A MICROPROBLEMATICUM FROM THE PALEOCENE OF SURINAM

M.W. HUGHES CLARKE[1])

SUMMARY

A problematic single-chambered microfossil is described from the Paleocene of boring Alliance 28 in Surinam (Dutch Guiana). Its possible affinities are briefly discussed.

INTRODUCTION

The material from which this microproblematicum was obtained consisted of two samples from well Alliance No. 28 in the coastal plain of Surinam (Dutch Guiana). The samples as examined were washed residues, prepared by The Netherlands Geological Survey for microfaunal analysis, from a cored interval considered to be of Paleocene age on the evidence of the Foraminifera (Van Voorthuysen, 1969, p.135). The material was placed at the author's disposal by Dr. R. Lagaaij, to whom it had been sent in view of the fact that the unknown skeletal remains might be of bryozoan origin.

DESCRIPTION OF THE SKELETAL MATERIAL

Form

The form is that of a single chamber having a smooth ovate internal cell with a single simple aperture at one end. The external shape is quite irregular but appears to consist of variations on two basic patterns (form A and form B in textfig. 1). Superimposed upon these two patterns are low irregular ribs and protuberances which, together with variation in proportions, combine to produce great variety of final form. Form A, which is much less common than form B, may, however, bear a number of regular ribs running across the exterior more or less perpendicular to the axis of the chamber, which passes through the aperture (indicated on textfig. 1)

Size

The several hundred specimens examined range in length from 0.21 to 0.32 mm, the greatest length being in the axis of the aperture. Width is in the range 0.15–0.25 mm.

Wall structure

The wall is two-layered (textfig. 2). The inner layer demarcating the chamber space is thin and dense, giving a very smooth inner surface to the chamber. The outer layer is much thicker and is porous in a manner giving an appearance very similar to the structure found in an echinoderm segment but on a finer scale. Most specimens examined also showed characteristic traces of the action of boring algae (see Plate I, fig. 1). Analysis of the wall composition by means of the X-ray diffraction camera showed 95% aragonite and 5% low-magnesium calcite to be present. Treament of freshly broken pieces of chamber wall with Fiegl's reagent gave an immediate stain to the outer wall layer, but in a number of cases the inner surface of the chamber remained unstained. This suggests that the inner layer contains the 5% calcite, but the result is not considered entirely

[1]) Kon/Shell Exploration and Production Laboratory, Rijswijk, The Netherlands.

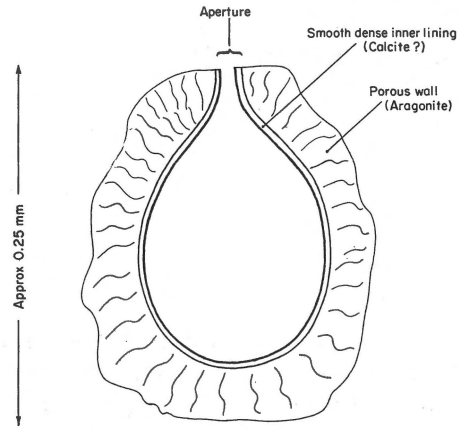


Fig. 1

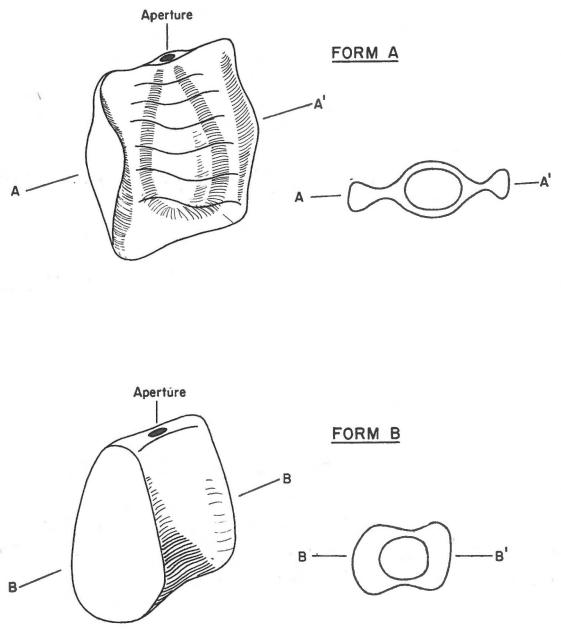


Fig. 2

satisfactory and the calcite may be contamination from debris within the chambers.

SAMPLE MATERIAL

The samples examined were:
i) Alliance 28 depth 288.10 metres
ii) Alliance 28 depth 289.50 metres.

Several hundred specimens of the microproblematicum were present in sample i) but only a few were found in sample ii). The material is kept in the Geological Survey collections under the registration numbers M.1 and M.2. No types were selected.

DISCUSSION OF AFFINITIES

In morphology, this problematicum most resembles a unicellular foraminifer, but few Foraminifera are aragonitic and none known to the writer have such variable external form. The irregular morphology is somewhat suggestive of the results of a random packing together of the individuals as if they had grown as a mass within a larger envelope. This suggests a resemblance to the calcified reproductive cysts known in several present-day calcareous green algae such as *Acetabularia*, which are also aragonitic (S m i t h, 1955). Random shapes due to packing are known in the case of the cysts in the alga *Acicularia* but there many fuse together to form a compound mass. The porous wall, however, is not known to occur in the recent algal cysts.

