genus. *V. borneensis* Keij, 1964, (Recent, S. China Sea) possesses a tubus furrow as does this form but differs in all other respects. It is not believed that this new form is a variant of any of the described species but is a distinct, separate form.

The author is indebted to W. H. Akers, W.P.S. Ventress, B.L. Hill and B. Kohl for reading an early draft of the manuscript and offering constructive advice; to D. Greig for assistance with the SEM photography; to J. R. Bailey and Mrs. P. Haman for technical assistance, and to Chevron U.S.A., Inc., for allowing access to the SEM and for publication permission.

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PLATE 2

VOORTHUYSENIELLA sp.

Bar = 100 microns unless noted

Figure

1 Lateral aperture A

2 Lateral aperture B

3 Enlargement of porta with surrounding area of test dissolution. Bar = 50 microns.

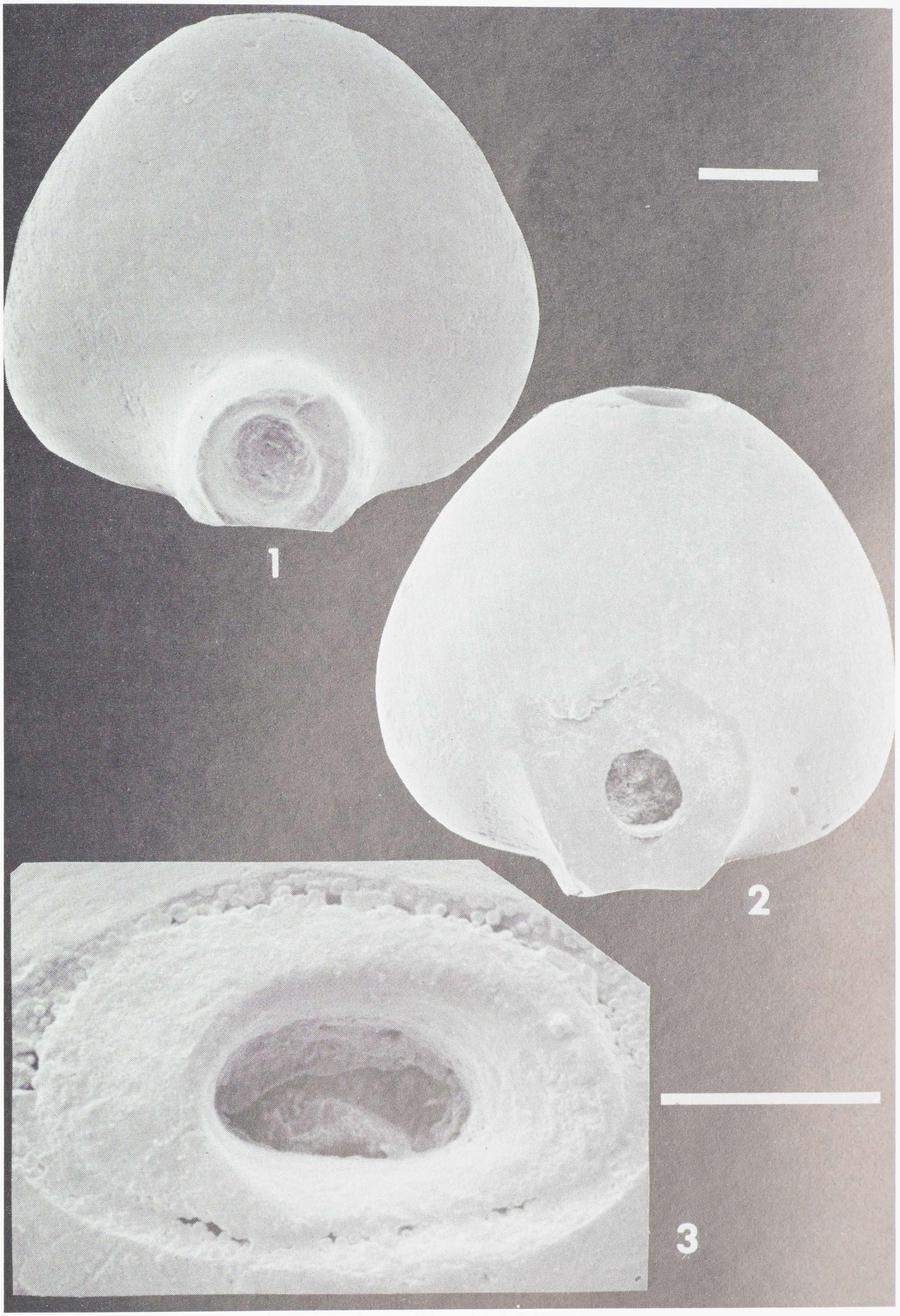

PLATE 2

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November 16, 1977

COMMENTS ON THE GENUS *VIRGULINELLA* CUSHMAN, 1932 (FORAMINIFERIDA)

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Cushman and Ponton (1931) described *Virgulina miocenica* from the Miocene of Florida and Maryland. The specimens were recorded from the Shoal River, Choctawhatchee (?) and Oak Grove formations of Florida, and from the Choptank Formation, Chesapeake Beach, Maryland. The relationship of this species to *Virgulina pertusa* Reuss and *V. gunteri* Cushman was discussed in the same article. In 1932 Cushman erected the subgenus *Virgulinella* and selected *V. pertusa* Reuss as the subgenotype, stating (1932, p. 9), with reference to the subgenus, that "as far as known the species are limited to the Miocene." Reuss (1861) had, however, recorded *V. pertusa* from the "Miocene and Pliocene of western Europe," as noted by Cushman (1931, p. 32). The European Pliocene occurrence must have been regarded as suspect by Cushman considering his subsequent statement (1937, p. 31) that "the European species has been recorded from the Pliocene of Belgium, but there seems to be some question as to the validity of this record." The Miocene restriction of this subgenus was reiterated. However, in the same year Yabe and Asano (1937) recorded *V. lunata* as common in a sandstone of Pliocene age at Tjilegong, Bantam, West Java, unquestionably establishing a stratigraphic range extension of the subgenus into the Pliocene.

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The taxon *Virgulinella* was accepted for decades as being a form of Miocene-Pliocene age, as is evidenced by Loeblich and Tappan (1964, p. C734) in their diagnosis of this taxon, which they regarded as a distinct genus. These authors indicated that the genus had a geographic extent of Europe (Germany, Netherlands) to North America and Indonesia.

Prior to the significant work of Loeblich and Tappan (1964) a report appeared that apparently has been overlooked by many authors in their analysis of this genus. In this work (Orlov, 1959) the taxon *Virgulinella* was accapted as a genus, and the species *V. pertusa* was recorded from the upper Maikop series (lower Miocene) of the Azerbaijan region, south Russia. A specimen of this species, from the collection of Z. V. Kuznetsova, was illustrated in this 1959 publication.

As this genus was originally described from the Gulf Coast province and as it has been utilized stratigraphically by many workers in this region (for example, Ellisor, 1940) the appearance of two recent papers on the taxon has prompted this short note. Two papers were published in 1976, both of which recorded *Virgulinella* from Recent sediments in the Indo-Pacific area. It is hoped that this article will emphasize the fact that the genus is not restricted to the Miocene and Pliocene on a world wide basis, and will make the record more complete by the inclusion of the Russian data. Ecologic