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REPORT ON THE CONSULTANT GROUP
ON CALCAREOUS NANNOPLANKTON,
KIEL, September 5-7, 1974

by

Denise NOËL and Katharina PERCH-NIELSEN

The consultant group on calcareous nannoplankton was open to all workers in this field wishing to attend. Topics discussed included a review of the recommendations made by the "Round table on calcareous nannoplankton" in Rome (1970), methods of study, species concepts, evolutionary trends, diagenetical effects and nannofacies, stratigraphical correlations from the Jurassic to the Cenozoic including also probabilistic stratigraphy, biogeographic and ecological aspects of recent and fossil coccolith communities, the need for a "Coccolith Committee" and the formulation of recommendations for future work.

The purpose of the meeting was twofold. While it should present an opportunity to discuss different problems and to formulate approaches it should, by presenting "the state of the art", also serve as a seminar for colleagues who have recently joined this field.

The discussion of the above mentioned topics was requested by a number of colleagues who had answered a questionnaire about what should be discussed at the meeting. From the same questionnaire a list of addresses and a table of "Who does what and where" (geographical area and stratigraphical interval) were compiled for the almost 100 out of 130 workers approached.

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1. *Recommendations made by the "Round Table on Calcareous nannoplankton" in Rome*

See Recommendations (9).

2. *Methods of study :*

Besides the already widely known preparation methods currently in use, a new and easy technique to observe the same specimen under light (LM) and scanning electronmicroscope (SEM) was presented by S. MOSHKOVITZ ¹

The method was demonstrated at the meeting.

3. *Species concepts :*

The topic about species concepts was approached from a biologist and a palaeontologist's point of view. For the palaeontologist the morphological species concept still seems to be the only applicable one despite the recent contributions and progress made by biologists.

Our knowledge about the biology of coccolithophorids and related forms, specially their life cycles and their ability of forming coccoliths, is still very limited. Although this influences the species concept of the living forms, it is of no immediate consequence for coccolith stratigraphy, since only the coccoliths are preserved and dimorphous or polymorphous coccospheres leave parallel ranges.

Calcareous nannofossils include coccolithophorids *s. str.* (coccoliths on, or likely to have been covering a cell) and many other minute calcareous bodies (nannoliths or fasciculiths, sphenoliths and discoasters) of unknown origin. In relation to this it was drawn to the attention of the palaeontologists by R. NORRIS, that some dinoflagellates and/or other phytoplankton groups form comparable calcareous bodies.

¹ Paper published in the *Israel J. earth Science*.

4. *Evolutionary lineages* :

Obviously the best way of biostratigraphical subdivision is the application of an evolutionary lineage. Only few evolutionary studies have been published so far (*Chiasmolithus*, *Helicopontosphaera*, *Sphenolithus*). The following new lineages of morphological groups from the Cretaceous were proposed by G. LAUER (*Arkhangelskiellaceae*)¹ and W. SISSINGH² (*Micula*) and discussed by the group. These two examples illustrate the utility of such studies for high resolution stratigraphy.

5a. *Dissolution and diagenesis of coccolith assemblages* :

Clearly this topic is in fashion for the moment. There were several talks at this symposium already which have dealt with it and where the micropalaeontologist became a sedimentologist or the other way round. Certainly and hopefully we will be more careful in describing new species and in evaluating assemblages in the future. We have long known that the coccoliths found in the sediments represent only a fraction of what was present in the photic zone but rarely were aware just how bad it was.

5b. *Nannofacies* :

Besides the study of nannofossils in smear slides, their examination *in situ* was stressed. This so called nannofacies study can provide interesting data: 1) from a petrographical point of view to find out environment of deposition by the observation of all constituents of a sediment in their mutual arrangement and their relative importance in the rock composition. For example in samples of DSDP (leg 1) smear slides show only a few *Nannoconus* whereas rock surfaces show that they are in fact abundant. 2) From a stratigraphical point of view study of nannofacies can be useful for hard limestones.

6. *Stratigraphic correlations* :

There seemed very little interest to discuss correlations between the quite well established nannoplankton zonations in the Tertiary. This is only partly true for the Cretaceous where zonation is still less reliable and for the Jurassic where zonation is only attempted yet. Here it was stressed that more precise information should be given about the age of a studied sample (means of dating).

