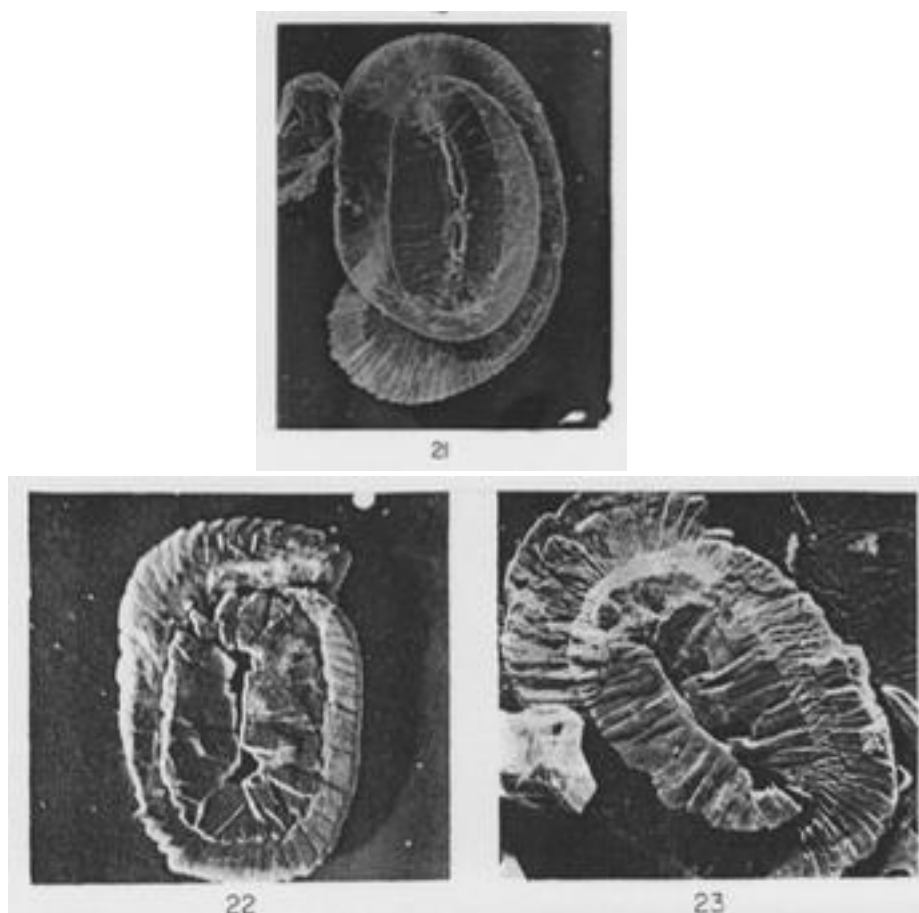


## 26. Helicosphaeraceae Black (1971)



Pl. 45-2, figs 21-23

Fig. 21. *Helicosphaera* sp. cf. *H. carteri* (Wallich) Kamptner, proximal view. Upper Pliocene. Cisano, nr. Albenga, N. Italy. No. 16859, x 5,300.

Fig. 22. *Helicosphaera orientalis* sp. nov., proximal view. Upper Miocene. Bebalain, Rotti, Indonesia. No. 15353, x 10,000.

Fig. 23. *Helicosphaera burkei* sp. nov., proximal view. Middle Miocene: Upper White Limestone. Jamaica. No. 16171. x 5,400.

**Diagnosis:** Coccolithophorales whose coccoliths have a large elliptical central shield surrounded by a spiral or otherwise asymmetrical flange constructed of radial elements; Typical genus *Helicosphaera* Kamptner. (Coccolithophorales coccolithis irregulariter ellipticis; in medio coccolitho scutum magnum ellipticum, ora inaequali circumdatum; ora palis anglistus structa; vel in cochleam serpens, vel aliter inaequalis. Genus typicum: *Helicosphaera* Kamptner.)

The peculiar, coccoliths for which Kamptner created the genus *Helicosphaera* were for many years regarded as asymmetrically developed placoliths, and many authors have included them in *Coccosphaera* or *Coccolithophora*. The internal structure of the massive

central area is still not fully understood, but is clearly quite different from the pillar or tube of a placolith, and the petaloid elements are arranged in a single spiral band and not in two separate annular shields.

Looking back into the Tertiary, we find a succession of species that share these peculiarities, and the genus *Helicosphaera* can confidently be traced back to the Eocene. The early species are associated with other asymmetrical coccoliths included in the genus *Lophodolithus*; in these the petaloid flange is apparently not spiral, but is more strongly developed at one sector of the periphery than elsewhere. *Lophodolithus* is unknown from pre-Tertiary rocks, but *Kamptnerius* in the Upper Cretaceous shares some of its peculiarities.

With the information available at present, it is difficult to assess the phylogenetic significance of an asymmetrical flange. Bramlette and Sullivan (1961) have given evidence of a gradation between the two genera in the less extreme forms of *Lophodolithus* and *Zygodiscus*, but there is as yet no connecting link between either of these and *Kamptnerius*. At no time in the known geological history of these genera is there any sign of derivation from a placolith-like structure.

Black, M., 1971. The systematics of coccoliths in relation to the paleontological record. In Funnell, B. M. & Riedel, W. R. (eds). *The Micropaleontology of the Oceans*. Cambridge University Press, Cambridge, 611-624.