Fossil distribution

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4. Fossil distribution

Radiolaria

Throughout the studied sequence radiolaria are generally common to abundant, but preservation varies considerably, confining useful assemblages to softer material (Table 1). Most recognizable radiolaria are present throughout the section, although their occurrence may be sporadic and abundance variable. Samples WIND 21, 23 and 24 contain only poorly preserved taxa. These samples are from near the top of the section where the effects of leaching are strongest. The absence of specific taxa in these samples is interpreted to be a result of post-mortem diagenesis (i.e. dissolution) and not necessarily a reflection of biostratigraphic change.

Spumellariina, and particularly forms with spongy cortical shells, dominate all the assemblages. *Arachnosphaera exilis* (HINDE) outnumbers all other taxa (often more than 50% of the assemblage); other common radiolaria characteristic for the assemblages include *Actinomma* (?) *pleiadesensis* n. sp., *Praeconocaryomma excelsa* n. sp., *Patulibracchium* (?) sp., *Spongodiscus renillaeformis* (CAMPBELL & CLARK), a variety of orbiculiformids and a profusion of unidentified actinommids (Actinommid gen. & sp. indet. being the most common). Both *P. excelsa* and *P.* (?) sp. are present only in the lower samples; *Paronaella* (?) *diastimusphere* n. sp., although rare, is large and easily recognized. Nassellarians are subordinate, comprising less than 20% of the total fauna and dominated by several species of *Windalia* n. gen. among them *Windalia pyrgodes* (RENZ). With the exception of the orbiculiformids and *S. renillaeformis*, all the above radiolaria have been documented only in sediments in the southern hemisphere (see Renz 1974; Haig & Barnbaum 1978; Ling & Lazarus 1990; Baumgartner 1992) or are newly described herein. They are considered to be non-Tethyan and appear to represent endemic elements that developed in the epicontinental basins of Australia and/or the restricted juvenile Antarctic and Indian Oceans that characterized the southern fragmenting portions of Gondwanaland in the early-mid Cretaceous. A variety of early Cretaceous Tethyan taxa are present in the Windalia assemblages, including *Acaeniotyle diaphorogona* FOREMAN, *A. longispina* (SQUINABOL), *Amphipyndax stocki* (CAMPBELL & CLARK), *Angulobracchia crassa* OZVOLDOVA, *Crucella messinae* PESSAGNO, *Histastrum aster* LIPMAN, *Holocryptocanium barbui barbui* DUMITRICA, *Tricolocapsa antiqua* (SQUINABOL) and species of *Archaeospongoprunum, Paranoella, Praeconocaryomma* and *Crucella* suggesting some connection with the low-latitude Tethyan seaway. However, all these forms show only moderate or rare abundance and are not dominant features of the Windalia assemblages.

Ammonites

Ammonites are well represented and diverse at the type section. They occur, almost without exception, as fragmentary or crushed moulds making specific identification difficult. However, generic identification is possible. Specimens collected by the author were identified, with the assistance of Dr Ken McNamara of the Western Australian Museum, as *Tropaeum* SOWERBY, *Australiceras* WHITEHOUSE and *Toxoceratoides* SPATH. Brunnschweiler (1959) reported the presence of *Tropaeum, Paracanthoplites* STOYANOW, *Aconoceras whitehousei* BRUNNSCHWEILER, and *Aconoceras astronisoides* BRUNN-

SCHWEILER. *Eofalciferella condoni* BRUNNSCHWEILER was also newly identified but is considered by Kennedy & Klinger (1979) as nomen dubium; Casey (1961) suggests that *E. condoni* probably belongs in *Sanmartinoceras*. Other specimens of *Aconoceras, Toxoceratoides, Tropaeum* and *Australiceras* have been collected previously by Dr H. M. Butler, Dr McNamara and G. W. Kendrick from exposures of Windalia Radiolarite in the Carnarvon Basin (collections stored at the W. A. Museum). Ammonite and belemnite biostratigraphy is discussed separately below.

Belemnites

Moulds of belemnite guards occur throughout the section and similar sized morphotypes tend to be found concentrated along bedding horizons that can be tracted laterally along the outcrop. Specific identification is difficult. Typically the guards posses undeflected ventrolateral alveolar grooves identifiable with *Peratobelus* WHITEHOUSE of the Dimitobelidae (Whitehouse 1924, Stevens 1965). Latex moulds show many specimens are cylindriconical in outline with slightly depressed transverse sections, similar to *P. oxys* TENISON-WOODS. Based on the shape of other casts, species comparable with *P. australis* PHILLIPS, and others tentatively identified as *Dimitobelus stimulus* DOYLE and *D. diptychus* MCCOY also occur.

Other fossil groups

Foraminifera recovered from the studied samples and listed in the literature are rare and poorly preserved, and are not biostratigraphically useful. Only few siliceous agglutinated specimens of *Ammodiscus* and *Haplophragmoides* were identified. Rare species of diminutive *Hedbergella* spp. have been recorded only from coeval sediments in offshore petroleum wells (Apthorpe 1979). Rare, poorly preserved ostracods and fish teeth have also been recorded during this, and previous studies but provide little biostratigraphically useful information. Samples processed for calcareous nannoplankton and palynology proved to be barren. Evidence for benthonic dwelling calcareous organisms is rare. Only one bivalve impression was noted at a separate locality (Ellis 1987), however, Brunnschweiler (1959), Johnstone et al. (1958), Condon et al. (1956) and Condon (1968) suggest a more common presence of bivalves. Rare sponge spicules include simple (oxy-)hexactines and microscleres (Rhaxella) (Dr Benita Murchey, pers. comm. 1991). Infaunal burrowing organisms appear to have been common during deposition of the Windalia Radiolarite as is evident from a mottling of the rock color and texture. Distinct bioturbate textures include abundant *Chondrites* and lesser *Thalassinoides*. Some bedding planes are covered by a network of shallow winding and straight furrows, apparently trails of some crawling invertebrate.

5. Systematic palaeontology

Genera and species are listed alphabetically. A synonymy is provided for previously recorded species to clarify the taxonomic designation. Complete descriptions are given only for new species; short remarks are provided for indeterminate or atypical forms.