In view of the "probabilistic stratigraphy" now practised and the fact that the DSDP volumes informations on nannofossils are used as base, it was discussed that it would be better to have a more uniform input in the computer than the one currently produced by shipboard nannofossil persons. For this purpose, a list of

¹ Paper published here, in addendum.

² Paper published in the *Proceed. of the Royal Academy of Amsterdam*.

Cretaceous taxa, one for Paleogene and one for Neogene forms were discussed. A list of Jurassic species was started. The presence or absence of these species should always be noted. The forms chosen—the number being limited by the possible input in the computer—should provide the possibility of a detailed zonation and furnish paleobiogeographical information. It was stressed that also “background noise”, long-ranging species be noted, since they are the only ones present in high latitudes.

7a. Ecological aspects of coccolith communities :

In the discussion of ecological aspects of modern coccolithophores it was established that the distribution of coccolithophores seems most clearly limited by temperature. Composition and diversity of assemblages also are influenced primarily by temperature, although other criteria cannot be ruled out principally because of a lack of adequate data.

7b. Paleobiogeography :

Studies in paleobiogeography were found to be fraught with several problems. Foremost among these are the difficulty of ascertaining polymorphism among fossil forms, and bias introduced into the sedimentary record by prolific versus sparse coccolith producers. Other important considerations enumerated are difficulties resulting from a non-uniform taxonomy (including variable quality of published data), imprecise stratigraphy for the level under consideration, and the effects of post depositional processes.

8. Coccolith committee :

Clearly the CC appointed at the Round table on calcareous nannoplankton in Rome 1970 has not functioned the way it was intended. However the CC was active in organizing the consulting group meeting for the III Planktonic Conference; in preparing a new address list of coccolith workers and a new inventory of who does what and where (which both will be distributed to workers who replied to the questionnaire).

The continuation of a CC could not be justified because most persons attending did not feel free to undertake additional time consuming tasks. Therefore a secretary was elected (Dr. S. GARTNER, RSMAS, 4600 Rickenbacker Causeway, Miami, Florida 33149, U.S.A.). He can be contacted if needed, particularly to arrange a new coccolith meeting.

9. Recommendations of the Consultant group on Calcareous Nannoplankton :

1. The recommendations regarding the description of new taxa made at the II Planktonic Conference in Rome are strongly reemphasized. Whenever

feasible, however, holotypes described by SEM should be preserved, now that methods to do so are available.

2. We recommend that researchers carefully consider and further investigate the effects of dissolution and diagenesis in their work. In doing so they are also urged to clearly state their criteria.

3. The few existing studies on paleobiogeography and evolutionary trends are very useful. We strongly recommend that more attention be given to these fields.

4. We recommend that in future the shipboard nannofossil paleontologists for DSDP/IPOD etc., prepare a checklist (range charts) of at least all species on the included lists for every drill site. Information about frequency of the species and preservation of the assemblage being noted also.

5. We recommend that DSDP material studied prior to the inception of the above scheme and in which checklists are lacking, be restudied. Such restudy should be encouraged in order to extract from existing samples all possible paleobiologic and paleoceanographic information that could be obtained within the framework of the present state of the art.

6. We strongly recommend that more complete information about the age assignment (fossil group, etc.) of a sample studied for coccoliths from land-sections, be given.

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This list and the inventory of "who does what and where" below have been compiled by D. NOËL from the replies to the questionnaire sent to all the known nanoplankton workers. They were displayed during the conference in Kiel to be rectified and improved.

