CLARIFICATION OF *RETICULOFENESTRA PERPLEXA* (BURNS) WISE, 1983

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Backman (in Heck, 1981) first pointed out that *Dictyococcites antarcticus* Haq (1976) is a junior synonym of *Dictyococcites perplexa* Burns (1975). Based on the well known size of *Isthmolithus recurvus,* which was figured along with the holotype and isotypes of *D. perplexa* in Burns (1975), Wise (1983) concluded that "all of Burns' magnifications are overstated by a factor of about 2.5. The dimensions he attributed to the holotype of *D. perplexa* are also overstated by the same factor; thus the holotype measures about 5 to 6 µm along the length of the distal surface rather than 18-20 µm as originally stated. The revised measurements are similar to those given by Haq (1976) for *D. antarcticus."* Wise (1983) transferred *D. perplexa* to *Reticulofenestra* because *Dictyococcites* is an ill-defined genus, and it is difficult and of little value to differentiate *Dictyococcites* from *Reticulofenestra.* In spite of all this, there is still confusion in the literature concerning the size of *R. perplexa.* Perch-Nielsen (1985) included *D. antarcticus* but not *R. perplexa* in her comprehensive compilation of nannofossil taxa. More recently, Driever (1988) argued that *R. perplexa* is a large-sized coccolith species (19-20 µm) based on written communication with Burns, thus he considered *R. perplexa* different from *D. antarcticus. Dictyococcites antarcticus* is still used in some of the most recent publications (e.g., Rodriguez--Pindado & Flores, 1990). Because *R. perplexa* (=*D. antarcticus*) is a dominant nannofossil species in the Miocene calcareous sediments from the Southern Ocean and has biostratigraphic and paleoceanographic utility (Haq, 1980; Wise, 1983; Wei & Wise, in press; Wei & Thierstein press; Wei and Wise, in prep), it is important to resolve the taxonomic problem. This has been done by re-examining the topotypic material of *D. perplexa,* as suggested by Dr. J.R. Young (written comm., 1989).

Two samples (265-16-6, 28-29 cm and 265-16-6, 35-36 cm) were examined from the same core section that the holotype of *R. perplexa* was described (265-16-6, 25-26 cm). One sample (329-3-3, 30-32 cm) from the interval that Haq (1980) reported abundant *D. antarcticus* was also examined. Smear slides were made from unprocessed samples and examined using a Zeiss Photomicroscope III. The first 60 or more well preserved specimens of *R. perplexa* (=*D. antarcticus*) encountered along random traverses of each slide were measured on a Panasonic monitor screen connected to a Panasonic TV camera mounted on the microscope. Calibration of the magnification of the screen images was determined by measuring several specimens both on the screen and in the microscope. The measurement error is estimated to be less than 0.3 µm.

Size (length) distribution patterns of *R. perplexa* (=*D. antarcticus*) for Samples 265-16-6, 28-29 cm, 265-16-6, 35-36 cm, and 329-3-3, 30-32 cm are presented in Figures 1 through 3. The mean sizes are 7.47, 7.62, and 7.40 µm for the three samples respectively. Most specimens range from 6 to 9 µm in all the samples. No specimens larger than 13 µm were found while scanning the slides. In fact, no specimens larger than 13 µm were observed during our studies of Miocene sediments from the Falkland Plateau (South Atlantic), Maud Rise (Weddell Sea), or the southern Indian Ocean. Detailed biometric study of *R. perplexa* from these regions is presented in Wei and Wise (in prep.).

In conclusion, re-examination of the topotypic material reveals that *R. perplexa* is a medium-sized placolith, commonly 6-9 µm instead of 18-20 µm as Burns (1975) stated. Consequently, *R. perplexa* is a senior synonym of *D. antarcticus,* as suggested previously by Backman (in Heck, 1981) and Wise (1983).

SYSTEMATIC PALAEONTOLOGY

Genus *RETICULOFENESTRA* Hay, Mohler & Wade, 1966

Reticulofenestra perplexa (Burns) Wise, 1983

(Pl. 1, Figs. 1-4)

Dictyococcites perplexa Burns, 1975, p.594, figs.13, 19-20.

Dictyococcites antarcticus Haq, 1976, p.567, figs.1-5, 7-8; Backman, 1980, pl.4, figs.4-5, 8.

Reticulofenestra perplexa (Burns) Wise, Wei & Wise, in press, pl.3, figs.1-3; Wei & Thierstein, in press, pl. 1, figs.5-10.

Remarks: *Reticulofenestra perplexa* has about 60 elements in each shield and has a closed central area. Its size commonly ranges from 6 to 9 µm and it grades into a smaller form, *Reticulofenestra producta,* near the Miocene/Pliocene boundary (Backman, 1980). The first occurrence of *R. perplexa* is time transgressive across latitudes, with an age ranging from ca.14.3 Ma at 65°S to ca.10.4 Ma at 50°S latitude (Wei and Wise, in prep).

