

Book Review

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Símonarson, L.A., Petersen, K.S. & Funder, S. 1998: Molluscan palaeontology of the Pliocene-Pleistocene Kap København Formation, North Greenland. Meddelelser om Grønland, Geoscience 36, 104 pp. ISBN 87-90369-27-0.

Molluscs and the formation of the Arctic

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In a world concerned with climatic change, the small annual to decadal variations are often emphasized, without putting them into the context of the huge climatic revolutions of the past. One of these revolutions is without doubt the transition from the warmer, but climatically deteriorating Pliocene, to the Pleistocene, the so-called era of the "ice ages". During this time, the globe experienced large environmental changes, and the development of the well-known modern day Arctic took place.

This time of transition has been addressed by a series of publications from the investigations at Kap København in Peary Land, North Greenland. From the start of the field studies almost 20 years ago, the scientific community has enjoyed reports of the amazing Kap København Formation, assumed to date from the transition between the Pliocene and the Pleistocene, i.e. around 2.45 Ma. The investigations have been carried out utilizing a variety of stratigraphic (Funder et al. 1984, Funder et al. 1985) and palaeoenvironmental tools, such as foraminifera (Feyling-Hanssen 1990), plant macrofossils (Bennike 1990) and insect remains (Bøcher 1995). This series of monographs addressing the biostratigraphic aspects of the Kap København Formation is now concluded by the current study of the molluscan palaeontology.

Starting out, I was a bit worried that this issue of Meddelelser om Grønland represented a highly specialised palaeontological study, aiming at an audience whose expertise in this area exceeded my own. It soon became evident that the issue encompasses much more than the palaeontological documentation and discussion. This monograph not only reviews the field observations, studied sites and stratigraphies, but it also takes the reader through a synthesis of the biostratigraphic evidence and a discussion of the age of the deposits.

The *Introduction* and the chapter on *Stratigraphy and mollusc fauna collections* review the setting of Kap København, the previously published results, and the composite lithostratigraphy of the area. Together with a comprehensive review of all studied sites (*Description of localities*), the authors provide us with an insight into the primary observations and the complexity of the bits and pieces of the composite stratigraphy. The chapters on *Age* and *Amino acid correlation* serve to bring us into the circumarctic setting, and introduce the problem of correlation. The geochronologic tools, such as amino acid racemization, prove insufficient for determining the exact age of the formation. The age estimate of 2.45 Ma (the boundary between the "cold" Member A and the "warm" Member B) relies on biostratigraphic correlations to arctic North American sites, and estimates of the first and last appearance datums for different species. The line of reasoning is well presented, and the reader may see clearly how sensitive these age estimates are to the quality of data beyond the study at Kap København.

The chapter on *Palaeontology* gives a detailed account of the individual species identified in the sedimentary successions, discusses their identification and taxonomy, and reviews both recent distributions and fossil occurrences. The latter two discussions represent important contributions, not only to the interpretation of the Kap København fossil faunas, but also to the use of mol luscs in the reconstruction of past climates at many sites in the North Atlantic and circumarctic region. The chapter is well illustrated with photographic documentation of the samples and maps of modern distributions. However, the reproduction quality of these photos is not as good as might be expected for such important documentation.

The discussion of the assemblages in the chapter on *The mollusc fauna in the Kap København formation and correlatives* leads to a discussion of possible correlation to other sites around the North Atlantic and the Arctic Ocean. Even if the purpose is the correlation of the Kap København succession, we are presented with a review of a series of important sites of Pliocene/Pleistocene age. The discussion of *Deep Sea records* outlines possible correlation with the oxygen isotope stratigraphy.

What is the contribution of the Kap København fauna to our understanding of the development of the Arctic? This topic is addressed in the chapter on *The origin of the arctic-high arctic shallow water mollusc fauna*. Based on the age estimates, the authors suggest that the extant fauna at Kap København started to adapt to shallow waters when the arctic shelves first were transgressed during cold climatic conditions immediately prior to formation of the oldest Kap København sediments.

In conclusion, my worries were unjustified. Símonarson, Petersen and Funder have delivered much more than a specialised monograph on molluscs. I have no reservations in recommending to anyone interested in the major climatic revolutions of the modern Earth this well-written account of events at the Pliocene/Pleistocene transition in the Arctic.

References

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