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June 17, 1970

SPHENASTER, NEW GENUS, A PLIOCENE CALCAREOUS
NANNOFOSSIL FROM THE TROPICAL INDO-PACIFIC

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I. ABSTRACT

A distinctive new calcareous nannoplankton taxon from the early Pliocene interval of a tropical Indo-Pacific deep-sea core is described as a new genus and species, *Sphenaster metula*.

II. INTRODUCTION

During a study of Pliocene calcareous nannoplankton from a series of tropical Indo-Pacific deep-sea cores, collected by the Scripps Institution of Oceanography, a previously un-

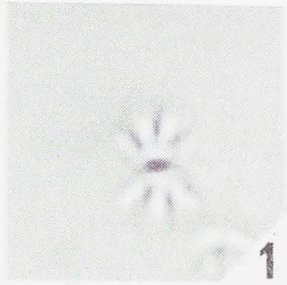
described taxon has been observed to occur consistently in the early Pliocene interval. Other authors may have referred to it previously as *Sphenolithus* sp. or *Sphenolithus* cf. *S. abies* in samples of the same age. Description of this new form is based on study with the light microscope and the transmission and scanning electron microscopes. The types are temporarily deposited in the collections of Chevron Oil Field Research Company, La Habra, California. Appreciation is expressed to Dr. Helen Tappan Loeblich for critical reading of the manuscript.

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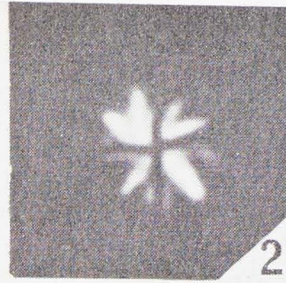
PLATE 1

Figures

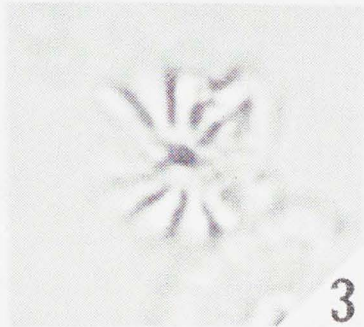
- 1-8 *Sphenaster metula* Wilcoxon, n. sp. (Figs. 1-4 from light microscope, Figs. 5-8 from transmission electron microscope), (1) plan view, $\times 2700$, (2) crossed nicols, (3) plan view, $\times 5400$, (4) crossed nicols, (5) tilted specimen, $\times 18,000$, (6) distal view of specimen between rays of discoaster, $\times 12,000$, (7) distal view of specimen with central hole plugged, $\times 18,000$, (8) distal view of specimen with central hole open, $\times 16,000$.



