New palaeontological finds from the Tremadocian of Kadriorg, Tallinn, northern Estonia

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In early spring 2003, a huge excavation was blasted into the bedrock just on the edge of the Baltic Klint in the southern bounds of Kadriorg, Tallinn, to prepare the place for the new building of the Art Museum of Estonia. In this temporary outcrop, the succession from the Cambrian sandstones up to the Middle Ordovician limestones was exposed. Fresh Tremadocian rocks, which can rarely be seen in comparable extent, were sampled for mineralogical and micropalaeontological study. The global Tremadocian Stage can be recognised in northern Estonia based on graptolite and conodont biostratigraphy. In the Kadriorg locality, the Tremadocian succession consists of quartz sandstone (upper part of the Kallavere Fm.), argillite and clay (Türisalu Fm. and Varangu Fm.) and glauconitic sandstone (lower part of the Leetse Fm.; see Fig. 1).

Conodonts. The conodont biozonation provides a precise tool for the subdivision and correlation of Lower Ordovician rocks in Baltoscandia (Viira *et al.* 2001). From the Kadriorg section six samples from the Türisalu, Varangu and Leetse formations were analysed and two conodont zones, the *Paltodus deltifer* and *Paroistodus proteus* zones, were distinguished (see Fig. 1). The three lower samples representing the *P. deltifer* Zone contain light-coloured indigenous conodonts. Samples from the lower part of the Leetse Fm., representing *P. proteus* Zone, yield on the other hand numerous reddish-brown redeposited conodonts and only rare light-coloured indigenous ones. The redeposited conodonts show different generations of the "redeposition index" (see Viira *et al.* in this volume). The conodont fauna of the Leetse Fm. is dominated by *Paroistodus*, a mix between *P. numarcuatus* and *P. proteus*. Indigenous *Drepanodus arcuatus* is also rather common. The occurrence of *Juanognathus*? sp. and *Tripodus* sp. allows precise correlation of the studied section with the *P. proteus* level of the Mäekalda section (Viira *et al.* 2001).

Chitinozoans. Early Ordovician chitinozoans are rare and rather poorly known in Baltoscandia, the oldest specimens coming from the Varangu and Leetse formations (Nõlvak 1999 and unpublished data). Most of the samples from the Kadriorg section are barren of chitinozoans. The only productive sample comes from an irregular lens of soft clay within the glauconitic sandstone of the Leetse Fm. (maximum thickness ca 1 cm) and contains an exceptional chitinozoan assemblage. The samples previously studied from other northern Estonian sites contain as a rule few specimens of up to three species. From the Kadriorg sample, however, several thousands of specimens were recovered representing eight different species: *Cyathochitina primitiva* Szaniawski, *Cyathochitina*? *clepsydra* Grahn, *Lagenochitina longiformis* (Obut), *L. esthonica* Eisenack, *Eremochitina* sp. sensu Nõlvak & Grahn 1993, (pl. V, figs C, E), *Rhabdochitina* cf. *gracilis* Eisenack, *Desmochitina* cf. *ornensis* Paris and rare *Velachitina* sp. The occurrence of *Cyathochitia primitiva* marks the *primitiva* Zone. *Desmochitina* cf. *ornensis*, *Velachitina* sp. and *Eremochitina* are well known zonal species from approximately coeval sections of North Gondwana (Paris 1990), indicating close relationships between chitinozoan faunas of Baltica and Gondwana. Interestingly, the newly recovered Estonian forms are somewhat larger that the corresponding specimens from Gondwana. It remains to be tested whether they in fact represent intraspecific variability and whether the size difference may be attributed to, e.g., different palaeoenvironmental settings.

Scolecodonts. Scolecodonts (polychaete jaws) are common microfossils in the Middle and Upper Ordovician rocks of different parts of the world, the Baltic region inclusive (e.g., Hints *et al.* 2004). Although the group is present already in the topmost Cambrian, the Lower Ordovician record of scolecodonts is remarkably poor. In the Baltic area, the oldest scolecodonts were recorded from the upper Volkhov Stage (lower Middle Ordovician) and the attempts to find material from Lower Ordovician strata have so far been unsuccessful.

The study of samples from the new section at Kadriorg revealed scolecodonts at different stratigraphical levels beginning from the basal portion of the Türisalu argillite (Tremadocian, Pakerort Stage).