ACKNOWLEDGEMENTS

The writer is grateful to Dr. R. Lagaaij for the chance to examine the material and to Ir. K. de Groot of Koninklijke Shell Exploratie en Productie Laboratorium Rijswijk, for carrying out the X-ray diffraction analysis. Permission to publish this paper was given by Shell Research N.V., Amsterdam, The Netherlands, and is also hereby acknowledged.

PLATE 1

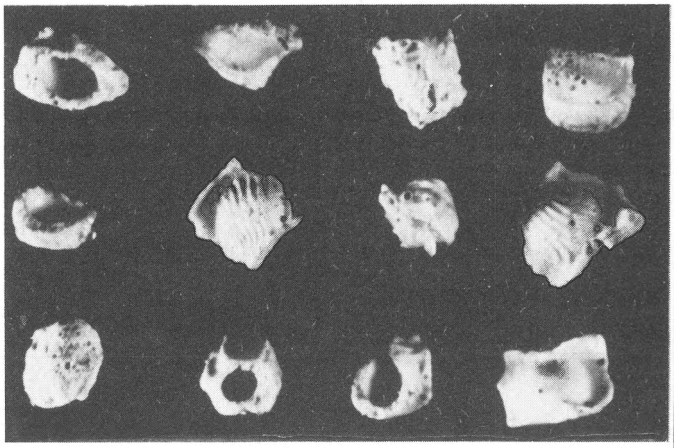


Fig. 1

x 48.5. 12 specimens showing the variety of form. The broken specimens show the inner chamber with its smooth lining. One aperture is visible (middle row, 2nd from right)

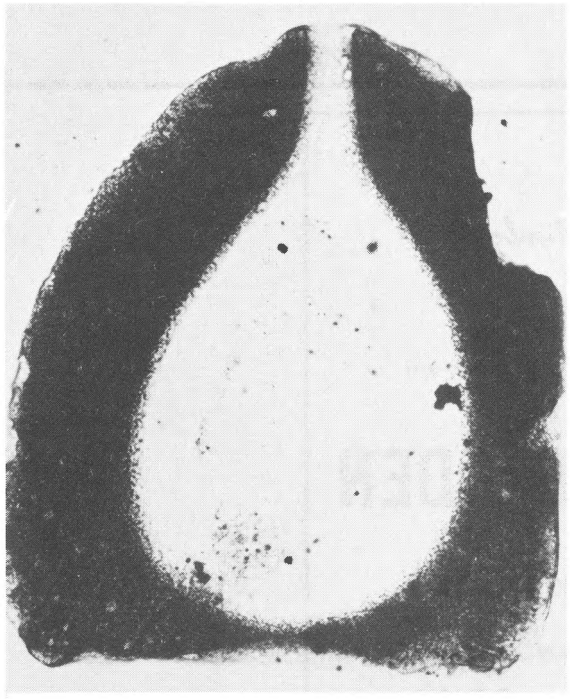


Fig. 3

x 332.8. Thin section showing porous (microgranular?) outer wall and inner layer outlining chamber.

(All specimens from Alliance-28 depth 288.10 m)

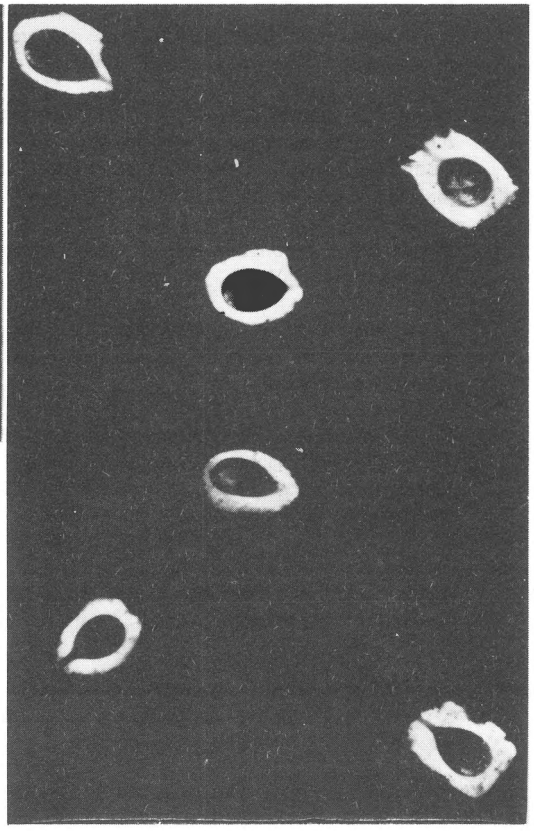


Fig. 2

x 46.7. 6 specimens in thin section showing constant form of internal chamber and aperture.

REFERENCES

Smith, G.M. (1955) – Life cycle of *Acetabularia*. Cryptogamic Botany, v. 1, Algae & Fungi. 2nd Ed.

Voorthuysen, J.H. van (1969) – Introduction and summary of the stratigraphical and sedimentological results of Boring Aliance-28 in the coastal plain of Surinam (Dutch Guiana). Geologie en Mijnbouw, 48/2.