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Occurrence of Late Miocene *Chilostomellina fimbriata* Cushman in the North Sea

ABSTRACT

Chilostomellina fimbriata Cushman has been recovered from Late Miocene rocks in the central North Sea Basin. This is the oldest known fossil record of this species to date. It is interpreted as a cold-water indicator based on its Recent distribution.

INTRODUCTION

While examining samples of ditch cuttings of Late Miocene sediments from numerous wells drilled in the central North Sea, the authors retrieved many specimens of *Chilostomellina fimbriata* Cushman. To date, this species has been recorded only in Recent sediments from the northern Pacific Ocean, off the west coast of North America and from the bordering Japan, Bering, and Okhotsk Seas.

DISCUSSION

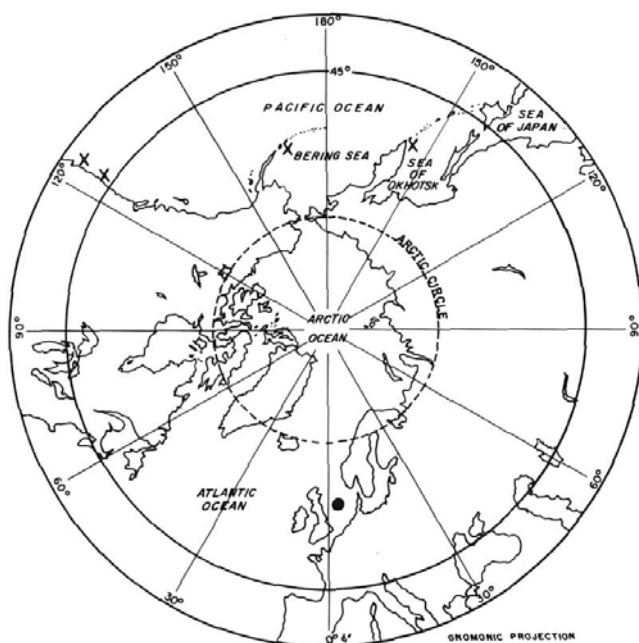
Almost 100 pyritised specimens of *Chilostomellina fimbriata* Cushman have been recovered from light grey, pyritiferous clay in samples of ditch cuttings taken from more than 30 wells situated in the central region of the North Sea Basin (text-figures 2-4). *Chilostomellina fimbriata* was found in these wells in association with the following species:

Bolivina subspinescens Cushman, 1922
Cibicides peelensis Ten Dam and Reinhold, 1942
Eponides umbonatus (Reuss, 1851)
Florilus boueanus (d'Orbigny, 1846)
Globigerina bradyi Wiesner, 1931
Globigerina concinna Reuss, 1850
Globigerina praebulloides Blow, 1959
Hoeglundina elegans (d'Orbigny, 1826)
Loxostomoides sinuosus (Cushman, 1936)
Martinottiella communis (d'Orbigny, 1846)
Melonis affinis (Reuss, 1851)
Pullenia quinqueloba (Reuss, 1851)
Pullenia sphaeroides (d'Orbigny, 1826)
Sphaeroidina bulloides d'Orbigny, 1826
Uvigerina pygmaea d'Orbigny, 1846

This faunal association is typical of that found in the Gram Formation of Denmark which has been dated, on the molluscan fauna, as Late Miocene in age (Rasmussen, 1966).

The adult specimens, which have a maximum length of 0.46 mm. and a maximum breadth of 0.34 mm., closely resemble Cushman's type figures (Cushman, 1926, pl. 11, fig. 22a-c) in overall shape and chamber arrangement. These Late Miocene forms, however, have a very poorly developed fimbriate apertural margin (text-figure 4).

Illustrations of this species by Saidova (1961, pl. 31, fig. 216), and in Rauzer-Chernousova and Fursenko (1959, figs. 868-869), Ishiwada (1964, pl. 7, fig. 110a-b), and Loeblich and Tappan (1953, pl. 17, fig. 3a-d) show a test varying from roughly spherical to elongate ovoid, all having a much reduced final chamber, which has very prominent, finger-like projections forming a fimbriate, apertural margin.



TEXT-FIGURE 1

Recent and fossil occurrences of *Chilostomellina fimbriata* Cushman. X, Recent; •, fossil.