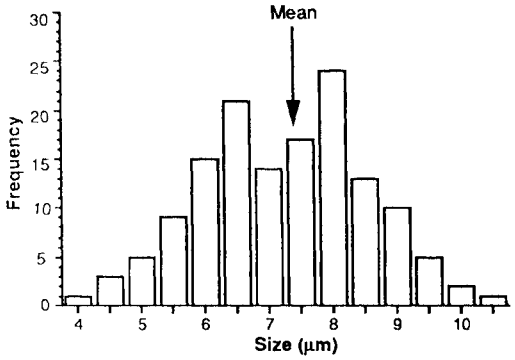

Figure 1. Histogram of size distribution of *Reticulofenestra perplexa*, Sample 265-16-6, 28-29 cm.

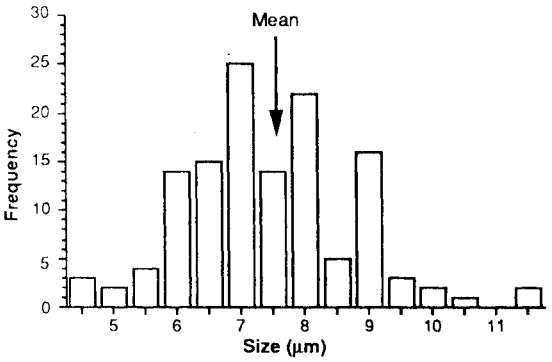

Figure 2. Histogram of size distribution of *Reticulofenestra perplexa*, Sample 265-16-6, 35-36 cm.

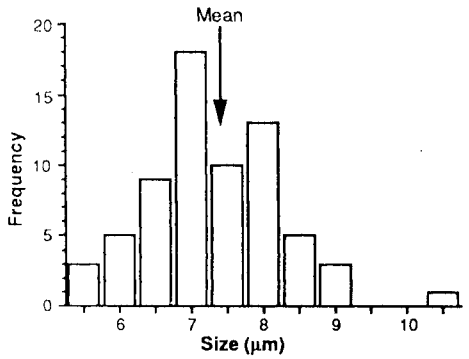

Figure 3. Histogram of size distribution of *Reticulofenestra perplexa*, Sample 329-3-3, 30-32 cm.

REFERENCES

Backman J. 1980: Miocene-Pliocene nannofossils and sedimentation rates in the Hatton-Rockall Basin, NE Atlantic Ocean. *Stockholm Contrib. Geol.*, **16**, 1-91.

Burns D. A. 1975: Distribution, abundance, and preservation of nannofossils in Eocene to Recent Antarctic sediments. *N. Z. J. Geol. Geophys.*, **18**, 583-595.

Driever B. 1988: The size of the coccoliths of *Dictyococcites perplexa* Burns. *Int. Nannoplankton Assoc. Newsl.*, **10**, 89.

Haq B. U. 1976: Coccoliths in cores from the Bellingshausen Abyssal Plain and Antarctic Continental Rise (DSDP Leg 35). *IRDSDP* **35**, 557-568.

Haq B. U. 1980: Biogeographic history of Miocene calcareous nannoplankton and paleoceanography of the Atlantic Ocean. *Micropaleontology,* **26**, 414-443.

Hay W. W., Mohler H. P. & Wade M. E. 1966: Calcareous nannofossil from Nal'chik (northwest Caucasus). *Eclog. Geol. Helv.*, **59**, 379-399.

Heck S. E. van 1981: Bibliography and taxa of calcareous nannoplankton. *Int. Nannoplankton Assoc. Newsl.*, **3**, 4-41.

Perch-Nielsen K. 1985: Cenozoic nannofossils. In Bolli H. M., Saunders J. B. & Perch-Nielsen, K. (eds.), "Plankton Stratigraphy", Cambridge University Press, p.427-554.

Rodriguez-Pindado M. L. & Flores J. A., 1990: Palaeo- ecological interpretation of calcareous nannoflora associations in the Upper Miocene-Pliocene of Site 397 (N.E. Atlantic). *Int. Nannoplankton Assoc. Newsl.*, **12**, 9-10.

Wei W. & Thierstein H. R., in press: Upper Cretaceous and Cenozoic calcareous nannofossils of the Kerguelen Plateau (southern Indian Ocean) and Prydz Bay (East Antarctica). *Proc. ODP Sci. Res.*, **119**.

Wei W. & Wise S. W. Jr., in press: Middle Eocene to Pleistocene calcareous nannofossils recovered by Ocean Drilling Program Leg 113 in the Weddell Sea. *Proc. ODP Sci. Res.*, **113**.

Wei W. & Wise S. W. Jr. in prep: Selected Neogene calcareous nannofossil species of the Southern Ocean: biochronology, biometrics, and paleoceanography. *Proc. ODP Sci. Res.*, **120**.

