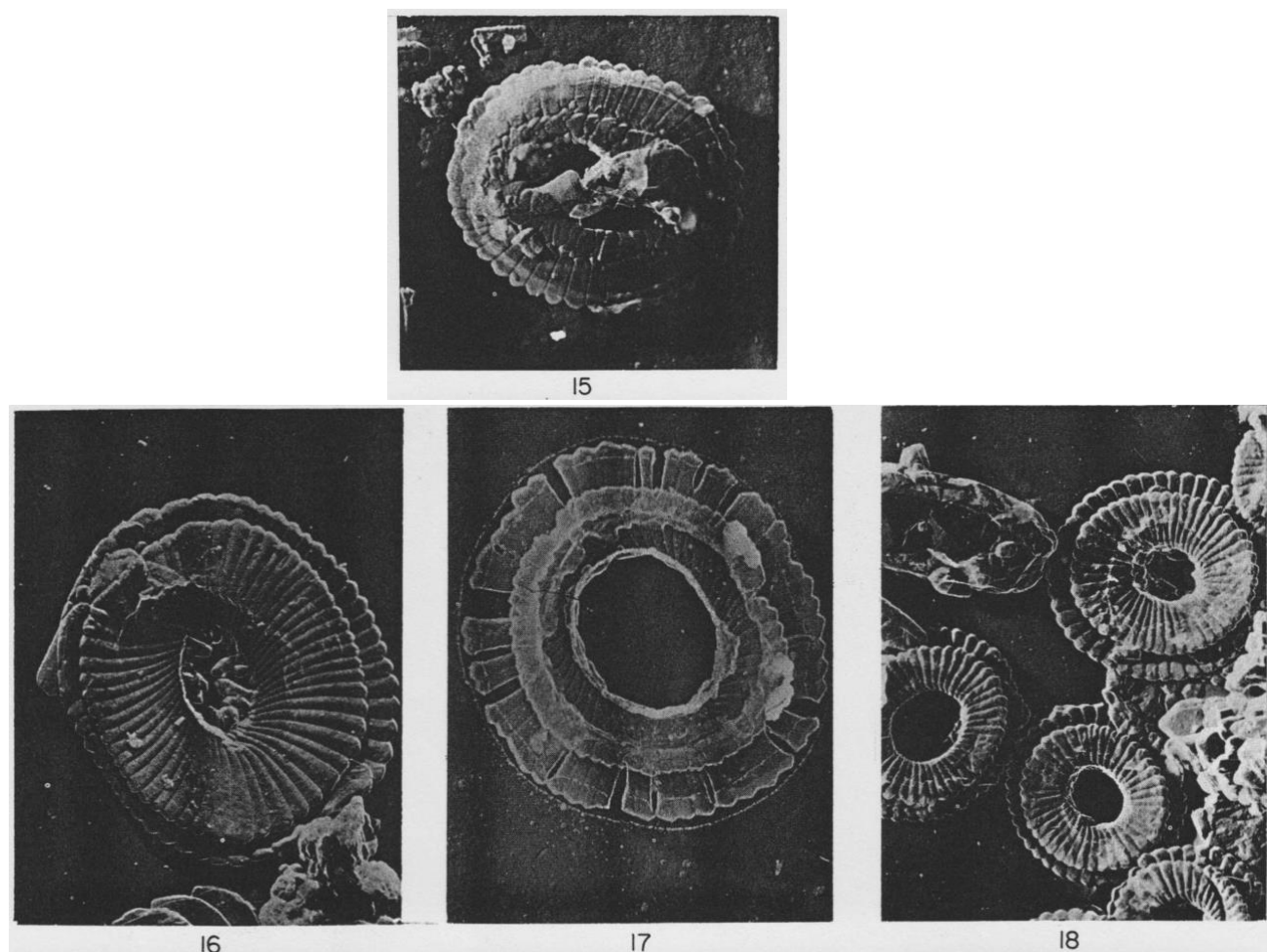


25. Gephyrocapsaceae Black (1971)



15. *Gephyrocapsa oceanica* Kamptner, distal view Recent Ooze, Challenger Sta. 338, South Atlantic (671.52). No. 13121, x10,000.
16. *Ellipsoplacolithus doronicoides* (Black) n. comb., proximal view. Lower Pliocene: LSDH 78 P, 250-70 cm, Pacific Ocean (553.84). No. 22215, x 5,000.
17. *Ellipsoplacolithus exsectus* (Kamptner) n. comb., proximal view. Pliocene: DWBP 119, 750-2 cm, Pacific Ocean (662.37). No. 16607, x10,000.
18. *Ellipsoplacolithus* sp. cf. *E. marismontium* (Black) n. comb. Upper Oligocene: DWBG 10, 11-27 cm, Pacific Ocean (523.83). No.22284, x 3,600.