COUNTRY	RECENT	QUATERNARY	TERTIARY		CRETACEOUS		JURASSIC		ANTE-JURASSIC
			UPPER	LOWER	UPPER	LOWER	UPPER	LOWER	
ASIA (cont.)	Nishida	Nishida Okada Smith, L.	Narasimhan	Narasimhan	Narasimhan	Narasimhan			
			Prins	Perch-Nielsen Prins	Perch-Nielsen Prins		Prins	Prins	
			Singh Smith, L.	Singh	Singh	Singh	Singh	Singh	Sayar
EUROPE	Boalch	Borsetti Cati Cepek	Baldi-Beke Barbieri	Baldi-Beke Barbieri	Acheriteguy Baldi-Beke Barbieri	Acheriteguy Baldi-Beke Barbieri	Baldi-Beke Barnard	Baldi-Beke Barnard	
			Borsetti	Benič	Benghezal Benič	Benghezal	Burns	Burns	
			Borsetti	Borsetti	Burns	Burns	Cepek Cooper Deres	Cepek Cooper Deres	Cooper Deres
EUROPE	Gayral	Fonseca Gartner	Fonseca	Farinacci Fonseca	Downs Farinacci	Downs Farinacci	Farinacci	Farinacci	
			Gartner	Gartner	Forchheimer Fortuin	Forchheimer Fortuin	Farinacci	Farinacci	

COUNTRY	RECENT	QUATERNARY	TERTIARY		CRETACEOUS		JURASSIC		ANTE-JURASSIC
			UPPER	LOWER	UPPER	LOWER	UPPER	LOWER	
EUROPE (<i>cont.</i>)		Smith, L.	Smith, L. Steinmetz Stradner	Smith, L. Steinmetz Stradner Stuijvenberg	Smith, L. Stradner Thierstein Verbeek Verdenius	Smith, L. Stradner Thierstein Verdenius Wilcoxon Worsley	Smith, L. Stradner Thierstein Verdenius Wilcoxon Worsley	Smith, L.	
OCEANIA		Edwards Smith, L.	Deres Edwards Lipps Smith, L. Wilcoxon	Deres Edwards	Edwards				
AUSTRALIA	Hekel	Hekel	Hekel	Hekel	Deres	Deres			
			Poore Shafik	Poore Shafik Smith, L.	Perch-Nielsen Shafik Smith, L. Thierstein	Noël Thierstein			
ANTARCTIC OCEAN	Boalch Burns	Burns Edwards	Burns Edwards	Burns Edwards Haq	Burns	Burns	Burns	Burns	Burns

	<p>Gaarder Gayral Honjo Jerkovič Lefort Martini</p>	<p>Clocchiatti Haq Le Blanc Martini Moshkovitz Müller Ushakova</p>	<p>Deres Fonseca Gartner Haq Jerkovič Le Blanc Martini Poore Steinmetz Stradner Ushakova</p>	<p>Deres Fonseca Gartner Le Blanc Martini Poore Steinmetz</p>	<p>Deres Le Blanc Le Blanc Le Blanc</p>
<p>PACIFIC OCEAN</p>	<p>Burns Honjo McIntyre Martini</p>	<p>Burns Edwards Ellis Gartner Haq Hay Hekel Lipps McIntyre Martini Melgen</p>	<p>Barbieri Burns Dmitrienko Edwards Elliott Ellis Gartner Haq Hay Hekel Lipps Martini Melgen</p>	<p>Burns Edwards Gartner Haq Hekel Martini</p>	<p>Burns Edwards Gartner Hekel Martini</p>

COUNTRY	RECENT	QUATERNARY	TERTIARY		CRETACEOUS		JURASSIC		ANTE-JURASSIC
			UPPER	LOWER	UPPER	LOWER	UPPER	LOWER	
PACIFIC OCEAN (<i>cont.</i>)	Nishida Okada	Müller Nishida Okada	Narasimhan Nishida	Narasimhan	Narasimhan Narasimhan				
		Roth Shafik	Poore Roth Shafik	Poore Roth Shafik Shumenko Steinmetz Ushakova Warren Wilcoxon	Roth Shafik	Roth Shafik			
	Ushakova	Ushakova Wilcoxon Worsley			Warren	Warren			
OTHER OCEANS	Boudreaux	Gartner Hoganson	Gartner Hoganson	Gartner Hoganson	Gartner Hoganson	Gartner Hoganson			
	Honjo Jerkovič Kling		Jerkovič						
	Martini Mikkelsen	Martini	Lleleva	Lleleva	Lleleva	Lleleva			
	Okada	Müller Okada Smith, Ch.	Smith, Ch. Warren Wilcoxon	Warren	Warren	Warren			
		Wilcoxon							