Wise S.W. Jr. 1983: Mesozoic and Cenozoic calcareous nannofossils recovered by DSDP leg 71 in the Falkland Plateau region, SW Atlantic Ocean. *IRDSDP*, **71/2**, 481-551.

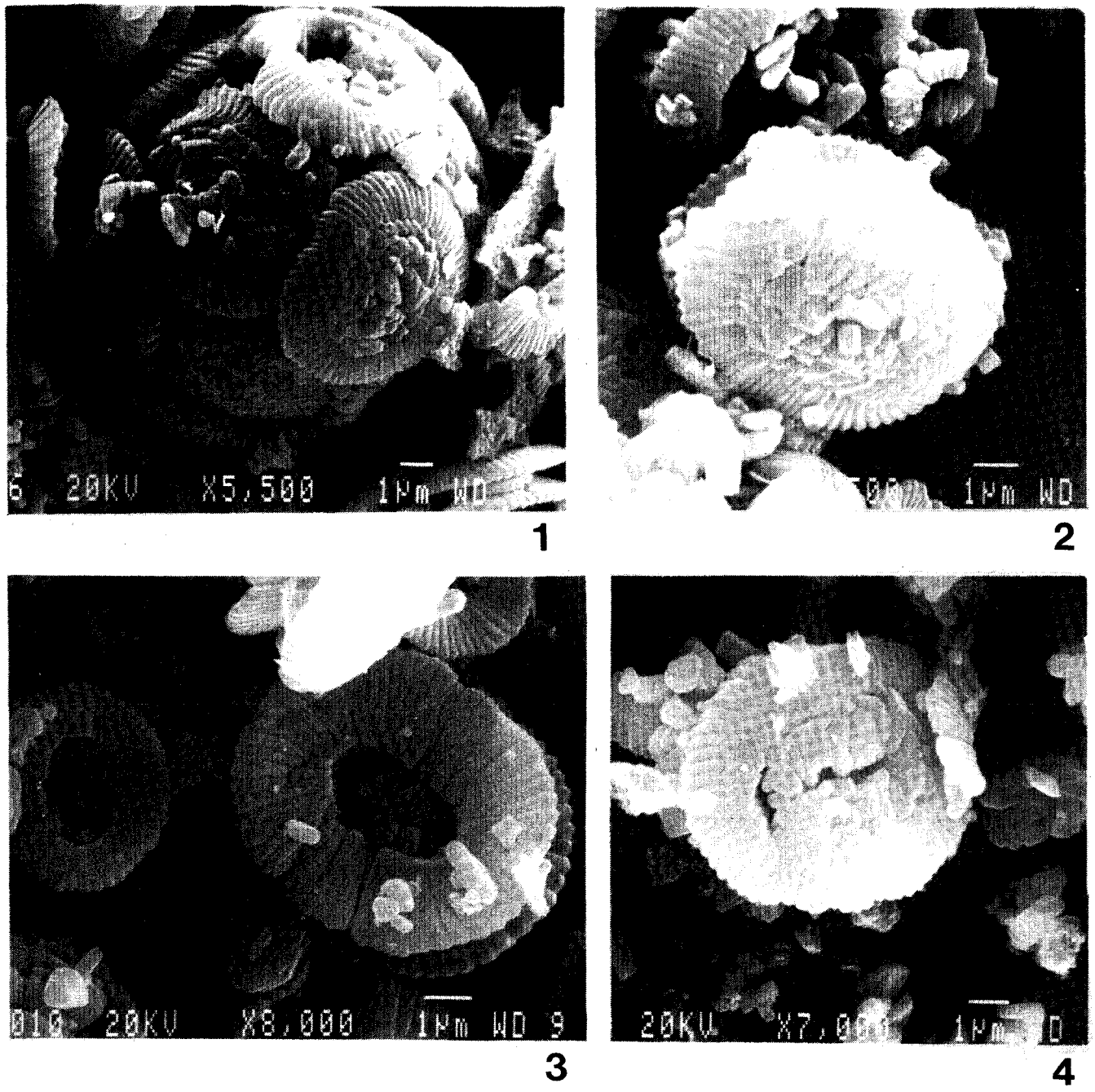

Plate 1. 1-4. *Reticulofenestra perplexa* (Burns) Wise; (1) coccosphere, Sample 265-16-6, 28-29 cm; note that specimen on top has been strongly dissolved which resembles those illustrated in fig. 12 of Burns (1975) where *Reticulofenestra pseudoumbilica* was recorded; (2) distal view, Sample 265-16-6, 28-29 cm; (3) proximal view, Sample 265-16-6, 35-36 cm; note size variation of *R. perplexa* (left specimen, 4.3 µm; right specimen, 7.3 µm); (4) distal view, Sample 265-16-6, 35-36 cm. Magnifications are indicated by numbers and micron bars in the pictures.