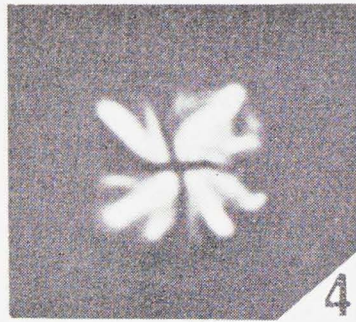
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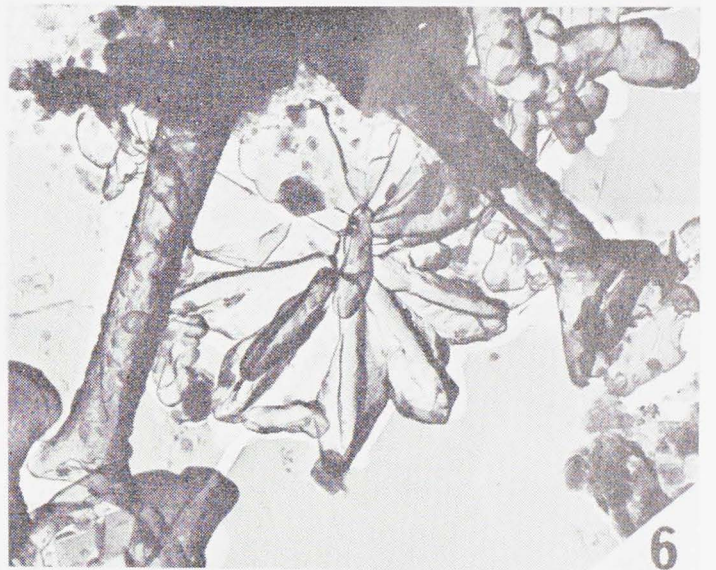
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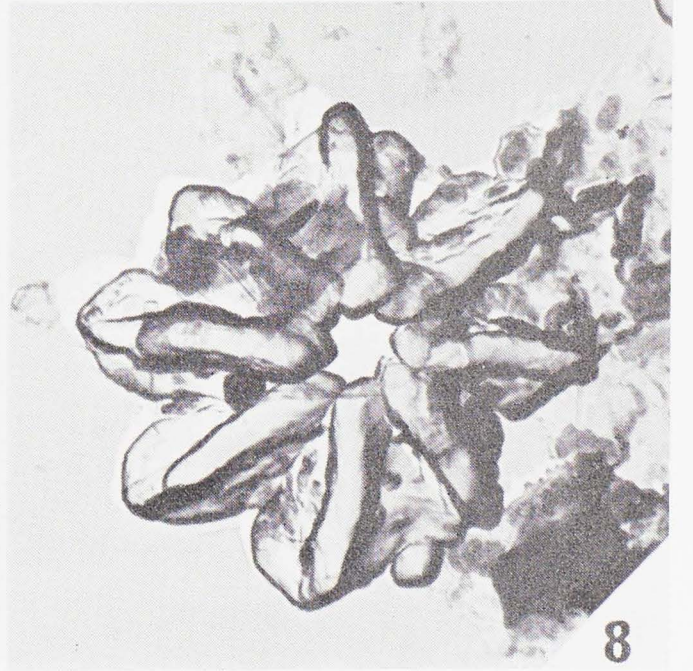
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III. SYSTEMATIC PALEONTOLOGY

Incertae Sedis

Genus SPHENASTER Wilcoxon, n. gen.

Diagnosis: Small, concavo-convex, sphenolith-like form, petaloid in plan view. Thickened elements radiate from an open central area and are joined throughout most of their length. As viewed from the side, each element tapers pyramidally from the base to the top.

Type species: *Sphenaster metula*, Wilcoxon, n. sp.

Remarks: *Sphenaster* differs from *Sphenolithus* in presenting a uniformly symmetrical extinction pattern between crossed nicols and by the presence of a hole through the center. It differs from *Discoaster* in not being a single unit of calcite.

SPHENASTER METULA, Wilcoxon, n. sp.

Pl. 1, figs. 1-8; Pl. 2, figs. 1-6

Description: Small (2-4 μ) petaloid form composed of 8-10 elements which radiate outward from a central opening. In some individuals this perforation is closed, presumably by secondary calcification. Individual elements broaden distally from the central hole for about half their length, then narrow to a bluntly pointed tip. On the con-

cave side, regarded as proximal, the sutural lines between the elements are sinuously curved; this sinuosity is not apparent on the convex, or distal side. On the dorsal surface a blunt ridge extends from the tip ends of each element upwards to their culmination at the open central area.

Remarks: Because of its very small size, the morphology of this species becomes clear only with the electron microscope. Although quite distinctive in polarized light, it may be mistaken for a species of *Sphenolithus*, as it strongly resembles an intermediate between a sphenolith and a discoaster.

The specific name is from the Latin *metula*, meaning small pyramid.

Age and Occurrence: All specimens figured are from the Scripps Institution of Oceanography, Indian Ocean deep-sea core DODO 57P, from 15° 40' S. lat., 112° 44' E. long., at 3660 m., depth in core 107-109 cm. The type level for this species is zone N. 19 (early Pliocene) of Banner and Blow (1965). It also has been observed in other Indo-Pacific deep-sea cores in the same zone.

IV. REFERENCES

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PLATE 2

Figures

- 1-6 *Sphenaster metula* Wilcoxon, n. sp. (all figures from scanning electron microscope), (1) paratype, distal view, specimen tilted 45°, $\times 18,000$, (2) same specimen tilted 70° showing side view, $\times 16,000$, (3) paratype, proximal view, specimen tilted 45°, $\times 18,000$, (4) same specimen as Fig. 3, proximal view, $\times 18,000$, (5) paratype, distal view, $\times 20,000$, (6) holotype, distal view, $\times 18,000$.