PREVIOUS DISTRIBUTION

In the Bering Sea and at a number of stations along the west coast of North America this species has been recorded from Recent sediments at water depths ranging from 37 m. to 2562 m. (Loeblich and Tappan, 1953); the types were taken from the Bering Sea at a depth of 276 fathoms (Albatross Station D3608). Saidova (1961) recorded this species from Recent sediments on the continental slope in the Sea of Japan and Bering and Okhotsk Seas at depths of 230 m. to 850 m., 1557 m.,

and 376 m. to 2000 m., respectively. In the last-named she recorded specimens in her South Kamchatka slope assemblage; the ecological factors described for this assemblage (Loeblich and Tappan, 1964, p. 123) were as follows: depth range, 250 m. to 1000 m.; substrate, silty clay mud to coarse silt; temperature, $+1.5^{\circ}\text{C}$. to 2.35°C .; and salinity, 33.50‰ to 34.25‰ . The overall depth range for this species, recorded by Saidova (1961), was 230m. to 2200 m., but, because it was abundant in the middle reaches of this interval, a modified range of 700 m. to 1100 m. was suggested. Cushman and Todd (1949) also considered this to be a cold-water species. The occurrences of Recent and fossil forms are shown in text-figure 1.

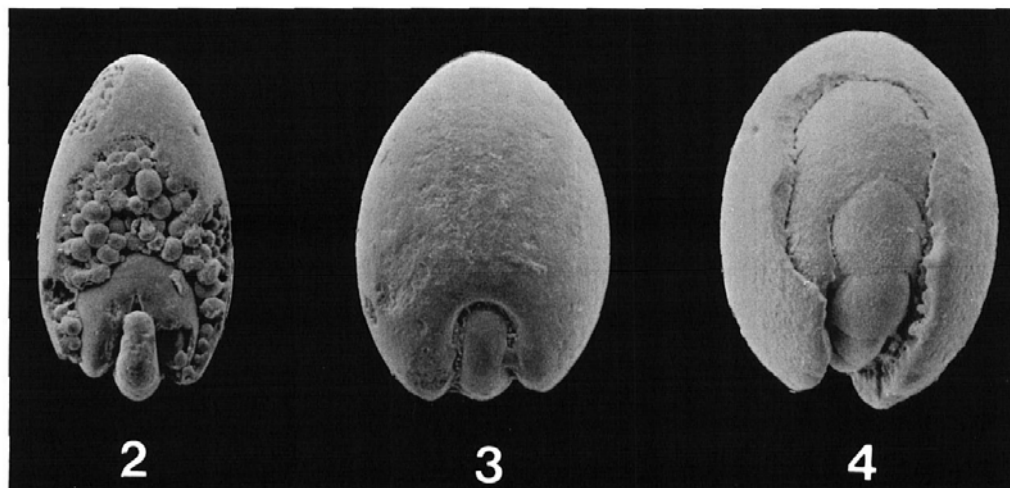
Chilostomellina cf. *fimbriata* has been recorded by Makiyama (1931, p. 42, list) in bluish grey mud, with intercalations of alternating fine-grained sands and muds from the Ketienzi beds in the Late Ketienzi Stage of the Middle Pliocene in Totomi in south-central Japan.

CONCLUSIONS

Chilostomellina fimbriata Cushman occurs in Late Miocene rocks, and the record of this occurrence is the earliest fossil record of this species to date. This species may indicate that cold-water conditions existed in the central North Sea area during Late Miocene times.

ACKNOWLEDGMENTS

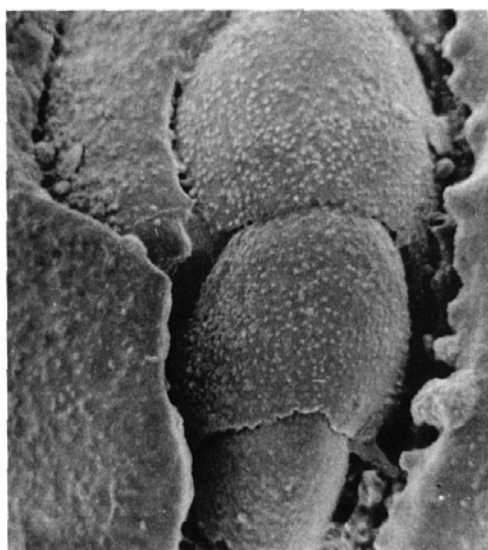
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TEXT-FIGURES 2-4

2-4 *Chilostomellina fimbriata* Cushman. All $\times 135$

2 Edge view, broken specimen; 3 Edge view; 4 Edge view, showing poorly developed fimbriate apertural margin.



TEXT-FIGURE 5

Enlarged view of a portion of the specimen illustrated in text-figure 4, x 480.

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