Pl. 45.2, figs 15-18

In the living genus *Gephyrocapsa* the rays of the distal shield do not overlap each other as they do in the genera so far considered, but lie side by side, with the sutures between adjacent rays nearly at right angles to the surface of the shield. The same arrangement is seen in *Coccolithus huxleyi* and in the species-group of *C. doronicoides* in the late Tertiary and Quaternary. *Ellipsoplacolithus exsectus* Kamptner and *E. lacunosus* Kamptner from

Pleistocene cores in the Pacific are again very similar in the structure of their shields (Kamptner 1963, figs. 50-2); indeed, almost identical forms in Pleistocene cores from the North Atlantic have recently been figured under the name of *Coccolithus daronicoides* (McIntyre and Be 1967, pl. 28 and pl. 3A).

In the Pleistocene, McIntyre (1967) has found coccoliths intermediate in form between *Gephyrocapsa oceanica* and *C. huxleyi*, and he has given reasons for believing that *C. huxleyi* has evolved from the *Gephyrocapsa* stock. Recent work suggests that all these forms are closely related, and that they belong to a family that was actively evolving during the Pleistocene; independently of the Coccolithophoraceae. The name Gephyrocapsaceae is proposed for this family, with the following diagnosis: Coccolithophorales bearing placoliths with a large central opening and with the shields constructed of non-imbricate radial elements. Typical genus *Gephyrocapsa* Kamptner. (Gephyrocapsaceae: Coccolithophorales placolithos ellipticus ferentes; in medio coccolitho foramen amplum; pali geminorum scutorum commissuris orthogoniis. Genus typicum: *Gephyrocapsa* Kamptner.)

Coccoliths with a similar structure are abundant in the Tertiary; *C. marismontium* in the Middle Eocene has much in common with some variants of *C. daronicoides*, and there are forms in the Miocene and Pliocene which appear to link the two together. An independent generic name is needed for the *C. daronicoides* and *C. marismontium* complex of species, in which the placoliths have a large open centre and in which both shields consist of numerous non-imbricate rays. The earliest generic name other than *Coccolithus* which has been proposed for a coccolith of this kind appears to be *Ellipsoplacolithus* Kamptner. Loeblich and Tappan (1966, p. 139), invoking Article 34 of the International Code of Botanical Nomenclature; have regarded this name as not having been validly published. Nevertheless, when Kamptner (1963, p. 171) proposed *Ellipsoplacolithus* as a new genus, he gave a diagnosis in which it is treated as an organ-genus, and designated *E. lacunosus* Kamptner as type species. The name is thus provisional only in the same sense that all organ-genera are provisional, but not within the meaning of Article 34. If we therefore accept it as a legitimate

name, *Coccolithus daronicoides* becomes *Ellipsoplacolithus daronicoides* (Black and Baines) n. comb., and *C. marismontium* becomes *E. marismontium* (Black) n. comb. The central opening of *Gephyrocapsa* is spanned distally by an oblique bridge, and proximally by a grille. A similar grille, but without a bridge, is present in *C. huxleyi* and in a large number of Tertiary species of *Tremalithus* as defined by the genotype, *T. placomorphus*. *Reticulofenestra* Hay, Mohler and Wade, and *Dictyococcites* Black differ very little from *Tremalithus* Kamptner, and probably ought to be merged into this genus.

All the forms discussed above fall quite naturally into the Gephyrocapsaceae. In the Cretaceous, there is an interesting complex of species whose relationships are not so clear-cut. They reach their greatest diversity in the Albian and Cenomanian, where there are forms with a bewildering combination of characters; some suggestive of the Gephyrocapsaceae, others of the Ellipsagelosphaeraceae. Much work will be needed before these can be satisfactorily sorted out; it may well be that we have here a record of an evolutionary divergence amongst whose products were the ancestors of the gephyrocapsoid stock that did not become clearly differentiated until the Tertiary.

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.